

Health Science

Career Field Technical Content Standards Document

with
Academic Content Standards in
English Language Arts, Mathematics, Science and Social Studies

September 2007

 **Ohio** | Board of Regents
Department of Education


OhioCollegeTechPrep
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FOREWORD

The *Health Science Career Field Technical Content Standards* are the curricular framework for career-technical education programs in Health Science. This document reflects the career field framework outlined in Ohio Administrative Code 3301-61-03 (Criteria for Secondary Workforce Development Programs).

This document represents a collaborative effort of the following professional partners: the Ohio Department of Education's Office of Career-Technical and Adult Education, the Ohio Board of Regents, the College Tech Prep Curriculum Service Center and the College of Health Science and Human Service at the University of Toledo and the Ohio Resource Center at The Ohio State University. Secondary and postsecondary educators, along with business professionals, also participated in the development of the technical content standards.

The *Health Science Career Field Technical Content Standards* combine business standards (reflecting English language arts, mathematics, science and technology), academic content standards (English language arts, mathematics, science and social studies) and the business process framework to develop technical literacy in health sciences. The health science career field includes occupations that focus on evaluating and testing to identify the presence or absence of illness or injury affecting the health status of individuals over time; careers supporting the environment that affects the health status of individuals; and careers that involve the use of health care data as well as therapeutic and medical device research. The health science career field is comprised of four pathways leading to technically-based careers in:

- Clinical Health Care Services;
- Health Information Management Services;
- Support Services; and
- Bioscience Research and Development.

This document delineates competencies that outline the knowledge and skills needed for career success in the above four pathways. It includes a) core competencies that span the Health Science Career Field addressing critical workplace skills, including technical skills, academic foundation and career exploration, communication, business process, legal and ethical responsibilities, health and safety; and b) pathway and specialization competencies that describe specific career knowledge and skills.

In addition, benchmarks from the Ohio *English Language Arts Academic Content Standards*, the *Mathematics Academic Content Standards*, *Science Academic Content Standards* and the *Social Studies Academic Content Standards* have been embedded, outlining the English language arts, mathematics, science and social studies knowledge and skills associated with specific technical competencies.

The Health Science document seeks to provide the basis for educational programming that will foster the development of what Doug Bush, vice president and chief information officer, Intel Corporation, refers to as the "T-shaped" employee. The T-shaped employee combines broad knowledge, insight and understanding of business processes, academic attainment and workplace readiness (the crossbar of the "T") with depth of knowledge and expertise in a career specialty (the post of the "T"). The T-shaped employee is needed to ensure that Ohio's Health Science workforce of tomorrow is competitive in a global environment that requires specialized skills in a broader context aimed at the innovation of new products and services in an ever-changing economy.

This document forms the basis for the development of an integrated delivery system that provides opportunities for new and challenging programs and courses. It is hoped that the document will enhance and expand College Tech Prep, career-technical education and postsecondary degree programs in Health Science and related fields.

The document is available on the Internet at <http://www.techprepohio.org> and through the Ohio Department of Education Web at www.education.ohio.gov, keyword search: *career field initiative*.

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Finally, the people listed below contributed significant research, subject matter, writing, editing and facilitation expertise to the development of the *Health Science Career Field Technical Content Standards* document.

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DEVELOPMENT OF HEALTH SCIENCE CAREER FIELD TECHNICAL CONTENT STANDARDS

The process for the development of the *Health Science Career Field Technical Content Standards* began in August 2006 with the convening of a Futuring Panel and culminated in May 2007 with the work of a panel of business representatives and educators focusing on academic correlation. Over the course of 2006-2007, numerous business representatives as well as secondary and postsecondary educators from across the state of Ohio took part in the formal development process. The following summarizes the various stages of the development process.

Futuring Panel

August 28, 2006

The Health Science Futuring Panel convened 14 key health professionals from across the state to advise the Ohio Department of Education and the Ohio Board of Regents on future trends impacting the Health Science Career Field and to suggest ways in which those trends could be incorporated into a *Health Science Career Field Technical Content Standards* document.

Business Review Panels

October 23, 2006

A diverse group of Ohio health care business and industry representatives participated on these panels. Drawn from various sectors and regions of the state, the panels identified what health science employees should know and be able to do in four health science career pathways: clinical health care services, health information management services, support services, Bioscience research and development, and 10 career specialties. The panels built upon work outlined by the Futuring Panel identifying essential and recommended knowledge and skills.

Educator Review Panels

December 4, 2006

These panels were composed of representatives from secondary and postsecondary institutions across Ohio. The panels determined *when* in the educational process (e.g., high school or college) competencies should be addressed and to *what depth*. In addition, the educator panels were asked to note questions they had on decisions made by the business review panel and formulated suggestions for additions, deletions, and editorial changes to the draft document.

Stakeholder Review Panel

January 29, 2007

Representatives from the business review and education review panels addressed issues educators raised in the December 4, 2006, meeting. Suggestions for additions, deletions and editorial changes were reviewed to ensure that the document provided a cohesive and deliverable set of competencies for health science professionals at both secondary and postsecondary exit points. The stakeholder review provided a forum to ensure that the final document facilitates the seamless education of students interested in pursuing a career in Health Science.

Academic Review Panel

May 9 and 10, 2007

The academic review panel brought together business representatives and secondary and postsecondary technical educators with academic educators to identify benchmarks from the *Ohio Academic Content Standards for English Language Arts, Mathematics, Science and Social Studies* that are embedded within the technical competencies. This incorporation of academic content standards with career field technical content standards provides an opportunity for instructional integration of content, helping to contextualize learning for students and providing the basis for collaboration across disciplines.

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Philosophy and Principles for Implementation

Ohio Career Field Initiative

The overarching framework for Ohio career-technical education is outlined in the Ohio Revised Code and subsequent administrative rules which specify career-technical programming based on 16 career fields. To view the full text of Administrative Rule 3301-61-03 (Criteria for Secondary Workforce Development Programs), go to: www.education.ohio.gov and keyword search *CTAE Administrative Rules*. This document provides the framework for an Ohio career field initiative that seeks to foster the educational shift needed to respond to the needs of a rapidly changing global environment.

A career field is a “grouping of occupations and/or broad industries based on commonalities” (see www.careerclusters.org). A career field provides the basis for developing both broad and specialized technical content standards that serve as a framework for curriculum, instruction, assessment and program design that addresses the needs of an entire industry and/or business sector. Ohio’s 16 career fields parallel national efforts to broaden career-technical education, and integrate it with academic study to respond to current and future workforce needs. For today’s students to meet these challenges they must have an education that:

- **incorporates a broad, long-term conception of work in combination with the depth of specialization skills;**
Employees need a comprehensive understanding beyond a single occupational area. Occupationally focused programming needs to be provided in a larger context, so students can generalize learning, make connections between education and work, and adapt to changes in their careers. Workplace knowledge and skills are needed to prepare employees for collaborating and problem solving while contributing to the broader business process.
- **emphasizes the acquisition of strong academic knowledge and skills;**
Academic skills provide the foundation for career success. The integration of academic content standards with career field technical content standards helps to contextualize learning for students, making English language arts, mathematics, science and social studies relevant to students as a means to an important end—success at work and in life.
- **facilitates high-school-to-postsecondary transitions.**
A lifetime of change means a lifetime of learning, including postsecondary education. Students need knowledge and skills for success in a variety of postsecondary options, including apprenticeships, industry credentialing through adult education, two- and four-year college degree programs and graduate school.

Ohio Career Field Technical Content Standards

Career field technical content standards outline the knowledge and skills needed for success within a career field, multiple pathways and in some cases, areas of specialization. Validated by Ohio business and industry representatives in conjunction with Ohio educators, these standards form the basis for developing educational programming in Ohio secondary and postsecondary schools. The standards also serve as the framework for developing strong career pathways that connect secondary, adult and postsecondary education systems with the workplace.

While mirroring the diverse nature of each career field, all career field technical content standards documents will delineate competencies that outline the knowledge and skills that span the career field (core competencies), as well as those that relate to specific career field pathways (pathway competencies) and, in some cases, career field specialization (specialization competencies).

Additionally, academic benchmarks from Ohio's academic content standards for English language arts, mathematics, science and social studies are correlated with the career field technical content standards. The embedded benchmarks have been determined by business representatives and academic and technical educators from secondary and postsecondary institutions to be strongly related to specific knowledge and skills statements or competencies for the given career field.

Key features of *Ohio Career Field Technical Content Standards* include:

- broad as well as specialized technical competencies;
- embedded benchmarks for the English language arts, mathematics, science and social studies academic content standards; and
- workplace readiness competencies (communications; safety, health and environment; problem solving and critical thinking; leadership, management and teamwork; information technology applications; ethics and legal responsibility; business processes; and career development and employability).

Career Pathways

A key component of the Ohio Career Field Initiative is a career pathway, which is a series of academic and technical career-focused course work and other learning experiences leading to a career specialty and employment in a career field. Pathways facilitate a seamless transition from high school to postsecondary education (including apprenticeships, adult education, two- and four-year colleges and graduate school) and from postsecondary education to the workplace.

To effectively facilitate the transition from secondary to postsecondary education and a career, high school career pathways should encompass:

- challenging technical course work in a chosen career field based on career field technical content standards;
- rigorous academics that meet Ohio’s academic content standards and grade-level expectations;
- electives that relate to career objectives;
- instructional enhancements such as experiential and authentic learning opportunities (e.g. work-based learning, mentorships, internships) and career-technical student organization participation;
- opportunities (when appropriate) for program accreditation and student certification and licensure;
- preparation for transition to further study that includes college readiness and opportunities to earn college credit while in high school;
- preparation for transition to employment with advancement opportunities; and
- performance targets that include high school academic and technical testing/exit and postsecondary entry/placement requirements

For additional information on the Career Field Initiative, including *Ohio Career Field Technical Content Standards* and Career Pathways, go to www.education.ohio.gov and keyword search: *career field*

STRUCTURE AND FORMAT

The *Health Science Career Field Technical Content Standards* document is composed of a series of units, competencies and descriptors:

- *Units* are a grouping of competencies sharing a common subject or theme;
- *Competencies* are specific knowledge and skill statements that outline the knowledge and skills needed for career success; and
- *Descriptors* follow each competency and serve to define what is meant by the related competency.

Also included in the document are selected benchmarks from the Ohio's Academic Content Standards for English language arts, mathematics, science and social studies, which correlate with specific technical competencies. Incorporating academic content standards with career field technical content standards provides an opportunity for instructional integration of content, helping to contextualize learning for students and providing the basis for collaboration across disciplines.

In addition, industry-driven, authentic assessments based on the career-technical student organization, SkillsUSA, are linked to various competencies and are included in the appendix. This demonstrates the co-curricular nature of the career-technical student organization and provides an opportunity for authentic assessment of a student's knowledge and skills at the local, regional, state and national levels. The SkillsUSA links are noted at the beginning of the appropriate units (see sample competency page xxix). Complete information on the assessments, including scoring rubrics, can be obtained at www.ohioskillsUSA.org.

Competencies that are common across pathways and their career fields and/or are critical for success in the health science career field are referred to as core competencies. These core competencies represent the sustaining characteristics of a career field and facilitate career readiness and long-term career success by:

- providing the basis for effective collaboration, teamwork and communication across pathways;
- laying the groundwork for successful transfer of knowledge and skills across pathways, thereby facilitating horizontal and vertical career success; and
- equipping students and workers with the skills needed to transition to new and emerging careers throughout a working lifetime.

In the Health Science document, core competencies include those focusing on:

- Career Exploration, Development and Employability Traits;
- Business Processes;
- Communication;
- Legal and Ethical Responsibilities; and
- Health and Safety Practices.

Pathway competencies are specific to one or several pathways within a larger career field. They differentiate the academic, technical and workplace knowledge and skills that are more specific than those that are relevant to the entire career field, yet they prepare students for multiple occupational specialties. The *Health Science Career Field Technical Content Standards* are built around four career pathways and 10 specialization areas indicated below.

- Clinical Health Care Services:
 - Phlebotomist Specialization;
 - Practical Nurse Specialization;
 - Medical Assistant Specialization;
 - Massage Therapist Specialization;

- Nurse Assistant Specialization;
 - Dental Assistant Specialization;
 - Pharmacy Technician Specialization;
 - Surgical Technician Specialization;
 - Emergency Medical Service Specialization; and
 - Exercise Science/Sports and Recreational Health care Specialization.
- Health Information Management Services
 - Support Services
 - Bioscience Research and Development

Specialization competencies are specific to occupational areas within the larger career pathway and career field.

Core, pathway, and specialization competencies form the basis for developing secondary and postsecondary programs, facilitating transition from one educational level to the next and to the workplace.

In the *Health Science Career Field Technical Content Standards*, business and health care representatives have designated competencies as *essential* or *recommended* within the pathway. Educators have designated *when* (by the end of the 12th grade and/or associate degree) and *to what depth* (introduced, reinforced, proficient) competencies should be addressed. Definitions used to make these designations appear on the following page, followed by a sample competency illustrating the layout of an actual competency.

DEFINITIONS AND CODES

Determined by Business, Industry and Labor (BIL) Panel

Essential (E) Competency:

E = Competency is needed to ensure minimal level of employability. Entry-level employees (defined as graduates of an associate degree or apprenticeship program) should be able to perform this competency for career success.

Recommended (R) Competency:

R = Competency should be included but is not essential for minimal level of employability or is related only to a subspecialty within a pathway.

Determined by Educator (EDU) Panel

Grade Level:

- 12** = by the end of grade 12
AD = by the end of the associate degree program

Depth:

- I** = Introduce competency
R = Reinforce, or add depth after introducing a competency, **OR** after proficiency
P = Proficient or achievement of the competency; ability to apply knowledge of and/or perform the competency

Determined by Academic Review Panel

Correlated English Language Arts Academic Content Benchmarks

Benchmarks drawn from the *Ohio Academic Content Standards for English Language Arts* that have been determined to be embedded in corresponding technical competency

Correlated Mathematics Academic Content Benchmarks

Benchmarks drawn from the *Ohio Academic Content Standards for Mathematics* that have been determined to be embedded in the corresponding technical competency

Correlated Science Academic Content Benchmarks

Benchmarks drawn from the *Ohio Academic Content Standards for Science* that have been determined to be embedded in the corresponding technical competency

Correlated Social Studies Academic Content Benchmarks

Benchmarks drawn from the *Ohio Academic Content Standards for Social Studies* that have been determined to be embedded in the corresponding technical competency

Sample Competency

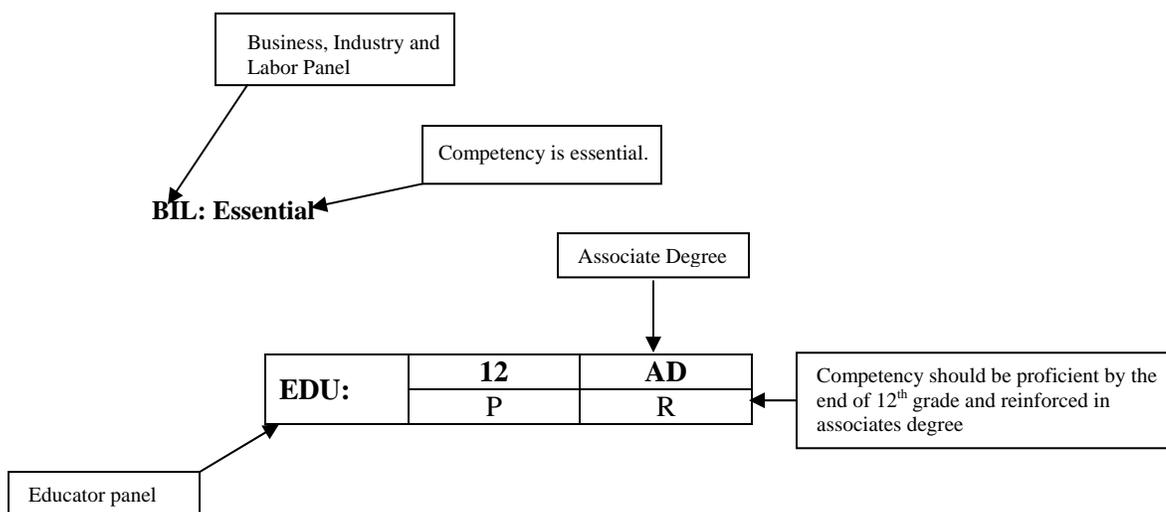
Unit 3: Communications

Industry-Driven Authentic Assessment: SkillsUSA (in appendix)

Prepared Speech—Evaluates each student’s ability to prepare and present clearly and effectively a series of thoughts relating to a central theme.

Extemporaneous Speaking—Evaluates each student’s ability to give a speech on an assigned topic with a minimum of advanced notice.

Job Interview—Evaluates students’ written, verbal and non-verbal skills in employment procedures when applying for a position.



Competency 3.6:

Apply active listening skills to obtain and clarify information provided in oral communications.

Unit number

Descriptors:

- 3.6.1 Identify and apply active listening techniques one to one and in team or group meetings.
- 3.6.2 Paraphrase and repeat information to confirm understanding.
- 3.6.3 Record and summarize information in written notes.
- 3.6.4 Ask questions to seek or confirm understanding.

Competency number

Descriptor number

Correlated English Language Arts Academic Content Benchmarks

- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)

Benchmarks from the English Language Arts Content Standards

Health Science Pathway Definitions

Clinical Health Care Services Pathway

Careers in this pathway apply to occupations or functions primarily involved in changing the health status of a patient over time. The pathway also includes careers involved in the performance of tests or evaluations to identify the presence or absence of illness or injury that creates a picture of the health status of a patient at a single point in time.

Sample careers include, but are not limited to:

Athletic trainer;
Cardiovascular technologist;
Dental assistant;
Exercise physiologist;
Licensed practical nurse;
Massage therapist;
Medical assistant;
Paramedic;
Phlebotomist; and
Speech language pathologist.

Health Information Management Services Pathway

This pathway includes careers involved in the use and management of health care data and information. These standards apply to occupations or functions that document patient care. Professionals in this pathway will provide information accurately and within regulatory guidelines.

Sample careers include, but are not limited to:

Certified compliance technician;
Clinical coder;
Information privacy officer;
Pharmacy manager;
Social worker; and
Utilization review manager.

Support Services Pathway

This pathway includes careers that involve supporting the environment that affects the health status of individuals over time. Careers in this pathway apply to occupations or functions primarily involve in direct or indirect patient care that create a therapeutic environment for providing that care.

Sample careers include, but are not limited to:

Bioscience/Clinical engineer;
Facilities manager;
Industrial hygienist; and
Transport technician.

Bioscience Research and Development Pathway

This pathway includes careers involved in therapeutic and medical device research and development. These individuals are primarily involved in biotechnology research and development that applies to human health.

Sample careers include, but are not limited to:

Biochemist;

Biostatistician;

Clinical pharmacologist;

Geneticist;

Lab technician;

Processing technician;

Quality assurance technician; and

Toxicologist.

Health Science Units

Page	Unit#	Unit
1		HEALTH SCIENCE CORE BODY OF KNOWLEDGE
2	1	Career Exploration, Development and Employability Traits
8	2	Business Processes
16	3	Communication
23	4	Legal and Ethical Responsibilities
28	5	Health and Safety Practices
34		CLINICAL HEALTH CARE SERVICES PATHWAY
35	6	Clinical Health Care Services Core Competencies
41	7	Phlebotomist Specialization
43	8	Practical Nurse Specialization
47	9	Medical Assistant Specialization
51	10	Massage Therapist Specialization
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61	12	Dental Assistant Specialization
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79	15	Emergency Medical Service (EMS) Specializations - EMS Organizations
83	16	EMS Specialization: Patient Assessment
85	17	EMS Specialization: Airway and Ventilation
87	18	EMS Specialization: Cardiology
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94	20	EMS Specialization: Trauma
99	21	EMS Specialization: Pediatrics
101	22	EMS Specialization: Obstetrics and Gynecology
103	23	EMS Specialization: Geriatrics
105		Exercise Science: Sports and Recreational Health Care Specialization
105	24	Exercise Science: Sports & Recreational Health Care Orientation

Page	Unit#	Unit
107	25	Exercise Science: Functional Anatomy and Exercise Science
110	26	Exercise Science: Health Appraisal and Fitness Testing
114	27	Exercise Science: Exercise Programming
116	28	Exercise Science: Nutrition and Weight Management
118	29	Exercise Science: Injury Recognition and Prevention
124	30	Exercise Science: Rehabilitation and Treatment
127	31	Exercise Science: Education and Counseling
129		Health Information Management (HIM) Services Pathway
130	32	Health Information Management (HIM) Services
138		Support Services Pathway
139	33	Support Services
146		Bioscience Research and Development Pathway
147	34	Demonstrate Scientific Method
148	35	Conducting Experiments
150	36	Laboratory Safety and Maintenance
154	37	Instrument Analysis
160	38	Chemical Materials Handling and Sampling
162	39	Physical Properties Measurement
164	40	Biohazard Storage, Handling and Disposal
166	41	Basic Microbiology
169	42	Biochemical Technology
176	43	Molecular Biology Technology
181	44	Cell Culturing
185	45	Protein Bioseparation Methods
190	46	Fermentation Technology
191	47	Microbiology for Biotechnology
193	48	Bioethics

Page	Unit#	Unit
195	49	Introduction to Biotechnology Industry
197	50	Technical Writing and Documentation

2007 Health Science Competency Chart

At the end of the secondary program (12) and associate degree (AD) each competency is coded:
I = Introductory; P = Proficient; R = Reinforce. In addition, the business, industry, and labor partnership (BIL) validated each competency: BIL: E = Essential; R = Recommended

Competency	12	AD	BIL
Health Science Core Body of Knowledge			
Unit 1: Career Exploration, Development and Employability Traits			
1.1 Explore health science careers.	P	R	E
1.2 Explore the academic foundation for health science careers.	P	R	E
1.3 Explain the responsibilities of a health care provider.	I	P	E
1.4 Complete required training, education, certification and professional development to keep abreast of relevant resources and current information.	I	P	E
1.5 Recognize the characteristics of team and team leadership.	I	R	R
1.6 Demonstrate positive work behaviors and personal qualities.	I	P	E
1.7 Demonstrate sensitivity to cultural values.	I	P	E
1.8 Employ problem solving and critical thinking.	I	P	E
1.9 Demonstrate common problem-solving skills used in health science.	I	P	E
Unit 2: Business Processes			
2.1 Analyze the business structure of health science career fields.	I	R	R
2.2 Explain the impact of economic, social and technological changes on the health science/health care services.	I	R	R
2.3 Explain how planning and budgeting are used to accomplish organizational goals and objectives.	I	P	E
2.4 Demonstrate internal and external patient service techniques.	I	P	E
2.5 Design a business plan.	I	P	R
2.6 Explain basic procedures in the accounting cycle.	I	R	R
2.7 Explain the measures used by health organizations to manage and improve performance.		P	E
2.8 Demonstrate effective use of technology.	P	R	E
2.9 Demonstrate facility operational protocols.	P	R	E
Unit 3: Communication			
3.1 Apply effective verbal and nonverbal communication skills.	P	R	E
3.2 Utilize available communication technology.	P	R	E
3.3 Interact with patient/client.	I	P	E
3.4 Convey essential patient/client information to appropriate team members.	I	P	E
3.5 Summarize Health Insurance Portability and Accountability Act (HIPAA).	I	P	E
3.6 Utilize basic medical terminology.	I	P	E
3.7 Locate, organize and reference written health science information from various sources.	P	R	E

Competency		12	AD	BIL
3.8	Write and utilize coherent and focused technical communications that support a defined perspective for health science careers.	P	R	E
3.9	Deliver formal and informal presentations that demonstrate organization and delivery skill.	P	R	E
3.10	Apply active listening skills to obtain and clarify information.	P	R	E
3.11	Interact in a professional manner.	P	R	E
Unit 4: Legal and Ethical Responsibilities				
4.1	Differentiate between legal and ethical issues/obligations.	P	R	E
4.2	Comply with organizational policies and government regulations.	P	R	E
4.3	Complete work-related duties within an ethical framework.	I	P	E
4.4	Assess the implications of ethical/unethical behavior.	I	P	E
4.5	Demonstrate competent care consistent with the requirements and limitations of the professions.	I	P	E
4.6	Practice procedures consistent with legal and ethical behavior.	I	P	E
4.7	Maintain standards of confidentiality and ethical practice.	I	P	E
4.8	Describe employee and employer liability.	I	P	E
Unit 5: Health and Safety Practices				
5.1	Demonstrate safe professional practices that contribute to the creation of a hazard-free environment.	P	R	E
5.2	Maintain general safety in accordance with government regulations, health standards, company policies and practices.	P	R	E
5.3	Discuss strategies to protect employees from occupation-related injuries.	P	R	E
5.4	Apply the principles of proper body mechanics and ergonomics.	P	R	E
5.5	Identify state, federal and local worker safety, health and environmental regulations.	I	P	E
5.6	Demonstrate practices that contribute to a healthy work environment.	P	R	E
5.7	Complete and apply operation and safety training on pertinent equipment.	P	R	E
5.8	Identify practices that contribute to a healthy environment.	P	R	E
5.9	Examine emergency preparedness response plans.	P	R	E
5.10	Complete requirements for CPR and First Aid.	P	R	E
5.11	Respond to medical emergencies.	I	P	E
Clinical Health Care Services Pathway				
Unit 6: Clinical Health Care Services Core Competencies				
6.1	Collect and distribute essential information to appropriate team members.	P	R	E
6.2	Process procedural requests.	P	R	E
6.3	Prepare the supplies, equipment and patient for procedures, according to facility protocol.	P	R	E
6.4	Perform procedures to create precise and accurate diagnostic data.	I	P	E
6.5	Evaluate procedures and results.	I	P	E

Competency		12	AD	BIL
6.6	Produce and report results using appropriate communication channels.	P	R	E
6.7	Demonstrate general knowledge of the human body.	P	R	E
6.8	Record a health history and/or basic information.	P	R	E
6.9	Explain the unique needs of each population across the lifespan.	I	P	E
6.10	Assess clients/patients' vital signs and other indicators of health status, within the scope of practice.	P	R	E
6.11	Utilize appropriate methods of data collection and documentation.	P	R	E
6.12	Contribute to the development of a plan of care.	I	P	E
6.13	Implement procedures accurately in support of the plan of care, within the scope of practice or role.	P	R	E
Unit 7: Phlebotomist Specialization				
7.1	Identify the phlebotomist's role as a member of a health care team.	P	R	E
7.2	Demonstrate specimen collection and specimen integrity in the delivery of patient care.	P	R	E
7.3	Identify blood collection supplies/equipment.	P	R	E
7.4	Perform venipuncture and draw blood.	P	R	E
Unit 8: Practical Nurse Specialization				
8.1	Define the practical nurse profession.	P	R	E
8.2	Protect clients and health care personnel from health and environmental hazards.	P	R	E
8.3	Obtain and record subjective and objective client data across the lifespan.	P	R	E
8.4	Recognize and take action on findings.	P	R	E
8.5	Participate in providing care for clients across the lifespan, within the scope of practice.	P	R	E
8.6	Demonstrate safe medication administration, within the scope of practice.	P	R	E
8.7	Participate in and utilize the nursing process.	P	R	E
Unit 9: Medical Assistant Specialization				
9.1	Define the role of a medical assistant.	P	R	E
9.2	Demonstrate medication administration.	I	P	E
9.3	Perform data collection measurements.	P	R	E
9.4	Recognize and take action on findings.	I	P	E
9.5	Assist with and/or perform procedures according to industry standards.	I	P	E
9.6	Perform laboratory procedures.	I	P	E
9.7	Demonstrate office procedures.	I	P	E
9.8	Perform a 12-lead electro-cardiogram (EKG) for interpretation	I	R	R
Unit 10: Massage Therapist Specialization				
10.1	Explain the theory and principles of massage therapy.	I	P	E
10.2	Analyze the skeletal and bone tissue areas of the body anatomy.	P	R	E
10.3	Analyze the articulation areas of the body.	I	P	E
10.4	Analyze muscle tissue and the muscular system.	I	P	E
10.5	Analyze nerve tissue and the nervous system.	I	P	E
10.6	Analyze the sensory, motor and integrative system.	I	P	E

Competency		12	AD	BIL
10.7	Analyze the endocrine system.	I	P	E
10.8	Analyze the circulator system.	I	P	E
10.9	Analyze the lymphatic, respiratory, digestive, urinary and reproductive systems.	I	P	E
10.10	Discuss massage manipulations and techniques.	I	P	E
10.11	Explain the legal and ethical issues related to massage therapy.	P	R	E
10.12	Explain the documentation required for massage therapy services.	I	P	E
10.13	Discuss the art of communications between hands and the mind.	P	R	E
10.14	Demonstrate massage manipulations and techniques.		P	E
Unit 11: Nurse Assistant Specialization				
11.1	Define the nurse assistant role.	P	R	E
11.2	Demonstrate performance of basic personal care.	P	R	E
11.3	Perform tasks as delegated by the nurse.	P	R	E
11.4	Explain the effects of the aging process.	P	R	E
11.5	Comply with personal safety and hygiene regulations.	P	R	E
11.6	Comply with client's rights, within the scope of practice.	P	R	E
Unit 12: Dental Assistant Specialization				
12.1	Explore the dental assistant profession.	P	R	E
12.2	Explain ethics and jurisprudence as it applies to dentistry.	P	R	E
12.3	Explain oral health and nutritional factors as they relate to dentistry.	P	R	E
12.4	Describe basic anatomical structures of the head and neck as utilized in the dental assistant profession.	I	P	E
12.5	Describe structure and function of teeth.	P	R	E
12.6	Explain dental charting and its importance in dentistry.	P	R	E
12.7	Explain the importance and procedures of infection control in a dental office.	P	R	E
12.8	Describe the proper steps necessary for preparation of patient care.	P	R	E
12.9	Describe the management of hazardous materials in the dental office.	P	R	E
12.10	Explain pharmacology and its use in dental procedures.	I	P	E
12.11	Explain potential emergencies in the dental office.	P	R	E
12.12	Explain radiology procedures in dental practices.	I	P	E
12.13	Explain basic dental office and dental assisting operations and procedures.	P	R	E
12.14	Explain various instruments used in dentistry.	P	R	E
12.15	Explain proper management of pain and anxiety of the dental patient.	I	P	E
12.16	Demonstrate dental laboratory procedures.	P	R	E
12.17	Examine various dental restorative materials.	P	R	E
12.18	Explore various specialty procedures in dentistry.	P	R	E
12.19	Comply with personal safety and hygiene regulations.	P	R	E
Unit 13: Pharmacy Technician Specialization				
13.1	Define the pharmacy technician profession and practice.	P	R	E
13.2	Use appropriate pharmaceutical terminology.	P	R	E

Competency		12	AD	BIL
13.3	Explain the general concepts of pharmacology.	P	R	E
13.4	Identify medication routes and formulations.	P	R	E
13.5	Demonstrate the prescription filling process.	P	R	E
13.6	Perform calculations and conversions required in pharmacy practice.	I	P	E
13.7	Explain various drug information.	P	R	E
13.8	Explain the use and side effects of prescription medications, nonprescription medications and alternative therapies.	I	P	E
13.9	Participate in the pharmacy department's process for preventing medication errors.	P	R	E
13.10	Assist with collecting, organizing and evaluating information for direct patient care.	I	P	E
Unit 14: Surgical Technician Specialization				
14.1	Define the surgical technician's role.	P	R	E
14.2	Demonstrate patient care concepts.	P	R	E
14.3	Demonstrate the principles of asepsis application.	P	R	E
14.4	Demonstrate basic surgical care preparation skills.	P	R	E
14.5	Demonstrate the scrub person's duties.	P	R	E
14.6	Demonstrate the circulator duties.	P	R	E
Unit 15: EMS Specialization				
15.1	Examine emergency medical service organizations.	P	R	E
15.2	Demonstrate the basic concepts of incident management.	P	R	E
15.3	Demonstrate essential communication skills and equipment utilization.	P	R	E
15.4	Provide for the safety of self, patient and fellow workers.	P	R	E
15.5	Analyze an incident to determine the magnitude of the situation.	P	R	E
15.6	Demonstrate rescue and extraction techniques.	I	P	E
15.7	Demonstrate safe handling and transport of patients.	P	R	E
Unit 16: EMS Specialization: Patient Assessment				
16.1	Explain patient assessment and initial management procedures, within the scope of practice.	P	R	E
16.2	Demonstrate patient assessment and initial management procedures, within the scope of practice.	P	R	E
Unit 17: EMS Specialization: Airway and Ventilation				
17.1	Analyze airway management and ventilation procedures, within the scope of practice.	P	R	E
17.2	Perform techniques to manage an airway and ventilate a patient, within the scope of practice.	P	R	E
17.3	Assess and manage respiratory emergencies, within the scope of practice.	P	R	E
Unit 18: EMS Specialization: Cardiology				
18.1	Assess and manage the cardiovascular system, within the scope of practice.	P	R	E
18.2	Assess and manage cardiac arrest emergencies, within the scope of practice.	P	R	E
18.3	Monitor cardiovascular activity in response to care, within the scope of practice.	P	R	E

Competency		12	AD	BIL
Unit 19: EMS Specialization: Medical Emergencies				
19.1	Assess and manage a patient with special needs.	P	R	E
19.2	Assess and manage a patient with signs and symptoms of infectious and communicable diseases.	P	R	E
19.3	Assess and manage a patient with signs and symptoms of an endocrine emergency, within the scope of practice.	P	R	E
19.4	Assess and manage a patient with signs and symptoms of digestive, genitourinary and reproductive emergencies, within the scope of practice.	P	R	E
19.5	Assess and manage a patient with signs and symptoms of an allergic reaction or anaphylaxis, within the scope of practice.	P	R	E
19.6	Assess and manage a patient with signs and symptoms of an environmentally-induced emergency, within the scope of practice.	P	R	E
19.7	Assess and manage a patient with signs and symptoms of toxic exposure or poisoning, within the scope of practice.	P	R	E
19.8	Assess and manage a patient with signs and symptoms of a diabetic emergency, within the scope of practice.	P	R	E
19.9	Assess and manage a patient with a behavioral emergency.	P	R	E
19.10	Assess and manage a variety of medical emergencies, within the scope of practice.	P	R	E
Unit 20: EMS Specialization: Trauma				
20.1	Assess a trauma patient using physical examination techniques.	P	R	E
20.2	Assess and manage a patient who is bleeding, within the scope of practice.	P	R	E
20.3	Evaluate and manage a patient with hemorrhage or shock, within the scope of practice.	P	R	E
20.4	Demonstrate the rapid trauma assessment used to assess a patient based on the mechanism of injury, within the scope of practice.	P	R	E
20.5	Demonstrate a clinical assessment to determine the proper management mobility for a patient with suspected spinal injury.	P	R	E
20.6	Demonstrate techniques for managing thoracic injuries, within the scope of practice.	P	R	E
20.7	Demonstrate a clinical assessment to determine the proper plan for a patient with suspected abdominal trauma, within the scope of practice.	P	R	E
20.8	Demonstrate a clinical assessment to determine the proper plan for a patient with musculoskeletal trauma, within the scope of practice.	P	R	E
20.9	Demonstrate a clinical assessment to determine the proper plan for a patient with head trauma, within the scope of practice.	P	R	E
20.10	Demonstrate a clinical assessment to determine the proper plan for a patient with thermal trauma, within the scope of practice.	P	R	E
Unit 21: EMS Specialization: Pediatrics				
21.1	Analyze techniques for successful assessment and treatment of infants and children, within the scope of practice.	P	R	E
21.2	Assess and manage patient care for infants and children, within the scope of practice.	P	R	E

Competency		12	AD	BIL
21.3	Demonstrate a clinical assessment to determine the proper plan for a pediatric trauma patient, within the scope of practice.	P	R	E
Unit 22: EMS Specialization: Obstetrics and Gynecology				
22.1	Explain the assessment, care and management of an obstetric patient, within the scope of practice.	P	R	E
22.2	Demonstrate how to provide care for a patient with excessive vaginal bleeding, abdominal pain, hypertensive crisis and sexual assault.	P	R	E
22.3	Demonstrate how to assist the obstetric patient in the delivery of a baby, within the scope of practice.	P	R	E
22.4	Demonstrate post-delivery care of the mother and newborn, within the scope of practice.	P	R	E
Unit 23: EMS Specialization: Geriatrics				
23.1	Discuss special factors associated with geriatric patients, within the scope of practice.	P	R	E
23.2	Analyze risk factors associated with geriatric patients, within the scope of practice.	I	P	E
23.3	Explain assessment and management of geriatric patients, within the scope of practice.	P	R	E
Exercise Science/Sports and Recreational Health Care Specialization				
Unit 24: Exercise Science/Sports and Recreational Health Care Orientation				
24.1	Identify exercise science and sports health career options.	P	R	E
24.2	Assess the role of technology in the sports health care and exercise science industry.	I	P	E
24.3	Demonstrate principles of facility management and operation.	I	P	E
Unit 25: Exercise Science: Functional Anatomy and Exercise Science				
25.1	Describe basic anatomical structures.	I	P	E
25.2	Locate musculoskeletal landmarks of the human body.	I	P	E
25.3	Examine the principles and concepts of human movement.	I	P	E
25.4	Define the components of physical fitness.	P	R	E
25.5	Describe the physiological responses to static and dynamic exercise.	P	R	E
25.6	Utilize common techniques to enhance neuromuscular flexibility.	P	R	E
25.7	Demonstrate training techniques to enhance muscle strength, endurance and flexibility.	I	P	E
Unit 26: Exercise Science: Health Appraisal and Fitness Testing				
26.1	Administer a health history appraisal form.	I	P	E
26.2	Examine testing data.	I	P	E
26.3	Describe the testing environment.	P	R	E
26.4	Demonstrate testing procedures and equipment calibration.	I	P	E
26.5	Describe the selection of exercise test protocols.	P	R	E
26.6	Measure and record vital signs.	P	R	E
26.7	Conduct a fitness assessment.	I	P	E
26.8	Interpret a fitness assessment.	I	P	E

Competency		12	AD	BIL
Unit 27: Exercise Science: Exercise Programming				
27.1	Construct components of exercise programming.	I	P	E
27.2	Demonstrate the principles of exercise programming.	I	P	E
27.3	Demonstrate the ability to recognize proper technique with exercise.	I	P	E
27.4	Describe aquatic exercise regimen.	I	P	E
27.5	Design various exercise programs.	I	P	R
Unit 28: Exercise Science: Nutrition and Weight Management				
28.1	Describe the functions of the nutrients in the body.	P	R	E
28.2	Evaluate the concepts of weight management.	I	P	E
28.3	Identify medically related nutrition issues.	P	R	E
28.4	Explain the United States Department of Agriculture (USDA) nutritional guidelines.	I	P	E
Unit 29: Exercise Science: Injury Recognition and Prevention				
29.1	Discuss risk factors and causes of injury.	P	R	E
29.2	Describe components of a pre-participation physical examination.	I	P	E
29.3	Identify and define environmental hazards.	P	R	E
29.4	Describe recommendations to avoid environmental hazards.	P	R	E
29.5	Monitor participants and environmental conditions.	P	R	E
29.6	Administer clinical joint measurement techniques.	I	P	E
29.7	Select and apply appropriate ambulatory aids.	P	R	E
29.8	Apply protective taping, wrapping, padding and protective equipment.	I	P	E
29.9	Perform history and observation techniques.	P	R	E
29.10	Identify common injuries to each body part.	I	P	E
29.11	Administer manual muscle testing techniques.	I	P	E
29.12	Administer clinical exams for bone and soft tissues.	I	P	E
29.13	Administer sensory and motor neurological tests.	I	P	E
29.14	Describe the characteristic pathology of selected injuries.	I	P	E
29.15	Identify physical activity concerns and modifications for specific medical conditions.	I	P	E
Unit 30: Exercise Science: Rehabilitation and Treatment				
30.1	Explain how the body reacts to injury.	P	R	E
30.2	Describe general physiological effects of inactivity and immobilization.	P	R	E
30.3	Discuss typical psychological and emotional responses to trauma and forced physical inactivity affecting the rehabilitation process.	I	P	E
30.4	Apply basic components of a comprehensive rehabilitation program.	I	P	E
30.5	Apply physical parameters to be evaluated for the development of individualized rehabilitation programs.	I	P	E
30.6	Demonstrate contemporary therapeutic modalities.	I	P	E
30.7	Prepare contemporary immobilization devices.	I	R	R
Unit 31: Exercise Science: Education and Counseling				
31.1	Describe the physiological effects, comparative benefits and contraindications of ergogenic aids.	I	P	E

Competency		12	AD	BIL
31.2	Describe techniques and methods of disseminating injury prevention and health care information.	I	P	E
31.3	Apply psychological principles associated with health behavior changes.	I	P	E
31.4	Describe psychological factors that may affect exercise.	I	P	E
Health Information Management Services Pathway				
Unit 32: Health Information Management (HIM) Services				
32.1	Discuss the field of health information management as it applies to health care.	I	P	R
32.2	Identify and apply health data structure, content and standards.	I	P	E
32.3	Utilize health information and communication technologies.	I	P	E
32.4	Apply data security.	I	P	E
32.5	Participate in implementation of health care information systems.	I	P	E
32.6	Apply health care information requirements and standards.	I	P	E
32.7	Utilize clinical classification systems.	I	P	E
32.8	Control access and release of health care information.	I	P	E
32.9	Apply reimbursement methodologies.	I	P	E
32.10	Prepare health care statistics.	I	P	E
32.11	Analyze data for quality management and performance improvement.	I	P	E
32.12	Integrate information for various health care delivery systems.	I	P	E
Support Services Pathway				
Unit 33: Support Services				
33.1	Assess basic operating procedures of support services careers within their roles.	P	R	E
33.2	Assess and maintain materials for quality management.	I	P	E
33.3	Comply with regulations related to support services.	P	R	E
33.4	Evaluate how risk management can apply to support service functions.	I	P	E
33.5	Analyze sanitation and infection control procedures required in support services careers.	P	R	E
33.6	Analyze practices that contribute to a safe work environment.	P	R	E
33.7	Demonstrate handling and storage of materials.	P	R	E
33.8	Analyze the business structure of supply and service management.	I	R	R
33.9	Explain staffing needs and productivity.	I	R	R
33.10	Collect and distribute essential patient information to appropriate team members.	P	R	E
33.11	Demonstrate or explain customer-centered model of care.	I	P	E
33.12	Determine role in emergency preparedness plan.	P	R	E
Bioscience Research and Development Pathway				
Unit 34: Demonstrate Scientific Method				
34.1	Define scientific research methods.	P	R	E
34.2	Develop a research plan.	P	R	E
Unit 35: Conducting Experiments				
35.1	Perform routine laboratory support work.	I	P	E
35.2	Conduct experiments.	I	P	E

Competency		12	AD	BIL
35.3	Record and report experimental results.	P	R	E
Unit 36: Laboratory Safety and Maintenance				
36.1	Explain the impact of federal, state, local and company regulations and policies on safety, health and environmental concerns of the community, worker and consumer.	P	R	E
36.2	Demonstrate personal safety procedures.	P	R	E
36.3	Identify general workplace safety hazards.	P	R	E
36.4	Handle laboratory equipment safely.	I	P	E
36.5	Handle chemicals and safety equipment appropriately.	I	P	E
36.6	Describe laboratory safety and biohazard issues.	P	R	E
Unit 37: Instrument Analysis				
37.1	Demonstrate proficiency in the use of pipeting devices, microwave, scales and pH meters.	P	R	E
37.2	Apply principles of filtration.	I	P	E
37.3	Perform sedimentation and separation of biological materials using centrifuges.	I	P	E
37.4	Demonstrate proficiency in the use of common types of microscopes (e.g., light microscope, phase contrast microscope).	P	R	E
37.5	Demonstrate proficiency in the use of an ultraviolet-visible (UV/visible) spectrophotometer, and construct standard curves.	I	P	E
37.6	Explain the use of thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC).	I	P	E
37.7	Apply basic concepts of spectroscopic analytical methods.	I	P	E
37.8	Apply principles of and typical instrumentation in high-performance liquid chromatography (HPLC).	I	P	E
37.9	Calibrate equipment accurately.	I	P	E
37.10	Maintain laboratory instrumentation.	I	P	E
Unit 38: Chemical Materials Handling and Sampling				
38.1	Explain principles and characteristics of chemical materials.	P	R	E
38.2	Use both common and chemical nomenclature for inorganic and organic materials.	P	R	E
Unit 39: Physical Properties Measurement				
39.1	Apply basic concepts of measurement.	I	P	E
39.2	Characterize physical properties of gases, liquids and solids.	P	R	E
Unit 40: Biohazard Storage, Handling and Disposal				
40.1	Handle infectious agents safely.	I	P	E
40.2	Explain safe disposal of infectious waste.	P	R	E
40.3	Describe methods used to measure and detect radiation.	I	P	E
Unit 41: Basic Microbiology				
41.1	Apply microbiological principles and procedures.	I	P	E
41.2	Explain immunological procedures.	I	P	E
41.3	Perform common microbiology procedures.	I	P	E
41.4	Contrast prokaryotic and eukaryotic cells.	P	R	E
41.5	Explain microbial growth.	I	P	E
Unit 42: Biochemical Technology				
42.1	Prepare common laboratory reagents.	P	R	E
42.2	Demonstrate basic, one-step chemical laboratory skills.	P	R	E

Competency		12	AD	BIL
42.3	Demonstrate combinations of chemical laboratory skills.	P	R	E
42.4	Describe the following chemical lab equipment and instruments.	I	P	E
42.5	Perform critical laboratory calculations and measurements.	P	R	E
42.6	Perform sample analysis.	I	P	E
42.7	Describe molecular behavior of amino acids and peptides.	I	P	E
42.8	Explain protein properties.	I	P	E
42.9	Perform enzyme assays.	I	P	E
42.10	Perform biochemical assays of nucleotides and nucleic acids.	I	P	E
42.11	Explain the relationship between deoxyribonucleic acid (DNA), ribonucleic acid (RNA) and protein.	P	R	E
42.12	Describe deoxyribonucleic acid (DNA) replication.	I	P	E
42.13	Describe biochemical assays of carbohydrates.	I	P	E
42.14	Describe biochemical assays of lipids.	I	P	E
42.15	Describe membrane fractionation.	I	P	E
Unit 43: Molecular Biology Technology				
43.1	Explain genetics and heredity.	P	R	E
43.2	Describe historical developments leading to modern recombinant deoxyribonucleic acid (DNA) technology.	I	P	E
43.3	Apply basic concept of recombinant deoxyribonucleic acid (DNA) technology.	I	P	E
43.4	Isolate and characterize deoxyribonucleic acid (DNA).	I	P	E
43.5	Clone deoxyribonucleic acid (DNA).	I	P	E
43.6	Perform advanced techniques in recombinant deoxyribonucleic acid (DNA) technology.	I	R	R
43.7	Relate molecular biology technology to our lives.	I	P	E
Unit 44: Cell Culturing				
44.1	Describe the history of cell culture.	I	P	E
44.2	Describe equipment needs for a tissue culture lab.	I	P	E
44.3	Describe aseptic technique.	P	R	E
44.4	Explain factors that influence cell growth during incubation.	I	P	E
44.5	Prepare media for culturing cells.	I	P	E
44.6	Maintain and passage aseptically cultured cells.	I	P	E
44.7	Explain methods for analysis of cultured cells.	I	P	E
44.8	Describe basic antibody-mediated immunity.	I	P	E
44.9	Describe the use of animals in research.	I	P	E
Unit 45: Protein Bioseparation Methods				
45.1	Explain basic chromatographic theory.	I	P	E
45.2	Interpret chromatographic results.	I	P	E
45.3	Prepare and run various types of chromatography separation.	I	P	E
45.4	Evaluate results of various types of chromatography separation.	I	P	E
45.5	Perform proper maintenance and operation techniques to high-performance liquid chromatography (HPLC) system.	I	P	E
45.6	Run and evaluate sample on high-performance liquid chromatography (HPLC) system and interpret results.	I	P	E
45.7	Identify and explain physical and chemical properties of proteins.	I	P	E
45.8	Desalt protein and change buffer.	I	P	E

Competency	12	AD	BIL
45.9 Perform ion exchange chromatography.	I	P	E
45.10 Perform electrophoresis of protein samples.	I	P	E
45.11 Perform affinity purification.	I	P	E
Unit 46: Fermentation Technology			
46.1 Assess various fermentation and bioprocessing applications and the effects of fermentation operations on cell growth kinetics.	I	P	E
46.2 Validate principles and importance of sterility in industrial fermentations.	I	P	E
Unit 47: Microbiology for Biotechnology			
47.1 Describe the general structure of viruses.	P	R	E
47.2 Explain how chemical energy operates major cell processes (e.g., biosynthesis, movement, transport, growth).	P	R	E
47.3 Describe active and passive transport.	P	R	E
Unit 48: Bioethics			
48.1 Explain the basic principles of ethics.	P	R	E
48.2 Apply principles of ethics to scientific problems.	P	R	E
48.3 Discuss regulations.	I	P	E
Unit 49: Introduction to Biotechnology Industry			
49.1 Analyze the impact of the biotechnology industry.	P	R	E
49.2 Classify applications of biotechnology by major industrial uses.	P	R	E
Unit 50: Technical Writing and Documentation			
50.1 Evaluate technical writing requirements.	I	P	E
50.2 Write technical reports.	I	P	E
50.3 Conduct technical research.	I	P	E
50.4 Design technical documentation.	I	P	E
50.5 Develop technical documentation.	I	P	E

**HEALTH SCIENCE
CORE BODY OF KNOWLEDGE**

Unit 1: Career Exploration, Development and Employability Traits

BIL: Essential

EDU:	12	AD
	P	R

Competency 1.1: Explore health science careers.

Descriptors:

- 1.1.1 Describe current and future trends and issues of various careers in health science.
- 1.1.2 Describe the scope of practice of various careers in health science.
- 1.1.3 Research projected growth of various health science careers.
- 1.1.4 Describe ways of gaining entry and access to the health science careers.
- 1.1.5 Examine personal motivation for seeking a career in health science.
- 1.1.6 Explore professional development and career advancement opportunities.
- 1.1.7 Identify academic requirements for health science credentials.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Formulate open-ended research questions suitable for investigation and adjust questions as necessary while research is conducted.* (Research A, 8-10)
- *Formulate open-ended research questions suitable for inquiry and investigation and adjust questions as necessary while research is conducted.* (Research A, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources.* (Research C, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Use historical interpretations to explain current issues* (History B, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 1.2: Explore the academic foundation for health science careers.

Descriptors:

- 1.2.1 Describe health science career pathways and their educational requirements.
- 1.2.2 Identify academic courses necessary for a career in health science (e.g., science, English language arts, math).

Correlated English Language Arts Academic Content Benchmarks

- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 1.3: Explain the responsibilities of a health care provider.

Descriptors:

- 1.3.1 Describe critical thinking and problem solving skills.
- 1.3.2 Describe positive work behaviors and personal qualities.
- 1.3.3 Explain the impact an individual’s past/present behavior can have on a career in health science.
- 1.3.4 Identify the roles and responsibilities of individuals working as part of a health care team.
- 1.3.5 Recognize the patient and family as key members of the health care team.
- 1.3.6 Identify the qualifications for licensure/certifications for health science careers.

Correlated English Language Arts Academic Content Benchmark

- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 1.4: Complete required training, education, certification and professional development to keep abreast of relevant resources and current information.

Descriptors:

- 1.4.1 Establish goals that address training, education and self-development.
- 1.4.2 Participate in career-related in-service training and/or degree programs or continuing education.
- 1.4.3 Establish methods to stay current with changes in the field.
- 1.4.4 Recognize ethical conflicts related to assessment practices (e.g., labeling, confidentiality).

Correlated Social Studies Academic Content Benchmarks

- *Evaluate, take and defend positions about issues concerning the alignment of the characteristics of American democracy with realities in the United States today.* (Government A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Recommended

EDU:	12	AD
	I	R

Competency 1.5: Recognize the characteristics of team and team leadership.

Descriptors:

- 1.5.1 Recognize the importance of teamwork and its impact on health science.
- 1.5.2 Explain the roles and responsibilities of the individual as part of the team.
- 1.5.3 Describe the interpersonal skills that contribute to leadership and teamwork (e.g., empathy, listening, respect, unconditional positive regard).
- 1.5.4 Discuss the importance of relating to the culture and climate of an organization.
- 1.5.5 Assist fellow team members to develop their careers within health science.

Correlated Social Studies Academic Content Benchmark

- *Analyze how issues may be viewed differently by various cultural groups. (People in Societies A, 11-12)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 1.6: Demonstrate positive work behaviors and personal qualities.

Descriptors:

- 1.6.1 Define professionalism.
- 1.6.2 Demonstrate professionalism, self-discipline, positive attitude and integrity in the work environment.
- 1.6.3 Conform to the health care facility's organizational policies, handbook and manuals (e.g., attendance, dress, punctuality).
- 1.6.4 Identify the roles and responsibilities of the individual as part of the health care team (e.g., dependability, integrity).
- 1.6.5 Exhibit professionalism when handling patient records (e.g., Health Insurance Portability and Accountability Act, [HIPAA]).
- 1.6.6 Recognize one's own limitations.
- 1.6.7 Explain how individuals impact the public perception of an organization (e.g., customer service).
- 1.6.8 Explain the importance of flexibility and willingness to adapt to changes as technology changes.
- 1.6.9 Engage in continuous self-assessment and goals modification for personal and professional growth.
- 1.6.10 Demonstrate the ability to seek and apply for employment.

Correlated English Language Arts Academic Content Benchmarks

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)
- *Produce letters (e.g., business, letters to the editor, job applications) that follow the conventional style appropriate to the text, include appropriate details and exclude extraneous details and inconsistencies.* (Writing Applications C, 8-10)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)
- *Work in groups to analyze an issue and make decisions.* (Social Studies Skills and Methods D, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 1.7: Demonstrate sensitivity to cultural values.

Descriptors:

- 1.7.1 Compare and contrast values and beliefs from a variety of cultures.
- 1.7.2 Recognize the impact of diversity in the workplace.
- 1.7.3 Demonstrate sensitivity to individuals with disabilities.
- 1.7.4 Explore personal values, beliefs and possible bias and describe how they can possibly lead to conflict.

Correlated Social Studies Academic Content Benchmarks

- *Analyze how issues may be viewed differently by various cultural groups.* (People in Societies A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 1.8: Employ problem solving and critical thinking.

Descriptors:

- 1.8.1 Describe decision-making models used in health science careers.
- 1.8.2 Utilize critical thinking (e.g., analysis, synthesis, evaluation) and team-building skills to solve problems.
- 1.8.3 Correlate results and formulate solutions to problems using critical thinking skills.
- 1.8.4 Engage in consensus group decisions within bounds of ethical, safety and legal concerns even when different from a personal preference.

- 1.8.5 Assist patients/clients in identifying alternatives when faced with the need to make a decision.
- 1.8.6 Assist patients/clients in identifying the potential outcomes of alternatives.
- 1.8.7 Cite barriers that limit choices and describe ways to overcome those barriers.
- 1.8.8 Describe specific examples in which professional ethics and responsibilities are potentially in conflict with clients' choices or preferences.
- 1.8.9 Recognize and correct discrepancies.
- 1.8.10 Discuss strategies to avoid recurrent or future problems.
- 1.8.11 Recognize signs and symptoms of emergencies and when to call for assistance.
- 1.8.12 Analyze the solutions and unintended consequences of problem solving methods.

Correlated Social Studies Academic Content Benchmarks

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)
- *Work in groups to analyze an issue and make decisions.* (Social Studies Skills and Methods D, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 1.9: Demonstrate common problem-solving skills used in health science.

Descriptors:

- 1.9.1 Recognize existence of a problem.
- 1.9.2 Identify possible reasons/causes of a problem.
- 1.9.3 Implement plan of action to resolve a problem.
- 1.9.4 Evaluate progress of an action plan.
- 1.9.5 Revise plan as indicated by findings.
- 1.9.6 Identify components of action plan to resolve problem.
- 1.9.7 Monitor progress of an action plan.
- 1.9.8 Apply methods for qualitative and quantitative analysis, data gathering, direct and indirect observations and predictions.
- 1.9.9 Identify ethical dilemmas involved in health careers.

Correlated English Language Arts Academic Content Benchmark

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)
- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

Unit 2: Business Processes
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Recommended

EDU:	12	AD
	I	R

Competency 2.1: Analyze the business structure of health science career fields.

Descriptors:

- 2.1.1 Define business processes.
- 2.1.2 Identify and explain the core business processes in health care.
- 2.1.3 Identify types of health science career providers that work together as a team for the patient and family.
- 2.1.4 Identify various health care organizations and their functions.
- 2.1.5 Describe and explain the mission and goals of various health science careers.
- 2.1.6 Explain how the various health care providers work together to provide services for patients and families.
- 2.1.7 Use organizational charts to analyze jobs and performance objectives.
- 2.1.8 Prepare a diagram/chart/model that illustrates the workflow through a health care facility.
- 2.1.9 Explain the major competitive challenges faced by the health care team.
- 2.1.10 Explain the need for credentials, licensure and continuing education for health science careers.

Correlated English Language Arts Academic Content Benchmarks

- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia.* (Research E, 8-10; Research E, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Recommended

EDU:	12	AD
	I	R

Competency 2.2: Explain the impact of economic, social and technological changes on the health science/health care services.

Descriptors:

- 2.2.1 Identify and describe types of health care services.
- 2.2.2 Define productivity as it relates to health care services.
- 2.2.3 Describe social and economic conditions that affect income growth/decline.
- 2.2.4 Describe the revenue and reimbursement processes for health care services.
- 2.2.5 Explain the impact of attitudes, preferences, demographics and population shifts on health care services.

- 2.2.6 Describe organizational adjustments needed to accommodate technological advancements.
- 2.2.7 Prepare a business plan that demonstrates the relationship between health care providers and patients (e.g., payers).

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers’ problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)
- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices.* (Economics A, 11-12)
- *Identify factors which inhibit or spur economic growth and cause expansions or recessions.* (Economics B, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 2.3: Explain how planning and budgeting are used to accomplish organizational goals and objectives.

Descriptors:

- 2.3.1 Explain the need to project revenue and expenses.
- 2.3.2 Define cost and benefit analyses.
- 2.3.3 Identify and explain reports used to track performance and resources.
- 2.3.4 Utilize technology to manage inventory.
- 2.3.5 Identify needed improvements and modifications and describe their implementation.

2.3.6 Explain the major competitive challenges of health care.

Correlated Mathematics Academic Content Benchmarks

- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)
- *Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.* (Mathematical Processes I, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices.* (Economics A, 11-12)
- *Identify factors which inhibit or spur economic growth and cause expansions or recessions.* (Economics B, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 2.4: Demonstrate internal and external patient service techniques.

Descriptors:

- 2.4.1 Conduct in-depth investigations to identify internal and external patient needs.
- 2.4.2 Describe the relationship between meeting patient needs while maintaining the organization’s profit.
- 2.4.3 Maintain patient satisfaction by addressing patient problems and complaints timely and efficiently.

Correlated English Language Arts Academic Content Benchmarks

- *Formulate open-ended research questions suitable for inquiry and investigation and adjust questions as necessary while research is conducted.* (Research A, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Mathematics Academic Content Benchmark

- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how issues may be viewed differently by various cultural groups.* (People in Societies A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)
- *Work in groups to analyze an issue and make decisions.* (Social Studies Skills and Methods D, 11-12)

BIL: **Recommended**

EDU:	12	AD
	I	P

Competency 2.5: **Design a business plan.**

Descriptors:

- 2.5.1 Describe the components of a business plan.
- 2.5.2 Establish a mission statement, organization goals and objectives.
- 2.5.3 Identify types of businesses (e.g., profit, non-profit, service, product).
- 2.5.4 Describe the type and quantity of resources needed (e.g., capital, people, materials).
- 2.5.5 Create a strategic plan that takes into account all aspects of the business (e.g., scope, time, costs, specifications, marketing, promotion).
- 2.5.6 Design an organizational chart including jobs and descriptions.
- 2.5.7 Budget for resources (e.g., materials, equipment, employees, leases).
- 2.5.8 Identify market segments and prospective clients.
- 2.5.9 Describe approaches for managing organizational risk.

Correlated English Language Arts Academic Content Benchmarks

- *Determine the usefulness of organizers and apply appropriate pre-writing tasks.* (Writing Processes B, 8-10)
- *Edit to improve sentence fluency, grammar and usage.* (Writing Processes D, 8-10)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)
- *Evaluate the usefulness and credibility of data and sources.* (Research B, 8-10)
- *Organize information from various resources and select appropriate sources to support central ideas, concepts and themes.* (Research C, 8-10)

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices.* (Economics A, 11-12)
- *Identify factors which inhibit or spur economic growth and cause expansions or recessions.* (Economics B, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Recommended

EDU:	12	AD
	I	R

Competency 2.6: Explain basic procedures in the accounting cycle.

Descriptors:

- 2.6.1 Describe the essential nature of profitability and value.
- 2.6.2 Describe job costing with direct and indirect costs.
- 2.6.3 Explain basic economic concepts (e.g., supply, demand, price, cost, profit, value, cash flow).
- 2.6.4 Calculate job costs and prepare billing documents.
- 2.6.5 Interpret financial statements (e.g., balance sheet, profit/loss statement).

Correlated English Language Arts Academic Content Benchmark

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Translate information from one representation (words, table, graph or equation) to another representation of a relation or function.* (Patterns, Functions and Algebra C, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.* (Mathematical Processes I, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices.* (Economics A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
		P

Competency 2.7: Explain the measures used by health organizations to manage and improve performance.

Descriptors:

- 2.7.1 Define and explain measures for financial performance (e.g. profitability, cost reduction, asset utilization).
- 2.7.2 Define and explain measures for market performance (e.g., patient, sales/service growth).
- 2.7.3 Define and explain measures for service and internal operations performance (e.g., patient satisfaction, service quality).
- 2.7.4 Explain cost and benefits of technological innovations.
- 2.7.5 Define and explain measures for organizational compliance, health, safety and environmental performance (e.g., audit findings, emissions, lost time accidents).
- 2.7.6 Benchmark performance against competitors and the general industry.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices.* (Economics A, 11-12)
- *Identify factors which inhibit or spur economic growth and cause expansions or recessions.* (Economics B, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods D, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 2.8: Demonstrate effective use of technology.

Descriptors:

- 2.8.1 Explain the role of information technology (IT) in the business organization.
- 2.8.2 Operate communication technology (e.g., e-mail, fax, phones).

- 2.8.3 Use computer software to generate reports (e.g. text document, spreadsheet, database).
- 2.8.4 Organize information for written and oral communications.
- 2.8.5 Retrieve and prepare documents with accuracy and completeness.
- 2.8.6 Demonstrate competence in creating documents using graphics and publishing software.
- 2.8.7 Calculate and interpret descriptive statistics to communicate and support conclusions.
- 2.8.8 Perform calculations and analysis on data.
- 2.8.9 Complete reports in accordance with established standards.

Correlated English Language Arts Academic Content Benchmarks

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers’ problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability.* (Data Analysis and Probability B, 11-12)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 2.9: Demonstrate facility operational protocols.

Descriptors:

- 2.9.1 Comply with facility policy and procedure manuals and/or handbooks.
- 2.9.2 Comply with facility expectation and documentation for specific job assignments.
- 2.9.3 Identify facility security policies.
- 2.9.4 Demonstrate the function and use of various supplies used in daily operations (e.g., inventory, maintenance, budget, purchasing).
- 2.9.5 Prepare data in accordance with facility protocol.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers’ problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

Unit 3: Communication
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 3.1: Apply effective verbal and nonverbal communication skills.

Descriptors:

- 3.1.1 Classify types of interpersonal communication.
- 3.1.2 Practice techniques of effective verbal and nonverbal communication between health care providers and medical practitioners, medical team and general public.
- 3.1.3 Identify barriers to communication and resolutions to the barriers.
- 3.1.4 Identify adjustments in communication techniques necessary for different levels of client understanding.
- 3.1.5 Identify resources (e.g., interpreters, technology devices) needed to breach communication barriers.
- 3.1.6 Research the benefits of Spanish as a second language.
- 3.1.7 Demonstrate sensitivity to cultural differences that may affect therapeutic and social communication.
- 3.1.8 Apply techniques for communicating with behaviorally or emotionally impaired clients.
- 3.1.9 Apply accepted rules for spelling, grammar and punctuation in written and oral communication.
- 3.1.10 Discuss the essential role of effective communication in all phases of health care.
- 3.1.11 Provide effective risk and hazard communication to clients.

Correlated English Language Arts Academic Content Benchmarks

- *Apply editing strategies to eliminate slang and improve conventions.* (Writing Processes D, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how issues may be viewed differently by various cultural groups.* (People in Societies A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)
- *Work in groups to analyze an issue and make decisions.* (Social Studies Skills and Methods D, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 3.2: Utilize available communication technology.

Descriptors:

- 3.2.1 Demonstrate knowledge of general communication technology (e.g., e-mail, Internet, fax).
- 3.2.2 Access information using electronic equipment.
- 3.2.3 Utilize a variety of computer applications that support patient care.
- 3.2.4 Use appropriate automated systems for various tasks.
- 3.2.5 Demonstrate competence with applicable software programs.
- 3.2.6 Identify and demonstrate computer operation for record keeping and data analysis.
- 3.2.7 Accurately transfer information as needed.
- 3.2.8 Identify the process of file maintenance, storage and retrieval systems.
- 3.2.9 Interpret, transcribe and communicate information, data and observations to apply information learned into actual practice.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 3.3: Interact with patient/client.

Descriptors:

- 3.3.1 Explain planned procedures and goals to patients/clients.
- 3.3.2 Demonstrate professional etiquette and maintain professional boundaries.
- 3.3.3 Respect patients' cultural differences.
- 3.3.4 Use language appropriate to situation.
- 3.3.5 Identify various forms of patient information.
- 3.3.6 Access resources needed to remedy communication barriers (e.g., patient/client with limited English proficiency).
- 3.3.7 Demonstrate privacy and confidentiality measures and procedures (e.g., HIPAA).
- 3.3.8 Recognize the significance of informed consent to patients.
- 3.3.9 Reinforce self-care recommendations to patients.

Correlated English Language Arts Academic Content Benchmarks

- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how issues may be viewed differently by various cultural groups.* (People in Societies A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 3.4: **Convey essential patient/client information to appropriate team members.**

Descriptors:

- 3.4.1 Observe and report unsafe environmental conditions.
- 3.4.2 Recognize and report unusual occurrences or changes in patient’s condition.
- 3.4.3 Use facility guidelines to disseminate health care information.
- 3.4.4 Maintain confidentiality (e.g., HIPAA).

Correlated English Language Arts Academic Content Benchmark

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 3.5: **Summarize Health Insurance Portability and Accountability Act (HIPAA).**

Descriptors:

- 3.5.1 Demonstrate knowledge of HIPAA standards.
- 3.5.2 Identify forms for release of medical information according to HIPAA and other regulatory agencies.
- 3.5.3 Ensure data security and confidentiality by controlling access and release of information.
- 3.5.4 Apply HIPAA standards.
- 3.5.5 Maintain patient records consistent with HIPAA regulations.
- 3.5.6 Obtain health records consistent with HIPAA regulations.

Correlated English Language Arts Academic Content Benchmark

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Use historical interpretations to explain current issues.* (History B, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 3.6: **Utilize basic medical terminology.**

Descriptors:

- 3.6.1 Define basic medical terms related to human physiology and anatomy.
- 3.6.2 Spell medical terms correctly.
- 3.6.3 Accurately pronounce basic medical terms.
- 3.6.4 Identify accepted symbols, abbreviations and acronyms.
- 3.6.5 Use approved standard professional terminology when preparing documents.
- 3.6.6 Apply correct medical terms to major disease processes, diagnostic exams, coding of exams and treatment modalities.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Use correct spelling conventions.* (Writing Conventions A, 8-10, Writing Conventions A, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 3.7: **Locate, organize and reference written health science information from various sources.**

Descriptors:

- 3.7.1 Locate written information to communicate with co-workers and clients.
- 3.7.2 Organize information to use in written and oral communications.
- 3.7.3 Document the source and proper reference for written information.

Correlated English Language Arts Academic Content Benchmarks

- *Formulate writing ideas and identify a topic appropriate to the purpose and audience.* (Writing Processes A, 8-10; Writing Processes A, 11-12)
- *Organize information from various resources and select appropriate sources to support central ideas, concepts and themes.* (Research C, 8-10)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 3.8: Write and utilize coherent and focused technical communications that support a defined perspective for health science careers.

Descriptors:

- 3.8.1 Use various note-taking techniques to summarize main ideas.
- 3.8.2 Structure ideas and arguments in an organized manner that are supported by relevant documentation and/or examples.
- 3.8.3 Write messages using language that is appropriate for the intended audience and purpose.
- 3.8.4 Use correct spelling, grammar, capitalization and punctuation.
- 3.8.5 Identify positions from relevant research and resources.
- 3.8.6 Calculate and interpret descriptive statistics to communicate and support predictions and conclusions.
- 3.8.7 Utilize tables, charts and graphs to clarify textual explanations and support arguments.

Correlated English Language Arts Academic Content Benchmarks

- *Formulate writing ideas and identify a topic appropriate to the purpose and audience. (Writing Processes A, 8-10; Writing Processes A, 11-12)*
- *Edit to improve sentence fluency, grammar and usage. (Writing Processes D, 8-10)*
- *Prepare writing for publication that is legible, follows an appropriate format and uses techniques such as electronic resources and graphics. (Writing Processes F, 8-10)*
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and include formatting techniques that are user friendly. (Writing Applications C, 11-12)*
- *Organize information from various resources and select appropriate sources to support central ideas, concepts and themes. (Research C, 8-10)*

Correlated Mathematics Academic Content Benchmarks

- *Evaluate different graphical representations of the same data to determine which is the most appropriate representation for an identified purpose. (Data Analysis and Probability B, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data Analysis and Probability A, 11-12)*
- *Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability. (Data Analysis and Probability B, 11-12)*
- *Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience. (Mathematical Processes I, 11-12)*

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions. (Social Studies Skills and Methods B, 11-12)*

BIL: Essential

EDU:	12	AD
	P	R

Competency 3.9: Deliver formal and informal presentations that demonstrate organization and delivery skill.

Descriptors:

- 3.9.1 Demonstrate appropriate usage of grammar, diction and sentence structure.
- 3.9.2 Communicate main ideas and supporting facts to achieve purpose of communication.
- 3.9.3 Use appropriate technology to enhance the clarity and persuasiveness.
- 3.9.4 Use proper organization and structure to achieve coherence.
- 3.9.5 Use technical terms, references and quoted material properly.
- 3.9.6 Engage an audience using appropriate vocal variety and gestures.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate an understanding of effective speaking strategies by selecting appropriate language and adjusting presentation techniques.* (Communication: Oral and Visual D, 8-10)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)
- *Give presentations using a variety of delivery methods, visual displays and technology.* (Communication: Oral and Visual G, 8-10; Communication: Oral and Visual F, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 3.10: Apply active listening skills to obtain and clarify information.

Descriptors:

- 3.10.1 Identify and apply active listening techniques both one to one and in group settings.
- 3.10.2 Paraphrase and repeat information for confirmation of details.
- 3.10.3 Record and report information in written format utilizing available communication technology.
- 3.10.4 Complete reports in accordance with established standards.
- 3.10.5 Use active listening skills that are sensitive to cultural and individual communication differences.

Correlated English Language Arts Academic Content Benchmarks

- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Analyze how issues may be viewed differently by various cultural groups.* (People in Societies A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 3.11: Interact in a professional manner.

Descriptors:

- 3.11.1 Recognize the importance of all patients/customers to health care.
- 3.11.2 Describe the relationship between meeting a patient's needs and profitability.
- 3.11.3 Demonstrate professional etiquette (e.g., phone, e-mail, person to person) when dealing with patients and/or their families.
- 3.11.4 Utilize reading strategies to interpret information for patients and their families.
- 3.11.5 Discuss the importance of follow-through and follow-up (in a timely manner) when commitments are made to patients and/or their families.

Correlated English Language Arts Academic Content Benchmarks

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Unit 4: Legal and Ethical Responsibilities

BIL: Essential

EDU:	12	AD
	P	R

Competency 4.1: Differentiate between legal and ethical issues/obligations.

Descriptors:

- 4.1.1 Define “legal” and “ethical” issues/obligations.
- 4.1.2 Describe and comply with legal responsibilities specified by state and federal act(s) and other pertinent legislation.
- 4.1.3 Differentiate between ethical and legal issues/obligations impacting health care.
- 4.1.4 Apply legal and ethical protocols to health science professions.
- 4.1.5 Discuss the importance of keeping current in legal and ethical issues/obligations through continuing education.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Science Academic Content Benchmark

- *Describe the ethical practices and guidelines in which science operates.* (Scientific Ways of Knowing C, 9-10)

Correlated Social Studies Academic Content Benchmarks

- *Evaluate, take and defend positions about issues concerning the alignment of the characteristics of American democracy with realities in the United States today.* (Government A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 4.2: Comply with organizational policies and government regulations.

Descriptors:

- 4.2.1 Identify laws, regulations and codes pertaining to health care facilities.
- 4.2.2 Comply with state, local and federal legislation as it relates to standards for workplace safety, harassment, labor and employment laws.
- 4.2.3 Identify legal responsibilities specified by state practice acts, other pertinent legislation and regulatory agencies as it relates to confidentiality (e.g., HIPAA).
- 4.2.4 Explain legal responsibilities, limitations and implications of actions.

- 4.2.5 Identify personal and organizational ramifications for failure to comply with government laws and regulations.
- 4.2.6 Demonstrate professional etiquette when dealing with patients, vendors and the general public.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Evaluate, take and defend positions about issues concerning the alignment of the characteristics of American democracy with realities in the United States today.* (Government A, 11-12)
- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 4.3: Complete work-related duties within an ethical framework.

Descriptors:

- 4.3.1 Identify the Ohio Ethics Law, related statutes and rulings.
- 4.3.2 Identify codes of ethics within the health care professions (e.g., exercise science, nursing, sonography).
- 4.3.3 Abide by HIPAA regulations.
- 4.3.4 Establish a personal ethical framework.
- 4.3.5 Demonstrate ethical behavior when interacting with patients and co-workers, both internal and external to the work facility.
- 4.3.6 Maintain confidentiality by limiting exposure of sensitive information to authorized personnel.
- 4.3.7 Describe the ethical impact of positive cultural sensitivity.
- 4.3.8 Explain the importance of positive professional interactions.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Science Academic Content Benchmarks

- *Describe the ethical practices and guidelines in which science operates.* (Scientific Ways of Knowing C, 9-10)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how issues may be viewed differently by various cultural groups.* (People in Societies A, 11-12)
- *Evaluate, take and defend positions about issues concerning the alignment of the characteristics of American democracy with realities in the United States today.* (Government A, 11-12)
- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 4.4: **Assess the implications of ethical/unethical behavior.**

Descriptors:

- 4.4.1 Identify the legal ramifications of unethical behavior.
- 4.4.2 Identify professional and personal ramifications of unethical actions (e.g., boundaries).
- 4.4.3 Compare/contrast personal, professional and organizational ethics.
- 4.4.4 Describe issues relating to potential conflicts of interest between personal and organizational ethics.
- 4.4.5 Identify behaviors that violate acceptable practice.
- 4.4.6 Discuss the role of patient feedback in maintaining patient satisfaction.
- 4.4.7 Identify strategies for responding to the unethical actions of health care providers.

Correlated English Language Arts Academic Content Benchmark

- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Science Academic Content Benchmark

- *Describe the ethical practices and guidelines in which science operates.* (Scientific Ways of Knowing C, 9-10)

Correlated Social Studies Academic Content Benchmarks

- *Evaluate, take and defend positions about issues concerning the alignment of the characteristics of American democracy with realities in the United States today.* (Government A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 4.5: **Demonstrate competent care consistent with the requirements and limitations of the professions.**

Descriptors:

- 4.5.1 Research credentialing requirements.
- 4.5.2 Identify the scope of practice as prescribed by law and the facility of practice.
- 4.5.3 Identify behaviors that violate acceptable practice as outlined by the credentialing agencies.
- 4.5.4 Apply legal and ethical concepts to health profession (e.g., code of ethics).
- 4.5.5 Describe strategies to deal with conflict between personal and organizational ethics.
- 4.5.6 Compare/contrast the roles of various regulatory agencies.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 4.6: Practice procedures consistent with legal and ethical behavior.

Descriptors:

- 4.6.1 Compare/contrast legal and ethical behavior.
- 4.6.2 Describe the importance and protocol for reporting unethical practices.
- 4.6.3 Comply with legal procedures when reporting diseases or abuse.
- 4.6.4 Recognize the significance of informed consent to patients.

Correlated English Language Arts Academic Content Benchmarks

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 4.7: Maintain standards of confidentiality and ethical practice.

Descriptors:

- 4.7.1 Recognize the importance of all customers to business.
- 4.7.2 Inform patients in advance regarding situations that may involve disclosure of private information (e.g. health and safety issues).
- 4.7.3 Inform clients about situations that warrant the release of confidential information without prior consent and the likely consequences of such disclosure.
- 4.7.4 Explain the legal requirement and personal liability for disclosure of all written communication.
- 4.7.5 Ensure clients are informed of their rights pertinent to services to be provided.
- 4.7.6 Maintain ethical standards of practice (e.g., confidentiality, informed consent) in formal as well as informal settings.
- 4.7.7 Demonstrate respect of patient’s cultural, social and ethnic diversity within the health care environment.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Analyze how issues may be viewed differently by various cultural groups.* (People in Societies A, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 4.8: Describe employee and employer liability.

Descriptors:

- 4.8.1 Define liabilities.
- 4.8.2 Explain the legal concept of *respondeat superior*.
- 4.8.3 Define negligence.
- 4.8.4 Identify issues related to liability and negligence.
- 4.8.5 Discuss ways to minimize liability and negligence risks (e.g., documentation, policies, procedures).
- 4.8.6 Discuss the importance of malpractice insurance.

Correlated English Language Arts Academic Content Benchmark

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Unit 5: Health and Safety Practices
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 5.1: Demonstrate safe professional practices that contribute to the creation of a hazard-free environment.

Descriptors:

- 5.1.1 Identify and comply with Environmental Protection Agency (EPA).
- 5.1.2 Discuss the purpose of the Occupational Safety and Health Administration (OSHA) regulations and how it promotes safety.
- 5.1.3 Comply with OSHA standards.
- 5.1.4 Report unsafe conditions in accordance with occupational safety and OSHA guidelines.
- 5.1.5 Demonstrate emergency procedures (e.g., exit routes, injury, threat, fire, disaster plan).
- 5.1.6 Dispose of refuse and biodegradable materials according to manufacturer’s directions and state and federal requirements.
- 5.1.7 Employ standard precautions when exposed to blood and body fluids.
- 5.1.8 Employ precautions designed to prevent injuries and accidents.
- 5.1.9 Interpret material safety data sheets (MSDS) and use materials accordingly.
- 5.1.10 Identify consequences of disregarding safety rules.

Correlated English Language Arts Academic Content Benchmarks

- *Use context clues and text structures to determine the meaning of new vocabulary.* (Acquisition of Vocabulary A, 8-10)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Evaluate how features and characteristics make information accessible and usable and how structures help authors achieve their purposes.* (Reading Applications: Informational, Technical and Persuasive Text A, 8-10)

Correlated Social Studies Academic Content Benchmark

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 5.2: Maintain general safety in accordance with government regulations, health standards, company policies and practices.

Descriptors:

- 5.2.1 Maintain and wear personal protective equipment (PPE) as appropriate.
- 5.2.2 Check and correct potential hazards (e.g. hair, jewelry, clothing).
- 5.2.3 Follow established procedures for the use of safety apparatus and equipment.

- 5.2.4 Check power sources for potential hazards and confirm proper grounding.
- 5.2.5 Identify the location of emergency flush showers, eye wash fountains, fire alarms and exits.
- 5.2.6 Maintain work areas in accordance with standards for cleanliness and safety.
- 5.2.7 Describe how to operate fire extinguishers and identify classes of fires.

BIL: Essential

EDU:	12	AD
	P	R

Competency 5.3: Discuss strategies to protect employees from occupation-related injuries.

Descriptors:

- 5.3.1 Define ergonomics.
- 5.3.2 Identify the principles and purpose of ergonomics and body mechanics.
- 5.3.3 Describe ergonomic factors in the workplace (e.g., height of equipment, noise level, lighting, air quality).
- 5.3.4 Identify work associated with repetitive motion.
- 5.3.5 Identify strategies to minimize repetitive tasks.
- 5.3.6 Identify strategies to minimize use of excessive muscle/physical force.
- 5.3.7 Define maximum permissible limit (MPL) and action limit (AL) for lifting.

Correlated English Language Arts Academic Content Benchmark

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.*
(Acquisition of Vocabulary D, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 5.4: Apply the principles of proper body mechanics and ergonomics.

Descriptors:

- 5.4.1 Demonstrate proper personal body mechanics and ergonomics.
- 5.4.2 Instruct others in proper body mechanics.
- 5.4.3 Demonstrate proper positioning and moving of clients/patients and objects.
- 5.4.4 Utilize available tools for ease in moving/transporting others and objects.
- 5.4.5 Apply the principles of body mechanics in lifting, moving, transferring objects and/or ambulating and positioning clients/patients in accordance with established safety practices.

BIL: Essential

EDU:	12	AD
	I	P

Competency 5.5: Identify state, federal and local worker safety, health and environmental regulations.

Descriptors:

- 5.5.1 Examine the rules and regulations of Occupational Safety and Health Administration (OSHA).
- 5.5.2 Describe the function of the state Bureau of Workers Compensation (BWC).
- 5.5.3 Discuss the Ohio and Federal EPA regulations.
- 5.5.4 Interpret personal safety rights according to employee’s right-to-know plan/hazardous communications.

Correlated English Language Arts Academic Content Benchmark

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 5.6: Demonstrate practices that contribute to a healthy work environment.

Descriptors:

- 5.6.1 Identify unsafe operations in the workplace.
- 5.6.2 Participate in safety training meetings.
- 5.6.3 Participate in accident/incident investigations.
- 5.6.4 Identify and correct unsafe actions of co-workers.
- 5.6.5 Identify the training and certification resources for First Aid and cardiopulmonary resuscitation (CPR).
- 5.6.6 Handle substances in accordance with MSDS.
- 5.6.7 Explain basic sanitation, health and hygiene principles.
- 5.6.8 Describe organizational strategies to eliminate substance abuse in the work environment.
- 5.6.9 Describe the risks associated with substance abuse in the workplace.

Correlated English Language Arts Academic Content Benchmark

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 5.7: Complete and apply operation and safety training on pertinent equipment.

Descriptors:

- 5.7.1 Participate in an orientation program and training for equipment used before operating.
- 5.7.2 Interpret instructional manuals for safe operation of equipment.
- 5.7.3 Use safety apparatus and equipment in accordance with job requirements and safety standards.
- 5.7.4 Participate in an ongoing evaluation to assure equipment is operated safely.
- 5.7.5 Fulfill safety and health requirements for equipment maintenance.
- 5.7.6 Monitor and operate equipment in compliance with both manufacturers' directions and in accordance with relevant government regulations and statutes.

Correlated English Language Arts Academic Content Benchmark

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 5.8: Identify practices that contribute to a healthy environment.

Descriptors:

- 5.8.1 Describe strategies to reduce exposure to health-threatening environments (e.g., temperature, chemicals, communicable diseases).
- 5.8.2 Identify types of hazardous materials (e.g., chemical, biological).
- 5.8.3 Describe precautions required when using toxic or flammable materials.
- 5.8.4 Describe some consequences of interactions of incompatible substances.
- 5.8.5 Identify government regulations regarding the storage of hazardous materials.
- 5.8.6 Recognize hazardous materials as identified in various government documents/signage.
- 5.8.7 Employ a hazardous materials safety plan.

Correlated English Language Arts Academic Content Benchmark

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12).
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12).

BIL: Essential

EDU:	12	AD
	P	R

Competency 5.9: Examine emergency preparedness response plans.

Descriptors:

- 5.9.1 Describe different types of emergency preparedness plans (e.g., natural disaster, crisis planning, substance abuse).
- 5.9.2 Identify the importance of securing emergency care information and parental consent for treatment of minors.
- 5.9.3 Demonstrate the ability to complete accident reports and injury reporting.
- 5.9.4 Demonstrate the ability to complete medical referral and treatment reports.
- 5.9.5 Explain emergency procedures in the event of a disaster.
- 5.9.6 Discuss health care issues related to homeland security.
- 5.9.7 Explain the role of MSDS in an emergency response.
- 5.9.8 Practice standard precautions to protect against infection and communicable diseases.

Correlated English Language Arts Academic Content Benchmarks

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12).

BIL: Essential

EDU:	12	AD
	P	R

Competency 5.10: Complete requirements for CPR and First Aid.

Descriptors:

- 5.10.1 Complete and maintain CPR and Automated External Defibrillation (AED) certification. Complete and maintain First Aid certification.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 5.11: Respond to medical emergencies.

Descriptors:

- 5.11.1 Perform head to toe assessment.
- 5.11.2 Describe signs and symptoms of emergency situations.
- 5.11.3 Identify basic emergency procedures and equipment.
- 5.11.4 Contact local emergency assistance.
- 5.11.5 Demonstrate first responder procedures.
- 5.11.6 Identify evacuation techniques.

**CLINICAL
HEALTH CARE SERVICES
PATHWAY**

Unit 6: Clinical Health Care Services Core Competencies
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 6.1: Collect and distribute essential information to appropriate team members.

Descriptors:

- 6.1.1 Recognize and report unusual or unsafe environmental conditions.
- 6.1.2 Maintain confidentiality according to the facility’s protocol as well as HIPAA.
- 6.1.3 Recognize and report changes in a patient’s condition.
- 6.1.4 Document patient response to treatment or procedure results accurately and appropriately.
- 6.1.5 Create a treatment plan using a problem-solving model.
- 6.1.6 Recognize ethical conflicts related to assessment practices (e.g., labeling, confidentiality).
- 6.1.7 Document actions according to the facility’s protocol and regulatory guidelines.

Correlated English Language Arts Academic Content Benchmarks

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers’ problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Use appropriate data sources and geographic tools to analyze and evaluate public policies.* (Geography C, 11-12)
- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 6.2: Process procedural requests.

Descriptors:

- 6.2.1 Identify purpose and intent of request (e.g., physician’s order, requisition).
- 6.2.2 Report apparent inconsistency or error in the request.
- 6.2.3 Complete plan for implementation of services ordered.
- 6.2.4 Obtain patient consent if applicable.

Correlated English Language Arts Academic Content Benchmark

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 6.3: **Prepare the supplies, equipment, and patient for procedures, according to facility protocol.**

Descriptors:

- 6.3.1 Identify and gather equipment necessary for procedures.
- 6.3.2 Maintain and calibrate equipment according to the operator manual.
- 6.3.3 Explain procedures and give related information to patient.
- 6.3.4 Follow patient identification protocol and confirm proper treatment/protocol (e.g., “Right Patient, Right Treatment”).

Correlated English Language Arts Academic Content Benchmarks

- *Use appropriate self-monitoring strategies for comprehension.* (Reading Process C, 8-10; Reading Process C, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 6.4: **Perform procedures to create precise and accurate diagnostic data.**

Descriptors:

- 6.4.1 Use appropriate supplies and equipment.
- 6.4.2 Monitor quality of sample or specimen.
- 6.4.3 Examine results of procedure to assure a quality result.
- 6.4.4 Evaluate patient response to treatments and procedures.
- 6.4.5 Maintain proper documentation of quality assurance procedures.

Correlated English Language Arts Academic Content Benchmark

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers’ problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 6.5: Evaluate procedures and results.

Descriptors:

- 6.5.1 Choose appropriate evaluation instruments to assess patient response to procedure/treatment.
- 6.5.2 Analyze test results for diagnostic quality.
- 6.5.3 Recognize and respond to abnormal results.
- 6.5.4 Select alternative protocol, as needed, within established guidelines.

BIL: Essential

EDU:	12	AD
	P	R

Competency 6.6: Produce and report results using appropriate communication channels.

Descriptors:

- 6.6.1 Use appropriate technology to generate reports.
- 6.6.2 Disseminate reports appropriately following HIPAA regulations.
- 6.6.3 Report results in a timely manner.

Correlated English Language Arts Academic Content Benchmarks

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

BIL: Essential

EDU:	12	AD
	P	R

Competency 6.7: Demonstrate general knowledge of the human body.

Descriptors:

- 6.7.1 Describe the basic structures and functions of body systems (e.g., skeletal, muscular, nervous, circulatory, respiratory).
- 6.7.2 Analyze the interdependence of the body systems as they relate to disease, wellness, therapies and rehabilitation.
- 6.7.3 Describe an individual's physiological, psychological and social response to stressors across the lifespan.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 6.8: **Record a health history and/or basic information.**

Descriptors:

- 6.8.1 Complete and document a health history (e.g., allergies, medications, pain, alcohol, previous surgeries).
- 6.8.2 Identify and assess components of a medical clearance (including medications).
- 6.8.3 Discuss health history with the health care team and identify any areas of concern.
- 6.8.4 Identify stressors or anxiety levels of patients.
- 6.8.5 Identify risk factors for high-risk populations.

Correlated English Language Arts Academic Content Benchmarks

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 6.9: **Explain the unique needs of each population across the lifespan.**

Descriptor:

- 6.9.1 Identify the physical, emotional and psychosocial changes across the lifespan.
- 6.9.2 Recognize and report unique medical issues across the lifespan.
- 6.9.3 Recognize and report safety concerns across the lifespan.

Correlated Social Studies Academic Content Benchmark

- *Analyze how issues may be viewed differently by various cultural groups.* (People in Societies A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 6.10: Assess clients/patients' vital signs and other indicators of health status, within the scope of practice.

Descriptors:

- 6.10.1 Record clients/patients' health status in accordance with facility protocol.
- 6.10.2 Provide input to the plan of care.

Correlated Mathematics Academic Content Benchmarks

- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)
- *Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histograms, scatterplots, measures of center and variability.* (Data Analysis and Probability A, 8-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 6.11: Utilize appropriate methods of data collection and documentation.

Descriptors:

- 6.11.1 Identify the types of data collected in health care and the methods of collecting it.
- 6.11.2 Differentiate between subjective and objective data.
- 6.11.3 Record and report information.
- 6.11.4 Maintain professional standards in all documentation activities.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.* (Mathematical Processes I, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 6.12: Contribute to the development of a plan of care.

Descriptors:

- 6.12.1 Identify the purpose of a plan of care.
- 6.12.2 Identify the components of a plan of care.
- 6.12.3 Provide input in the development of plan of care based on the scope of practice or role.

BIL: Essential

EDU:	12	AD
	P	R

Competency 6.13: Implement procedures accurately in support of the plan of care, within the scope of practice or role.

Descriptors:

- 6.13.1 Describe the procedures within the scope of practice or role.
- 6.13.2 Perform procedures accurately and in a timely fashion.
- 6.13.3 Document procedures according to facility policy.
- 6.13.4 Examine and monitor patient response to treatments and procedures if applicable.
- 6.13.5 Maintain proper documentation of quality assurance procedures if applicable.

Unit 7: Phlebotomist Specialization

BIL: Essential

EDU:	12	AD
	P	R

Competency 7.1: Identify the phlebotomist's role as a member of a health care team.

Descriptors:

Recognize the roles and qualifications of the phlebotomist.

- 7.1.2 Identify the professional associations related to the phlebotomist profession.
- 7.1.3 Identify education and training required to work as a phlebotomist.
- 7.1.4 Describe the organizational structure of the clinical laboratory department.
- 7.1.5 Define the phlebotomist's role in collecting and/or transporting specimens to the lab.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources.* (Research C, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 7.2.: Demonstrate specimen collection and specimen integrity in the delivery of patient care.

Descriptors:

- 7.2.1 List the general criteria for suitability of a specimen for analysis and reasons for specimen rejection or recollection.
- 7.2.2 Explain the importance of timed, fasting and stat specimens, as related to specimen integrity and patient care.
- 7.2.3 Explain the reasons for processing procedures.
- 7.2.4 Implement corrective quality control techniques where indicated.

BIL: Essential

EDU:	12	AD
	P	R

Competency 7.3.: Identify blood collection supplies/equipment.

Descriptors:

- 7.3.1 List the types of laboratory procedures performed in the various sections of the clinical laboratory department.
- 7.3.2 Describe the types of patient specimens that are analyzed in the clinical laboratory (e.g., routine blood tests of newborn and adult).

- 7.3.3 Differentiate tube stopper colors.
- 7.3.4 Identify tube additives and their actions.
- 7.3.5 List the supplies that should be carried on a phlebotomist's tray when collecting micro specimens.
- 7.3.6 Maintain collection equipment.

BIL: Essential

EDU:	12	AD
	P	R

Competency 7.4: Perform venipuncture and draw blood.

Descriptors:

- 7.4.1 Inform patient/client of procedure.
- 7.4.2 Identify potential sites for venipuncture, capillary and arterial puncture.
- 7.4.3 Differentiate between sterile and antiseptic techniques.
- 7.4.4 Discuss the selection and preparation of a puncture site for collection of blood sample.
- 7.4.5 Describe proper methods of blood collection.
- 7.4.6 Identify problems that may occur during blood collection (e.g., causes of complications, routes of infection).
- 7.4.7 Discuss venipuncture duties utilizing standard precautions while conforming to current OSHA, CDC, Clinical Lab Improvement Amendment (CLIA) and National Committee for Clinical Laboratory Services guidelines.

Correlated English Language Arts Academic Content Benchmarks

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

Unit 8: Practical Nurse Specialization
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 8.1: Define the practical nurse profession.

Descriptors:

- 8.1.1 Describe the current and future trends, issues and scope of practice of the practical nurse.
- 8.1.2 Identify the professional associations and regulatory agencies related to the practical nurse profession.
- 8.1.3 Discuss the specializations within the nursing profession (e.g., job titles, types of work).
- 8.1.4 Identify education and licensure required for work as a practical nurse.
- 8.1.5 Describe the ways of gaining entry and access to the nursing profession.
- 8.1.6 Identify employment opportunities.
- 8.1.7 Delegate task within the scope of practice.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Use historical interpretations to explain current issues.* (History B, 11-12)
- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 8.2: Protect clients and health care personnel from health and environmental hazards.

Descriptors:

- 8.2.1 Define standard precautions for health care professionals (e.g., EPA, CDC, OSHA).
- 8.2.2 Identify consequences of disregarding safety policies.
- 8.2.3 Maintain personal health (e.g., annual physical, inoculations).
- 8.2.4 Follow policies for proper disposal of non-hazardous and hazardous materials (e.g. HMIS, MSDS, OSHA).

- 8.2.5 Maintain and calibrate medical equipment according to the operator’s manual (e.g., sterilization, storage, preventive maintenance checks).
- 8.2.6 Complete and maintain CPR and AED competency.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 8.3: Obtain and record subjective and objective client data across the lifespan.

Descriptors:

- 8.3.1 Measure and record pulses, respirations, blood pressure, temperature, height and weight and pain.
- 8.3.2 Perform head-to-toe systems data collection.
- 8.3.3 Obtain and record client health history.

Correlated English Language Arts Academic Content Benchmarks

- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers’ problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)
- *Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histograms, scatterplots, measures of center and variability.* (Data Analysis and Probability A, 8-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 8.4: Recognize and take action on findings.

Descriptors:

- 8.4.1 Recognize change in patient condition (e.g., data collection, lab work).
- 8.4.2 Take appropriate action on change in patient condition.
- 8.4.3 Report change to appropriate practitioner.
- 8.4.4 Document nursing intervention and patient response.
- 8.4.5 Recognize normal and abnormal health data.

Correlated Mathematics Academic Content Benchmarks

- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 8.5: Participate in providing care for clients across the lifespan, within the scope of practice.

Descriptors:

- 8.5.1 Assist other practitioners in providing care.
- 8.5.2 Prepare necessary equipment and supplies.
- 8.5.3 Apply aseptic and sterile principles.
- 8.5.4 Report and document procedures and client outcomes.
- 8.5.5 Cooperate as a constructive member of the health care team.
- 8.5.6 Utilize therapeutic communications (e.g., family, health care team members, patients).
- 8.5.7 Utilize strategies to promote, maintain and restore health.
- 8.5.8 Perform appropriate and effective client teaching.
- 8.5.9 Perform holistic nursing care.
- 8.5.10 Integrate content from the physical, biological, technological, social and behavioral sciences.

BIL: Essential

EDU:	12	AD
	P	R

Competency 8.6: Demonstrate safe medication administration, within the scope of practice.

Descriptors:

- 8.6.1 Apply pharmacological principles to prepare and administer medications.
- 8.6.2 Store and dispose of medications in accordance with protocol.
- 8.6.3 Calculate dosages accurately and according to authorized health care provider orders.
- 8.6.4 Administer medications according to authorized health care provider orders and institutional policies.

- 8.6.5 Instruct patients on use of medications.
- 8.6.6 Practice six rights of medication administration.
- 8.6.7 Document medication administration and patient response.

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Demonstrate fluency in operations with real numbers, vectors and matrices, using mental computation or paper and pencil calculations for simple cases and technology for more complicated cases.* (Number, Number Sense and Operations D, 11-12)
- *Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates.* (Measurement D, 8-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 8.7: Participate in and utilize the nursing process.

Descriptors:

- 8.7.1 Contribute to the initial patient assessment.
- 8.7.2 Collect ongoing patient data.
- 8.7.3 Contribute to the development of a plan of care.
- 8.7.4 Implement safe and effective nursing care according to plan of care.
- 8.7.5 Participate in developing a home care plan for patient and family.
- 8.7.6 Document and report patient’s response to nursing interventions.

Correlated English Language Arts Academic Content Benchmarks

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers’ problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

Unit 9: Medical Assistant Specialization
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 9.1: Define the role of a medical assistant.

Descriptors:

- 9.1.1 Describe the current and future trends, issues and scope of practice of the medical assistant.
- 9.1.2 Identify the professional associations related to the medical assistant profession.
- 9.1.3 Identify education and training required to work as a medical assistant.
- 9.1.4 Describe the ways of gaining entry and access to the medical assistant profession.
- 9.1.5 Identify career opportunities.
- 9.1.6 Adhere to the principles of the Code of Ethics for Medical Assistants adopted by the American Association of Medical Assistants (AAMA).

Correlated English Language Arts Academic Content Benchmarks

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Use historical interpretations to explain current issues.* (History B: Analysis and Interpretation, 11-12)
- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 9.2: Demonstrate medication administration.

Descriptors:

- 9.2.1 Apply pharmacological principles to prepare and administer medications.
- 9.2.2 Instruct patients about prescribed medications and their effects on the body (e.g., dosage, application, possible side effects).

Correlated English Language Arts Academic Content Benchmarks

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Demonstrate fluency in operations with real numbers, vectors and matrices, using mental computation or paper and pencil calculations for simple cases and technology for more complicated cases.* (Number, Number Sense and Operations D, 11-12)
- *Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates.* (Measurement D, 8-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 9.3: Perform data collection measurements.

Descriptors:

- 9.3.1 Measure and record pulse, respiration, blood pressure, temperature, height and weight.
- 9.3.2 Measure and record visual or reading abnormalities.
- 9.3.3 Measure and record physical measurements of adults and children.

Correlated Mathematics Academic Content Benchmarks

- *Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision.* (Measurement E, 8-10)
- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 9.4: Recognize and take action on findings.

Descriptors:

- 9.4.1 Recognize change in patient condition.
- 9.4.2 Take appropriate action on change in patient condition.
- 9.4.3 Report change to appropriate practitioner.
- 9.4.4 Document nursing interactions and patient response.

Correlated English Language Arts Academic Content Benchmarks

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 9.5: Assist with and/or perform procedures according to industry standards.

Descriptors:

- 9.5.1 Assist with exam by preparing the room/space with necessary equipment.
- 9.5.2 Assist with specialty procedures (e.g., eye and ear irrigations, spirometry, pulse oximetry).
- 9.5.3 Assist with surgical procedures (e.g., prepare room, gather sterile equipment, documentation).
- 9.5.4 Record procedure according to office protocol.
- 9.5.5 Recognize and respond to emergency needs.
- 9.5.6 Apply aseptic and sterilization principles.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 9.6: Perform laboratory procedures.

Descriptors:

- 9.6.1 Collect laboratory specimens according to protocol.
- 9.6.2 Perform basic diagnostic tests (e.g., occult blood, glucose, cholesterol).
- 9.6.3 Maintain laboratory equipment and supplies.

BIL: Essential

EDU:	12	AD
	I	P

Competency 9.7: Demonstrate office procedures.

Descriptors:

- 9.7.1 Prioritize incoming telephone calls while maintaining phone etiquette.
- 9.7.2 Prepare medical records according to HIPAA standards for storage and distribution.
- 9.7.3 Demonstrate use of computer technology for information gathering and dispensing.
- 9.7.4 Demonstrate use of office equipment (e.g. fax, answering machine, multiline phone system, intercom, mail).
- 9.7.5 Maintain inventory of supplies.
- 9.7.6 Maintain patient accounts in accordance with office protocol.
- 9.7.7 Perform procedural and diagnostic coding.
- 9.7.8 Prepare financial summaries.

Correlated English Language Arts Academic Content Benchmarks

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)
- *Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.* (Mathematical Processes I, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: **Recommended**

EDU:	12	AD
	I	R

Competency 9.8: Perform a 12-lead electrocardiogram (EKG) for interpretation.

Descriptors:

- 9.8.1 Set and adjust an EKG machine (e.g., enter personal data, paper speed, calibration, interpretation).
- 9.8.2 Describe the steps involved in preparing a patient/client for an EKG.
- 9.8.3 Demonstrate proper placement of electrodes for a 12-lead EKG.
- 9.8.4 Obtain a legible rhythm strip with a 12-lead EKG.
- 9.8.5 Prepare a 12-lead EKG tracing for physician interpretation.

Unit 10: Massage Therapist Specialization

BIL: Essential

EDU:	12	AD
	I	P

Competency 10.1: Explain the theory and principles of massage theory.

Descriptor:

- 10.1.1 Explain the foundations of therapeutic application of touch.
- 10.1.2 Describe the scientific art of therapeutic massage.
- 10.1.3 Describe table position, body mechanics and draping for client privacy.
- 10.1.4 Explain the medical and psychological effects of massage.
- 10.1.5 Explain benefits, indications, contraindications and endangerment areas of massage therapy.
- 10.1.6 Describe physiological effects of heat and cold applications.
- 10.1.7 Recognize certain classifications of drugs (e.g., antipyretics, analgesics).
- 10.1.8 Describe common imbalances of the various body systems.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Science Academic Content Benchmarks

- *Recognize that scientific literacy is part of being a knowledgeable citizen.* (Scientific Ways of Knowing D, 9-10)
- *Explain how societal issues and considerations affect the progress of science and technology.* (Scientific Ways of Knowing C, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 10.2: Analyze the skeletal and bone tissue areas of the body anatomy.

Descriptor:

- 10.2.1 Describe bone tissue and bone formation.
- 10.2.2 Explain the histology of compact and spongy bone.
- 10.2.3 Identify the different types of bone fractures and the process of bone repair.
- 10.2.4 Differentiate bones of the axial skeleton from the appendicular skeleton.
- 10.2.5 Explain bone surface markings.
- 10.2.6 Describe the bones of the axial skeleton.
- 10.2.7 Describe the bones of the appendicular skeleton.

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 10.3: Analyze the articulation areas of the body.

Descriptor:

- 10.3.1 Classify joints into structural and functional categories.
- 10.3.2 Describe rotator cuff and knee injuries.
- 10.3.3 Explain the factors affecting range of motion (ROM).
- 10.3.4 Describe the structures of the shoulder, hip, elbow and knee.
- 10.3.5 Differentiate between a sprain and a strain.

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 10.4: Analyze muscle tissue and the muscular system.

Descriptor:

- 10.4.1 Describe the types and functions of muscle tissue and fascia.
- 10.4.2 Explain the structure of the neuromuscular junction and motor unit.
- 10.4.3 Describe the sequence of muscle metabolism associated with muscular activity.
- 10.4.4 Differentiate between skeletal, cardiac and smooth muscle.
- 10.4.5 Describe the different types of muscle contractions.
- 10.4.6 Describe the origin and insertion, actions, innervations and common injuries of the various muscles.
- 10.4.7 Describe the skeletal muscle as a functional unit of origin containing skeletal muscle, connective tissue, nervous and vascular tissue.
- 10.4.8 Compare three types of levers.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 10.5: Analyze nerve tissue and the nervous system.

Descriptor:

- 10.5.1 Describe the types of neuralgia and structure of a typical neuron.
- 10.5.2 Differentiate gray matter from white matter.

- 10.5.3 Explain the phase of action potential and signal transmission at synapses.
- 10.5.4 Describe damage and repair of peripheral neurons.
- 10.5.5 Explain the classes and function of neurotransmitters.
- 10.5.6 Analyze the structure and function of the spinal cord and spinal nerves.
- 10.5.7 Explain the structure and functions of the brain stem, cerebellum, diencephalons and cerebrum.
- 10.5.8 Describe the autonomic nervous system and its function.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 10.6: Analyze the sensory, motor and integrative system.

Descriptor:

- 10.6.1 Describe the different senses and their anatomical structures.
- 10.6.2 Explain the physiology of vision.
- 10.6.3 Describe the physiology of hearing and equilibrium.
- 10.6.4 Classify sensory receptors according to location and stimulus.
- 10.6.5 Describe the organization of the sensory and motor cortex.
- 10.6.6 Discuss learning and memory.
- 10.6.7 Describe wakefulness and sleep.

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*
- *Demonstrate that waves (e.g., sound, seismic, water and light) have energy and waves can transfer energy when they interact with matter. (Physical Sciences G, 9-10)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 10.7: Analyze the endocrine system.

Descriptor:

- 10.7.1 Classify the major groups of hormones according to chemistry.
- 10.7.2 Describe the mechanisms of hormonal actions.
- 10.7.3 Discuss the location, histology and major functions of each endocrine gland, their hormones and target tissues.
- 10.7.4 Describe how the body responds to stress.

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 10.8: Analyze the circulatory system.

Descriptor:

- 10.8.1 Describe the physical characteristics, components and functions of blood.
- 10.8.2 Discuss the relationship of blood to interstitial fluid and lymph.
- 10.8.3 Explain the ABO and Rh blood groups.
- 10.8.4 Describe the structure of the heart and pericardium.
- 10.8.5 Trace the flow of blood through the heart and systemic and pulmonary circulatory.
- 10.8.6 Describe the structure and function of arteries, veins and capillaries.
- 10.8.7 Explain the factors that regulate velocity and volume of blood flow.
- 10.8.8 Describe how blood pressure is regulated.

Correlated Science Academic Content Benchmarks

- *Explain the characteristics of life as indicated by cellular processes and describe the process of cell division and development. (Life Sciences B, 9-10)*
- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 10.9: Analyze the lymphatic, respiratory, digestive, urinary and reproductive systems.

Descriptor:

- 10.9.1 Describe the formation of the lymph, lymphatic vessels and direction of lymph flow.
- 10.9.2 Explain the structure and function of bone marrow, thymus gland, lymph nodes, spleen and lymphatic nodules.
- 10.9.3 Describe the structure and function of the respiratory system.
- 10.9.4 Discuss pulmonary ventilation and how respiratory rates are controlled.
- 10.9.5 Describe the structure of the digestive system and its accessories.
- 10.9.6 Explain the function of the stomach, small intestine, large intestine and accessory glands.
- 10.9.7 Explain the structure and function of the urinary system.
- 10.9.8 Differentiate the anatomy, structure and function of the male and female reproductive systems.

Correlated Science Academic Content Benchmarks

- *Explain the characteristics of life as indicated by cellular processes and describe the process of cell division and development.* (Life Sciences B, 9-10)
- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 10.10: **Discuss massage manipulations and techniques.**

Descriptor:

- 10.10.1 Describe the manipulations and techniques of massage (e.g., touch, friction, kneading, percussion).
- 10.10.2 Describe physiological effects of massage techniques.
- 10.10.3 Describe the complimentary body works systems.
- 10.10.4 Discuss alternative and adjunctive therapies (e.g., seated, sports, infant, foot).
- 10.10.5 Describe the role of the massage therapist in wellness education.
- 10.10.6 Explain the assessment procedures for developing a care plan.
- 10.10.7 Discuss client education, results and benefits.

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 10.11: **Explain the legal and ethical issues related to massage therapy.**

Descriptor:

- 10.11.1 Describe the state and local legal boundaries of massage therapy.
- 10.11.2 Discuss the ethical and professional issues of massage therapy.
- 10.11.3 Describe adaptive massage and client management issues.
- 10.11.4 Explain how massage therapist behavior may enhance or compromise client well-being.

Correlated Social Studies Academic Content Benchmarks

- *Evaluate, take and defend positions about issues concerning the alignment of the characteristics of American democracy with realities in the United States today.* (Government A, 11-12)
- *Evaluate various means for citizens to take action on a particular issue.* (Citizenship Rights and Responsibilities A, 11-12)
- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 10.12: Explain the documentation required for massage therapy services.

Descriptor:

- 10.12.1 Discuss documentation of client history (e.g., medications, medical reports, referral from other professional).
- 10.12.2 Conduct and document client interviews (e.g., physical assessment, posture and gait analysis, muscle testing, range of motion).
- 10.12.3 Utilize medical terminology for professional record keeping.
- 10.12.4 Diagram a client chart using Subjective-Objective-Assessment-Plan (SOAP) charting.
- 10.12.5 Discuss referral to other professionals for complimentary care.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 10.13: Discuss the art of communications between hands and the mind.

Descriptor:

- 10.13.1 Discuss the emotional aspects a client experiences during a massage.
- 10.13.2 Describe the value of respect and empathy.
- 10.13.3 Discuss how the hands sense emotions from the client's tissues, muscles and bones.

BIL: Essential

EDU:	12	AD
		P

Competency 10.14: Demonstrate massage manipulations and techniques.

Descriptor:

- 10.14.1 Apply basic strokes utilized for application of general massage.

- 10.14.2 Demonstrate appropriate use of heat and cold applications.
- 10.14.3 Demonstrate appropriate body mechanics, table positioning and draping.
- 10.14.4 Apply the basic strokes of massage (e.g., touch, effleurage, petrissage, kneading, percussion).

Unit 11: Nurse Assistant Specialization
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 11.1: Define the nurse assistant role.

Descriptors:

- 11.1.1 Describe the current and future trends, issues and role of the nurse assistant.
- 11.1.2 Identify the professional associations related to the nurse assistant.
- 11.1.3 Discuss the specializations within the nurse assistant role (e.g., job titles, types of work).
- 11.1.4 Identify education and training required to work as a nurse assistant.
- 11.1.5 Describe the ways of gaining entry and access to the nurse assistant role.
- 11.1.6 Identify employment opportunities for the nurse assistant.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources.* (Research C, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Use historical interpretations to explain current issues.* (History B, 11-12)
- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 11.2: Demonstrate performance of basic personal care.

Descriptors:

- 11.2.1 Interact with resident/client.
- 11.2.2 Administer or assist resident/client with personal care.
- 11.2.3 Apply principles of body mechanics for nurse assistant and resident/client.
- 11.2.4 Assist with elimination needs.
- 11.2.5 Provide comfort measures.
- 11.2.6 Demonstrate proper transfer techniques.
- 11.2.7 Measure and record vital signs according to facility policy.
- 11.2.8 Employ techniques for adequate nutrition and hydration of resident/client.

Correlated English Language Arts Academic Content Benchmarks

- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)
- *Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histograms, scatterplots, measures of center and variability.* (Data Analysis and Probability A, 8-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 11.3: Perform tasks as delegated by the nurse.

Descriptors:

- 11.3.1 Assist with admissions, transfers and discharges.
- 11.3.2 Document activities of daily living (ADL) according to facility policy.
- 11.3.3 Measure intake and output.
- 11.3.4 Collect specimens according to facility policy.
- 11.3.5 Assist with a dying resident/client.

Correlated English Language Arts Academic Content Benchmarks

- *Use appropriate self-monitoring strategies for comprehension.* (Reading Process C, 8-10; Reading Process C, 11-12)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers’ problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 11.4: Explain the effects of the aging process.

Descriptors:

- 11.4.1 Identify the physical, emotional and psychosocial changes across the lifespan.
- 11.4.2 Apply individualized interventions for care of resident/client with special needs.
- 11.4.3 Explain restorative care.
- 11.4.4 Contribute to the assessment, planning and evaluation of nursing care.

Correlated Social Studies Academic Content Benchmark

- *Analyze how issues may be viewed differently by various cultural groups.* (People in Societies A, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 11.5: **Comply with personal safety and hygiene regulations.**

Descriptors:

- 11.5.1 Define standard precautions for health care professionals (e.g. EPA, CDC/OSHA).
- 11.5.2 Identify consequences of disregarding safety policies.
- 11.5.3 Maintain personal health (e.g., annual physical, immunizations).
- 11.5.4 Follow policies for proper disposal of non-hazardous and hazardous materials (e.g., HMIS, MSDS, OSHA).

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 11.6: **Comply with client’s rights, within the scope of practice.**

Descriptors:

- 11.6.1 Comply with client’s rights according to current legislation and regulations (e.g., Omnibus Reconciliation Act of 1997 [OBRA], Patient Bill of Rights).
- 11.6.2 Identify legal rights of clients.
- 11.6.3 Discuss ways to respect client rights.

Correlated English Language Arts Academic Content Benchmark

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

Unit 12: Dental Assistant Specialization
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 12.1: Explore the dental assistant profession.

Descriptors:

- 12.1.1 Explain what Doctor of Dental Surgery (DDS) and Doctor of Dental Medicine (DMD) stand for.
- 12.1.2 Describe, generally, the career skills performed by dentists, dental assistants, dental hygienists, Certified Dental Assistants (CDA), dental laboratory technicians and expanded functions dental auxiliaries (EFDAs).
- 12.1.3 List the education required for and the professional organizations that represent each profession.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources.* (Research C, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 12.2: Explain ethics and jurisprudence as it applies to dentistry.

Descriptors:

- 12.2.1 Define the Dental Practice Act and what it covers.
- 12.2.2 Identify who oversees the Dental Practice Act and how licenses for the dental field are obtained.
- 12.2.3 Define the requirements and process to gain radiography certification and Certified Dental Assistant status.
- 12.2.4 Define ethics and give examples of the American Dental Association’s and American Dental Assistants Association’s principles of ethics.

Correlated English Language Arts Academic Content Benchmark

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 12.3: **Explain oral health and nutritional factors as they relate to dentistry.**

Descriptors:

- 12.3.1 Describe how plaque forms and affects the teeth.
- 12.3.2 Identify the oral hygiene aids available to all patients, including manual and automatic.
- 12.3.3 Demonstrate tooth brushing techniques.
- 12.3.4 Identify types of dental floss and demonstrate flossing technique.
- 12.3.5 Describe fluoride and its use in dentistry.
- 12.3.6 Define fluoridation and describe its effectiveness on tooth development and the post-eruption stage.
- 12.3.7 Describe how an understanding of nutrition is used in the dental assisting profession.

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 12.4: **Describe basic anatomical structures of the head and neck as utilized in the dental assistant profession.**

Descriptors:

- 12.4.1 Describe the basic structures and functions of body systems (e.g., skeletal, muscular, nervous, circulatory, respiratory).
- 12.4.2 List and identify the major landmarks of the face and oral cavity.
- 12.4.3 Identify the bones of the cranium and the face, and identify the landmarks on the maxilla and mandible.
- 12.4.4 Identify the parts of the temporomandibular joint (TMJ) and describe how the joint works.
- 12.4.5 Identify and explain the functions of the muscles of mastication, facial expression, the floor of the mouth, the tongue, the throat, the neck and the shoulders.
- 12.4.6 List and identify the nerves of the maxilla and the mandible.
- 12.4.7 Identify the major arteries and veins of the head and neck.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 12.5: Describe structure and function of teeth.

Descriptors:

- 12.5.1 Identify the four primary structures of the tooth and the location and function of each.
- 12.5.2 Identify the substances of enamel, dentin, cementum and pulp.
- 12.5.3 Identify the components of the periodontium and the considerations of the alveolar bone.
- 12.5.4 Describe the structures of the gingival and the mucosa.
- 12.5.5 Identify the dental arches and quadrants using the correct terminology.
- 12.5.6 List the primary and permanent teeth by name and location.
- 12.5.7 Describe the eruption schedule for the primary and permanent teeth.
- 12.5.8 Identify the surfaces of each tooth and their locations.
- 12.5.9 List the anatomical structures and their definitions.
- 12.5.10 Describe each permanent and deciduous (primary) tooth according to location, anatomical features, morphology, function, position and other identifying factors.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 12.6: Explain dental charting and its importance in dentistry.

Descriptors:

Explain why charting is used in most dental practices.

- 12.6.2 Identify charts and their symbols to represent conditions in the oral cavities.
- 12.6.3 Define G.V. Black's six classifications of cavity preparations.
- 12.6.4 Describe basic dental charting terminology, including normal and abnormal conditions.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 12.7: Explain the importance and procedures of infection control in a dental office.

Descriptors:

- 12.7.1 Maintain personal health records (e.g., physicals, inoculations).
- 12.7.2 Identify the rationale, regulations, recommendations and training that govern infection control in the dental office.
- 12.7.3 Describe how pathogens travel from person to person in the dental office.
- 12.7.4 List the three primary routes of microbial transmission and the associated dental procedures that affect the dental assistant.
- 12.7.5 Demonstrate the principles of handwashing.
- 12.7.6 List various disinfectants and their applications as used in dentistry.
- 12.7.7 Identify and demonstrate the usage of different types of sterilizers.
- 12.7.8 Demonstrate the usage of several types of sterilization monitors, such as biological and process indicators.
- 12.7.9 Identify and show the proper usage of pre-procedure mouth rinses, high volume evacuation, dental dams and disposable items.
- 12.7.10 Identify and demonstrate the correct protocol for disinfection, cleaning and sterilizing prior to seating the patient, as well as at the end of the dental treatment, in the dental radiography area and in the dental laboratories.

BIL: Essential

EDU:	12	AD
	P	R

Competency 12.8: Describe the proper steps necessary for preparation of patient care.

Descriptors:

- 12.8.1 Help the patient complete the patient history.
- 12.8.2 Review the medical and dental history and alert the dentist to any areas of concern.
- 12.8.3 Perform or assist the dentist in an oral evaluation, including lips, tongue, glands and oral cavity.
- 12.8.4 Perform vital signs on the patient, including temperature, pulse, respiration and blood pressure.
- 12.8.5 Read and understand the vital signs and alert the dentist if the signs are abnormal.

Correlated English Language Arts Academic Content Benchmarks

- *Use appropriate self-monitoring strategies for comprehension.* (Reading Process C, 8-10; Reading Process C, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)
- *Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histograms, scatterplots, measures of center and variability.* (Data Analysis and Probability A, 8-10)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 12.9: Describe the management of hazardous materials in the dental office.

Descriptors:

- 12.9.1 Identify the scope of the OSHA bloodborne/hazardous materials standard.
- 12.9.2 Identify physical equipment and mechanical devices provided to safeguard employees (e.g., eyewash station, sharps containers).
- 12.9.3 Demonstrate safe disposal of sharps.
- 12.9.4 Describe MSDS manuals and their importance.
- 12.9.5 Demonstrate the use of the colors and numbers in hazardous chemical identification.
- 12.9.6 Describe employee training required to meet the OSHA standard for hazardous chemicals.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 12.10: Explain pharmacology and its use in dental procedures.

Descriptors:

- 12.10.1 Identify the terms related to drugs, pharmacology and medicines.
- 12.10.2 Identify the difference between drug brand names and generic names.
- 12.10.3 Identify the parts of a written prescription.
- 12.10.4 Specify the drug laws (prescription fraud, etc.) and who enforces them.
- 12.10.5 Identify the routes through which drugs can be administered.
- 12.10.6 Summarize the uses and effects of tobacco, caffeine, alcohol, marijuana and cocaine.
- 12.10.7 Describe drugs used in dentistry and the ways in which they are used.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 12.11: Explain potential emergencies in the dental office.

Descriptors:

- 12.11.1 Describe several emergency situations that may take place in the dental office and explain how dental assistants can be prepared for these possibilities.
- 12.11.2 Demonstrate the ABC's of CPR and associated skills.
- 12.11.3 Identify the causes, signs and treatments of the emergencies of syncope, asthma, allergic reactions, anaphylactic reaction, hyperventilation, epilepsy, diabetes mellitus, hypoglycemia, angina pectoris, myocardial infarction, congestive heart failure and stroke/cerebrovascular accident (CVA).
- 12.11.4 Identify several dental emergencies that a patient may have, such as an abscessed tooth, avulsed tooth, broken prosthesis, soft tissue injury, broken tooth and loose crown.

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 12.12: Explain radiology procedures in dental practices.

Descriptors:

- 12.12.1 List the properties of radiation and explain the biological effects of radiation exposure.
- 12.12.2 Identify the components of a dental x-ray unit and explain the function of each component.
- 12.12.3 Describe the safety precautions for the operator and patient when using radiation.
- 12.12.4 Explain how an x-ray is produced.
- 12.12.5 Describe the composition, sizes, types and storage of dental x-ray film.
- 12.12.6 Explain the bisecting and paralleling techniques and equipment used.

- 12.12.7 List common production and processing errors.
- 12.12.8 Demonstrate correct mounting procedures.
- 12.12.9 Identify extraoral films, and describe exposing techniques such as panoramic radiographs.
- 12.12.10 List standardized procedures, and state policies that dental offices follow to ensure quality radiographs.
- 12.12.11 Identify imaging systems used for dental purposes, including types of digital radiography and computer systems.
- 12.12.12 Define As Low as Reasonably Achievable (ALARA).

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)
- *Demonstrate that waves (e.g., sound, seismic, water and light) have energy and waves can transfer energy when they interact with matter.* (Physical Sciences G, 9-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 12.13: Explain basic dental office and dental assisting operations and procedures.

Descriptors:

- 12.13.1 Describe the design of a dental office, explaining the purpose of each area.
- 12.13.2 Describe the equipment and function of the equipment in each area.
- 12.13.3 Explain basic concepts of chairside assisting.
- 12.13.4 Describe the necessary steps to prepare a patient for treatment.
- 12.13.5 Explain the necessary steps to seat the patient for treatment.
- 12.13.6 Describe the ergonomics of the operator and the assistant at chairside.
- 12.13.7 Describe the necessary steps to dismiss the patient after treatment is concluded.
- 12.13.8 Identify the special needs of certain patients (e.g., pregnancy, wheelchair).

BIL: Essential

EDU:	12	AD
	P	R

Competency 12.14: Explain various instruments used in dentistry.

Descriptors:

- 12.14.1 Describe how instruments are identified.
- 12.14.2 Identify the categories and functions of dental burs.
- 12.14.3 Describe the types and functions of abrasives.
- 12.14.4 Explain the various handpieces and attachments.
- 12.14.5 Describe the types of tray systems and color-coding systems.
- 12.14.6 Describe the grasps, positions and transfer of instruments for a procedure (4-handed and 6-handed dentistry).
- 12.14.7 Explain the purpose of the dental dam and identify who places the dental dam on a patient.

- 12.14.8 Explain the advantages and contraindications of the dental dam.
 12.14.9 Identify the armamentarium needed for the dental dam procedure and explain the function of each.

BIL: Essential

EDU:	12	AD
	I	P

Competency 12.15: Explain proper management of a dental patient’s pain and anxiety.

Descriptors:

- 12.15.1 Describe the methods used to manage the pain and anxiety related to dental procedures.
 12.15.2 Explain different topical anesthetics and their placements.
 12.15.3 Describe types of local anesthetics.
 12.15.4 List the steps for preparing for the administration of local anesthetic.
 12.15.5 Identify the injection sites for the maxillary and mandibular arches.
 12.15.6 Describe the equipment and materials needed to administer local anesthetic.
 12.15.7 Discuss the role of nitrous oxide in the care of the dental patient.
 12.15.8 Explain the assistant’s role in the administration of nitrous oxide, as defined by law.

BIL: Essential

EDU:	12	AD
	P	R

Competency 12.16: Demonstrate dental laboratory procedures.

Descriptors:

- 12.16.1 Prepare, take and remove impressions and wax bites.
 12.16.2 Use gypsum products such as Type 1: Impression plaster; Type II: laboratory or model plaster; Type III: laboratory stone; Type IV: die stone; and Type V: high strength die stone.
 12.16.3 Pour and trim a patient’s impression (diagnostic cast).
 12.16.4 Identify the use of a dental articulator for dental casts or study models.
 12.16.5 Fabricate acrylic tray resin self-curing and light-curing custom trays, vacuum-formed and thermoplastic custom trays.
 12.16.6 Contour prefabricated temporary crowns and to fabricate and fit custom temporary restorations.

BIL: Essential

EDU:	12	AD
	P	R

Competency 12.17: Examine various dental restorative materials.

Descriptors:

- 12.17.1 List and explain the properties of dental materials.
 12.17.2 List the types of materials used to restore cavity preparations.
 12.17.3 Identify the types of dental cements and explain their properties, composition, uses and manipulation.
 12.17.4 Describe bonding agents and their manipulation.

- 12.17.5 Identify the types of direct restorative materials and where they are used.
- 12.17.6 Explain the properties, composition and manipulation of dental amalgam.
- 12.17.7 Identify the armamentarium and steps of an amalgam procedure.
- 12.17.8 Explain the composition of composite resins.
- 12.17.9 Explain the properties and manipulation of various composite restorations.
- 12.17.10 Identify the armamentarium and steps of a composite restoration.
- 12.17.11 Explain the use of glass ionomer, resin, resin reinforced glass ionomers and composite restorative materials.

Correlated Science Academic Content Benchmark

- *Describe the identifiable physical properties of substances (e.g., color, hardness, conductivity, density, concentration and ductility). Explain how changes in these properties can occur without changing the chemical nature of the substance. (Physical Sciences C, 9-10)*

BIL: Essential

EDU:	12	AD
	P	R

Competency 12.18: Explore various specialty procedures in dentistry.

Descriptors:

- 12.18.1 Define pediatric dentistry as a specialty.
- 12.18.2 Identify common procedures and equipment unique to pediatric dentistry.
- 12.18.3 Identify the signs of child abuse and the procedure for reporting suspected child abuse cases.
- 12.18.4 Define orthodontics and describe the orthodontic facility.
- 12.18.5 Define the role of the dental assistant in an orthodontic facility.
- 12.18.6 Define endodontics and describe what an endodontist does.
- 12.18.7 Identify instruments used in endodontic procedures and their functions.
- 12.18.8 Identify materials used in endodontics and their function.
- 12.18.9 Describe endodontic procedures and the role of the dental assistant.
- 12.18.10 Describe the scope of oral surgery.
- 12.18.11 Discuss suture technique and suture removal.
- 12.18.12 Explain the functions of sutures when they are placed.
- 12.18.13 Describe the scope of periodontics.
- 12.18.14 Describe the stages of periodontal disease.
- 12.18.15 Demonstrate how to record a periodontal charting.
- 12.18.16 Explain surgical procedures and the role of the dental assistant.
- 12.18.17 Define the scope of fixed prosthodontics including crown, bridge and implants.
- 12.18.18 Define removable prostheses and list the reasons for using them.
- 12.18.19 Explain the dental assistant’s role in removable prosthetic treatment.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Acquisition of Vocabulary D, 11-12)*
- *Use multiple resources to enhance comprehension of vocabulary. (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)*

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 12.19: Comply with personal safety and hygiene regulations.

Descriptors:

- 12.19.1 Define standard precautions for health care professionals (e.g., CDC, OSHA).
- 12.19.2 Identify consequences of disregarding safety policies.
- 12.19.3 Complete and maintain CPR and AED certification.

Correlated English Language Arts Academic Content Benchmark

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

Unit 13: Pharmacy Technician Specialization

BIL: Essential

EDU:	12	AD
	P	R

Competency 13.1: Define the pharmacy technician profession and practice.

Descriptors:

- 13.1.1 Discuss the role of the pharmacy technician.
- 13.1.2 Identify the professional associations related to the practice of the pharmacy technician.
- 13.1.3 Identify career opportunities.
- 13.1.4 Explain how state laws and regulations determine what duties can be delegated by a pharmacist to the technician.
- 13.1.5 Discuss the importance of and resources for staying current with changes in pharmacy practice.
- 13.1.6 Demonstrate ethical conduct in all job-related activities.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources.* (Research C, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 13.2: Use appropriate pharmaceutical terminology.

Descriptors:

- 13.2.1 Discuss the role of the pharmacy technician.
- 13.2.2 Use and comprehend pharmaceutical abbreviations and symbols used in the prescribing and dispensing of drugs.
- 13.2.3 Use and comprehend medical abbreviations used in the prescribing and dispensing of drugs.
- 13.2.4 Identify a fraudulent prescription.
- 13.2.5 Interpret the elements of a prescription.
- 13.2.6 State and follow guidelines to properly transcribe directions.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Evaluate how features and characteristics make information accessible and usable and how structures help authors achieve their purposes.* (Reading Applications: Informational, Technical and Persuasive Text A, 8-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 13.3: Explain the general concepts of pharmacology.

Descriptors:

- 13.3.1 Define general pharmacological terminology such as: pharmacodynamics, pharmacokinetics, pharmacotherapeutics, pharmacy, toxicology, bioequivalence.
- 13.3.2 Compare/contrast bioequivalence and bioavailability.
- 13.3.3 Identify proper drug storage conditions regarding to heat/light/moisture.
- 13.3.4 Explain human variables that affect drug activity.
- 13.3.5 Explain adverse drug reactions, drug/drug, drug/diet interactions that affect drug activity.
- 13.3.6 Identify disease states that affect drug activity.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 13.4: Identify medication routes and formulations.

Descriptors:

- List and describe the various routes of administration such as oral, sublingual, buccal, rectal, etc.
- Describe various dosage administration forms such as tablet, capsule, syrup and specialized preparations (e.g., extended release, dermal patches, enteric coated).
- List advantages/disadvantages and limitations of various routes of administration.

BIL: Essential

EDU:	12	AD
	P	R

Competency 13.5: Demonstrate the prescription filling process.

Descriptors:

- 13.5.1 Refer appropriate problems to the pharmacist.
- 13.5.2 Identify when a generic substitution is warranted.
- 13.5.3 Select and prepare the medication(s) indicated on the prescription or medication order.
- 13.5.4 Use appropriate materials and techniques to prepare medications.
- 13.5.5 Describe United States Pharmacopeia (USP) requirements for labeling on all prepackaged products (e.g., prescription number, date, patient's name, directions, physician's name, product name/generic equivalent, quantity, refill information).

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Use appropriate self-monitoring strategies for comprehension.* (Reading Process C, 8-10; Reading Process C, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 13.6: Perform calculations and conversions required in pharmacy practice.

Descriptors:

- 13.6.1 Convert Roman numerals into Arabic numerals.
- 13.6.2 Perform calculations and conversions between metric, household and apothecary.
- 13.6.3 Demonstrate proficiency with calculations (e.g., decimals, fractions, ratio).
- 13.6.4 Calculate day's supply and dispense quantity.
- 13.6.5 Calculate dosage based on body weight.
- 13.6.6 Calculate parenteral doses, percent solutions, ratio solutions and dilutions.
- 13.6.7 Calculate infusion rates and drip rates.

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates.* (Measurement D, 8-10)
- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 13.7: Explain various drug information.

Descriptors:

- 13.7.1 Explain a variety of drug classifications (e.g., antitussive, benzodiazepines, beta blockers).
- 13.7.2 Identify the brand and generic names of the top 100 drugs dispensed in a particular geographic area.
- 13.7.3 Recognize look-alike/sound-alike drugs.

BIL: Essential

EDU:	12	AD
	I	P

Competency 13.8: Explain the use and side effects of prescription medications, nonprescription medications and alternative therapies.

Descriptors:

- 13.8.1 Explain the use and side effects of prescription medications.
- 13.8.2 Explain the use and side effects of nonprescription medications.
- 13.8.3 Explain the use and side effects of alternative therapies.
- 13.8.4 Explain the role of the FDA in regulating herbal products.

Correlated Social Studies Academic Content Benchmarks

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 13.9: Participate in the pharmacy department's process for preventing medication errors.

Descriptors:

- 13.9.1 Discuss the characteristics of an effective departmental approach to preventing errors.
- 13.9.2 Describe the procedures currently in place for reporting medication errors.
- 13.9.3 Describe the procedure for reporting adverse medication reactions.

BIL: Essential

EDU:	12	AD
	I	P

Competency 13.10: Assist with collecting, organizing and evaluating information for direct patient care.

Descriptors:

- 13.10.1 Discuss state laws and regulations for activities associated with collection of patient specific information.
- 13.10.2 Maintain confidentiality of patient and proprietary business information.
- 13.10.3 Describe the procedures involved in receiving and screening prescription/medication orders for completeness and authenticity.
- 13.10.4 Demonstrate preparation of medications for distribution.
- 13.10.5 Demonstrate the process of verification and preparation, of medications produced by other technicians.
- 13.10.6 Explain the process of billing and payment of pharmacy services and prescription coverage plans.
- 13.10.7 Describe the methods of inventory control of medications, equipment and devices.

Correlated English Language Arts Academic Content Benchmark

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Mathematics Academic Content Benchmark

- *Apply mathematical knowledge and skills routinely in other content areas and practical situations.* (Mathematical Processes B, 8-10)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

Unit 14: Surgical Technician Specialization

BIL: Essential

EDU:	12	AD
	P	R

Competency 14.1: Define the surgical technician's role.

Descriptors:

- 14.1.1 Describe the current and future trends, issues and roles of the surgical technician.
- 14.1.2 Identify the professional associations related to the surgical technician.
- 14.1.3 Discuss the specializations within the surgical technician's role (e.g., job titles, types of work).
- 14.1.4 Identify education and training required to work as a surgical technician.
- 14.1.5 Describe the ways of gaining entry and access to the surgical technician profession.
- 14.1.6 Identify employment opportunities for the surgical technician.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Use historical interpretations to explain current issues.* (History B, 11-12)
- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 14.2: Demonstrate patient care concepts.

Descriptors:

- 14.2.1 Describe a safe, efficient and supportive environment for the patient.
- 14.2.2 Identify a patient's response to illness.
- 14.2.3 Demonstrate proper transportation of the surgical patient.
- 14.2.4 Apply monitoring equipment to the patient and assess for any abnormalities.

BIL: Essential

EDU:	12	AD
	P	R

Competency 14.3: Demonstrate the principles of asepsis application.

Descriptors:

- 14.3.1 Describe the principles of sterile technique.
- 14.3.2 Apply the principles of sterile technique to various operative procedures.
- 14.3.3 Describe the methods of care and handling of surgical instruments.
- 14.3.4 Apply the methods of care and handling of surgical instruments (e.g., sterilization of instruments, disinfection, antisepsis).

BIL: Essential

EDU:	12	AD
	P	R

Competency 14.4: Demonstrate basic surgical care preparation skills.

Descriptors:

- 14.4.1 Describe normal and pathological anatomy and physiology to individualize patient care.
- 14.4.2 Demonstrate creation and maintenance of the sterile field.
- 14.4.3 Identify the basic surgical instruments by type, function and name.
- 14.4.4 Identify common sponges and dressings.
- 14.4.5 Identify major types of catheters, drains, tubes and collecting mechanisms.
- 14.4.6 Identify suture materials and stapling devices for specific procedures.
- 14.4.7 Prepare appropriate suture and stapling devices for specific procedures.
- 14.4.8 Demonstrate care, handling and assembly of accessory and specialty equipment.
- 14.4.9 Demonstrate proper draping of patient for specific procedures.
- 14.4.10 Discuss necessity of accounting for all instruments, sponges, needles per policy and procedures.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 14.5: Demonstrate the scrub person's duties.

Descriptors:

- 14.5.1 Discuss the principles of correct hand scrub.
- 14.5.2 Apply gown and gloves.
- 14.5.3 Demonstrate proper passing of instruments, supplies and sutures, as requested by the surgeon.

- 14.5.4 Prepare medications and irrigating solutions as requested by the surgeon.
- 14.5.5 Discuss emergency situations and corrective action.
- 14.5.6 Explain the various step-by-step procedures of a scrub person's responsibility.

BIL: Essential

EDU:	12	AD
	P	R

Competency 14.6: Demonstrate the circulator duties.

Descriptors:

- 14.6.1 Demonstrate selection and preparation of supplies and equipment for the operative team.
- 14.6.2 Discuss the care of the patient for various procedures.
- 14.6.3 Assist anesthesia personnel as needed.
- 14.6.4 Apply appropriate equipment to the patient, as requested by the surgeon.
- 14.6.5 Demonstrate positioning of a patient for a surgical procedure.
- 14.6.6 Prepare the operative site for surgery.
- 14.6.7 Prepare all specimens for laboratory analysis.
- 14.6.8 Identify emergency situations and assist with appropriate treatment.

Emergency Medical Service (EMS) Specialization

Unit 15: EMS Specialization: EMS Organizations (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 15.1: Examine emergency medical service organizations.

Descriptors:

- 15.1.1 Trace the development of the EMS systems and review emergency medical service careers.
- 15.1.2 Describe emergency medical service systems.
- 15.1.3 Differentiate among and explain the roles and responsibilities of the Emergency Medical Responder, Emergency Medical Technicians (EMT), Advanced EMT and Paramedic.
- 15.1.4 Describe the interrelationships with other public safety agencies.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources.* (Research C, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 15.2: Demonstrate the basic concepts of incident management.

Descriptors:

- 15.2.1 Follow EMS safety and well-being guidelines.
- 15.2.2 Demonstrate guidelines for handling and moving patients.
- 15.2.3 Maintain scene safety.
- 15.2.4 Manage causes of stress for patients, families and pre-hospital care providers.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 15.3: Demonstrate essential communication skills and equipment utilization.

Descriptors:

- 15.3.1 Integrate the principles of communication while providing care.
- 15.3.2 Obtain medical history from a patient.
- 15.3.3 Use EMS local dispatch communication systems.
- 15.3.4 Prepare documentation of patient assessment, care and transport.
- 15.3.5 Use proper medical terminology.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 15.4: Provide for the safety of self, patient and fellow workers.

Descriptors:

- 15.4.1 Discuss the importance of body substance isolation.
- 15.4.2 Describe the steps the EMS providers should take for personal protection from airborne and blood borne pathogens.
- 15.4.3 Identify the presence of hazardous chemicals.
- 15.4.4 Use physician medical direction for authorization to provide care.
- 15.4.5 Discuss legalities and ethics for providing care (e.g., Ohio Do Not Resuscitate [DNR] Law, Comfort Care Law).
- 15.4.6 Discuss the forms of consent.
- 15.4.7 Assess and provide care to patients and families involved in suspected abuse or neglect.
- 15.4.8 Describe warning signs of potentially violent situations (e.g., gangs, hostage/sniper situations, clandestine drugs labs, firearms).
- 15.4.9 Discuss the cleaning, disinfection and disposal of equipment exposed to body substances.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Evaluate how features and characteristics make information accessible and usable and how structures help authors achieve their purposes.* (Reading Applications: Informational, Technical and Persuasive Text A, 8-10)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 15.5: Analyze an incident to determine the magnitude of the situation.

Descriptors:

- 15.5.1 Anticipate and predict the likely behavior and stability of environments, materials, structures, vehicles and/or machinery.
- 15.5.2 Acquire the last known location of the victim(s) and the outside perimeter zone of possible victim(s) locations.
- 15.5.3 Plan an incident response based on available personnel and equipment.
- 15.5.4 Establish and/or enforce scene control procedures and implement the planned response.
- 15.5.5 Transfer sick or injured persons from an unsafe location/environment.
- 15.5.6 Provide triage to victims of multiple casualty incidents.
- 15.5.7 Examine the progress of the planned incident response.

Correlated English Language Arts Academic Content Benchmarks

- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Use appropriate data sources and geographic tools to analyze and evaluate public policies.* (Geography C, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 15.6: Demonstrate rescue and extraction techniques.

Descriptors:

- 15.6.1 Describe a mass causality incident (MCI) and when it should be declared.
- 15.6.2 Support a variety of rescue procedures (e.g., automobile, structural collapse, confined-space, line, machine, trench, water).
- 15.6.3 Differentiate between life-threatening and non-life-threatening entrapment situations.
- 15.6.4 Support urban search operations.
- 15.6.5 Provide emergency medical care during rescue.

Correlated Social Studies Academic Content Benchmarks

- *Use appropriate data sources and geographic tools to analyze and evaluate public policies.* (Geography C, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 15.7: Demonstrate safe handling and transport of patients.

Descriptors:

- 15.7.1 Use body mechanics when lifting and moving a patient.
- 15.7.2 Move a patient from the ground to a stretcher and position patient on the stretcher.
- 15.7.3 Move a patient secured to a stretcher to the ambulance and load the patient.

Unit 16: EMS Specialization: Patient Assessment
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 16.1: Explain patient assessment and initial management procedures, within the scope of practice.

Descriptors:

- 16.1.1 Differentiate between a medical emergency and a trauma situation.
- 16.1.2 Describe the anatomy, physiology and pathophysiology of the human body.
- 16.1.3 Identify normal ranges for vital signs (e.g., blood pressure, temperature, pulse, respiration).
- 16.1.4 Describe the importance of the A-B-Cs during the initial assessment.
- 16.1.5 Explain the developmental, anatomy and physiology considerations for infants, toddlers, pre-school, school-age adolescents, adults and geriatric patients.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 16.2: Demonstrate patient assessment and initial management procedures, within the scope of practice.

Descriptors:

- 16.2.1 Assess vital signs of a sick or injured person.
- 16.2.2 Use medical identification devices.
- 16.2.3 Conduct an initial/focused assessment.
- 16.2.4 Interview individuals at the scene to obtain relevant facts to the sick/injured person's condition.
- 16.2.5 Complete a detailed assessment.

Correlated English Language Arts Academic Content Benchmarks

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)
- *Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histograms, scatterplots, measures of center and variability.* (Data Analysis and Probability A, 8-10)

Unit 17: EMS Specialization: Airway and Ventilation
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 17.1: Analyze airway management and ventilation procedures, within the scope of practice.

Descriptors:

- 17.1.1 Explain the primary objective of airway maintenance.
- 17.1.2 Describe the anatomy and functions of the upper and lower airway.
- 17.1.3 Clarify the relationship between pulmonary circulation and respiration.
- 17.1.4 Describe the equipment and methods for suctioning the airway and pharynx.
- 17.1.5 Differentiate methods and management of airway in an adult, child and infant.
- 17.1.6 Describe the special considerations in airway management and ventilation for patients with facial injuries.

BIL: Essential

EDU:	12	AD
	P	R

Competency 17.2: Perform techniques to manage an airway and ventilate a patient, within the scope of practice.

Descriptors:

- 17.2.1 Demonstrate the skill of artificially ventilating a patient with basic and advanced airway adjuncts.
- 17.2.2 Insert an oropharyngeal and nasopharyngeal airway.
- 17.2.3 Perform assessment to confirm correct placement of the endotracheal tube.
- 17.2.4 Use a non-rebreather facemask and a nasal cannula.
- 17.2.5 Demonstrate artificial ventilation of a patient with a flow-restricted, oxygen-powered ventilation device and bag-valve mask.
- 17.2.6 Demonstrate suctioning techniques.
- 17.2.7 Intubate the trachea using orotracheal and dual lumen airways methods.
- 17.2.8 Demonstrate management of an obstructed airway of an adult, child and infant.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 17.3: Assess and manage respiratory emergencies, within the scope of practice.

Descriptors:

- 17.3.1 Differentiate between adequate and inadequate ventilation, normal and abnormal lung sounds.
- 17.3.2 Describe the anatomy, physiology and pathophysiology of the respiratory system.
- 17.3.3 Identify the normal partial pressures of oxygen and carbon dioxide in the alveoli, arterial and venous blood and factors that affect those levels.
- 17.3.4 Describe the signs, sounds and pathophysiology of conditions affecting the respiratory system.
- 17.3.5 Perform basic life support (BLS)/CPR procedures.
- 17.3.6 Identify the pharmacology, actions, indications, precautions, dosages, contraindications and side effects of typical respiratory drugs.
- 17.3.7 Demonstrate the techniques and routes for administering respiratory drugs.

Correlated English Language Arts Academic Content Benchmark

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

Unit 18: EMS Specialization: Cardiology
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 18.1: Assess and manage the cardiovascular system, within the scope of practice.
Descriptors:

- 18.1.1 Explain the anatomy, physiology and pathophysiology of cardiovascular diseases and emergencies.
- 18.1.2 Describe the components of assessment of a patient with cardiovascular compromise.
- 18.1.3 Describe a systematic approach to the analysis and interpretation of basic electrocardiogram (EKG) and 12-Lead EKG.
- 18.1.4 Identify the clinical presentations of a patient with chest pains that may be angina pectoris or myocardial infraction.
- 18.1.5 Identify the pharmacological agents for use in the management of the patient experiencing chest pain.
- 18.1.6 Describe the clinical presentations of common emergencies (e.g., pulmonary edema, hypertensive emergency, congestive heart failure).
- 18.1.7 Identify critical actions in caring for the patient in cardiac arrest.
- 18.1.8 Identify the pharmacology, actions, indications, precautions, dosages, contraindications and side effects of common cardiovascular drugs.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Apply mathematical knowledge and skills routinely in other content areas and practical situations.* (Mathematical Processes B, 8-10)

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 18.2: Assess and manage cardiac arrest emergencies, within the scope of practice.

Descriptors:

- 18.2.1 Describe the signs, symptoms and common complaints of patients with cardiac problems.
- 18.2.2 Explain the cardiac risk factors, specific observations and physical findings to be evaluated in the cardiac patient.
- 18.2.3 Develop, execute and evaluate a treatment plan for a patient with signs and symptoms of a cardiac emergency.
- 18.2.4 Demonstrate basic and advanced life support techniques (e.g., cardiopulmonary resuscitation, automated external defibrillation, manual defibrillation).
- 18.2.5 Describe the indications for the use of pericardial thump, vagal maneuvers, synchronized cardioversion, defibrillation and external pacing.

BIL: Essential

EDU:	12	AD
	P	R

Competency 18.3: Monitor cardiovascular activity in response to care, within the scope of practice.

Descriptors:

- 18.3.1 Describe the primary interventions various levels of EMS providers can provide for patients during a cardiac arrest.
- 18.3.2 Demonstrate how to set, adjust and read an EKG.
- 18.3.3 Describe etiology, clinical significance and EKG characteristic of cardiac dysrhythmias.
- 18.3.4 Identify waveforms, artifacts and dysrhythmias on Lead, MCL1 rhythm strips and oscilloscope.
- 18.3.5 Apply an EKG electrode and obtain a sample rhythm strip.
- 18.3.6 Perform a pericardial thump, vagal maneuvers, synchronized cardioversion, defibrillation and external pacing.

Unit 19: EMS Specialization: Medical Emergencies
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 19.1: Assess and manage a patient with special needs.

Descriptors:

- 19.1.1 Discuss the special needs patient (e.g. physical, mental, medical).
- 19.1.2 Assess the injury/illness as well as the special needs of the patient.
- 19.1.3 Provide appropriate care in regard to the injury/illness and special needs.

Correlated English Language Arts Academic Content Benchmarks

- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 19.2: Assess and manage a patient with signs and symptoms of infectious and communicable diseases.

Descriptors:

- 19.2.1 Describe the anatomy, physiology, pathophysiology, modes of transmission and incubation periods of typical infectious and communicable diseases and parasites.
- 19.2.2 List signs and symptoms of typical infectious and communicable diseases and parasites.
- 19.2.3 Practice universal precautions according to the Centers for Disease Control (CDC) standards.
- 19.2.4 Report and follow up after exposure to a communicable disease, according to CDC standards.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 19.3: Assess and manage a patient with signs and symptoms of an endocrine emergency, within the scope of practice.

Descriptors:

- 19.3.1 Describe the anatomy, physiology, pathophysiology and assessment of the endocrine system.
- 19.3.2 Identify the pharmacology, actions, indications, precautions, dosages, contraindications and side effects of relevant drugs.
- 19.3.3 Identify patient’s endocrine emergencies.
- 19.3.4 Formulate and administer a relevant treatment plan based on field impression.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 19.4: Assess and manage a patient with signs and symptoms of digestive, genitourinary and reproductive emergencies, within the scope of practice.

Descriptors:

- 19.4.1 Describe the anatomy, physiology, pathophysiology of the digestive, genitourinary and reproductive systems.
- 19.4.2 Identify the pharmacology, actions, indications, precautions, dosages, contraindications and side effects of relevant drugs.
- 19.4.3 Explain the basic principles, types and complications of renal emergencies.
- 19.4.4 Develop and administer a treatment plan based on field impression.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 19.5: **Assess and manage a patient with signs and symptoms of an allergic reaction or anaphylaxis, within the scope of practice.**

Descriptors:

- 19.5.1 Compare the clinical signs and symptoms of allergic reaction versus anaphylactic shock.
- 19.5.2 Recognize the signs and symptoms related to anaphylaxis.
- 19.5.3 Develop a treatment plan based on field impression in the patient with allergic reaction or anaphylaxis.
- 19.5.4 Administer a treatment plan to a patient experiencing an allergic reaction or anaphylactic shock, based on field impression.

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 19.6: **Assess and manage a patient with signs and symptoms of an environmentally-induced emergency, within the scope of practice.**

Descriptors:

- 19.6.1 List signs and symptoms of environmentally-induced emergencies (e.g., near-drowning; heat cramps, heat exhaustion, heat stroke; frostbite; bites and stings; radiation).
- 19.6.2 Recognize the potential hazards of an environmental emergency (e.g. patient, bystanders, EMTs, emergency medical responders.)
- 19.6.3 Develop a patient management plan based on the field impression of the patient.
- 19.6.4 Integrate pathophysiological principles and assessment findings to formulate a field impression and implement a treatment plan.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Use appropriate data sources and geographic tools to analyze and evaluate public policies.* (Geography C, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 19.7: Assess and manage a patient with signs and symptoms of toxic exposure or poisoning, within the scope of practice.

Descriptors:

- 19.7.1 Describe the signs and symptoms of exposure to poisons and other toxic substances.
- 19.7.2 Correlate the assessment findings with the most commonly abused drugs or poisoning substances.
- 19.7.3 Discuss the clinical uses, street names, pharmacology, assessment findings and the management for patients who have taken commonly used street drugs.
- 19.7.4 Distinguish between drug overdose, alcoholism and drug abuse.
- 19.7.5 Differentiate among the various treatments and pharmacological interventions in the management of the most common poisonings by inhalation, ingestion, absorption and injection.
- 19.7.6 Describe the role of the Poison Control Centers in the EMS system.
- 19.7.7 Administer a treatment plan to a patient experiencing toxic exposure or poisoning.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 19.8: Assess and manage a patient with signs and symptoms of a diabetic emergency, within the scope of practice.

Descriptors:

- 19.8.1 Recognize the signs and symptoms of hypoglycemia and hyperglycemia.
- 19.8.2 Describe the management of the patient with hypoglycemia and hyperglycemia.
- 19.8.3 Differentiate between diabetic emergencies based on assessment and history.
- 19.8.4 Demonstrate the appropriate technique to perform glucose monitoring.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 19.9: Assess and manage a patient with a behavioral emergency.

Descriptors:

- 19.9.1 Review techniques for physical assessment in a patient with behavioral emergencies.
- 19.9.2 Describe medical/legal considerations for managing a patient with behavioral emergencies.
- 19.9.3 Formulate a field impression based on the assessment findings for patients with behavioral problems.
- 19.9.4 Review situations in which the EMS provider is expected to transport against the patient's will.
- 19.9.5 Administer a patient management plan based on the field impression.

BIL: Essential

EDU:	12	AD
	P	R

Competency 19.10: Assess and manage a variety of medical emergencies, within the scope of practice.

Descriptors:

- 19.10.1 Discuss the assessment and management of the patient with non-traumatic, acute abdominal pain.
- 19.10.2 Discuss the assessment findings and management for stroke, transient ischemic attack and intracranial hemorrhage.
- 19.10.3 Discuss the assessment findings and management for non-specific coma or altered level of consciousness/syncope/weakness/headache.
- 19.10.4 Discuss the assessment findings and management for epilepsy/seizures.
- 19.10.5 Administer a patient management plan based on the field impression.

Unit 20: EMS Specialization: Trauma
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 20.1: Assess a trauma patient using physical examination techniques.

Descriptors:

- 20.1.1 Explain the importance of the patient assessment in the overall management of the trauma patient.
- 20.1.2 Describe the primary survey/initial assessment using the ABCDE method.
- 20.1.3 Describe the rapid examination skills necessary to evaluate respiration, circulation and level of consciousness/responsiveness.
- 20.1.4 Identify the steps in the secondary survey/focused history and physical examination.
- 20.1.5 Demonstrate a physical examination on a trauma patient.

BIL: Essential

EDU:	12	AD
	P	R

Competency 20.2: Assess and manage a patient who is bleeding, within the scope of practice.

Descriptors:

- 20.2.1 Differentiate between arterial, venous and capillary bleeding.
- 20.2.2 Identify items that can be used to control external bleeding and minimize the contamination of open wounds.
- 20.2.3 Describe a patient with signs and symptoms of hemorrhagic shock.
- 20.2.4 Demonstrate procedures to assist the patient who exhibits signs and symptom of internal bleeding.
- 20.2.5 Recognize the need for body substance isolation (BSI) in bleeding control.

BIL: Essential

EDU:	12	AD
	P	R

Competency 20.3: Evaluate and manage a patient with hemorrhage or shock, within the scope of practice.

Descriptors:

- 20.3.1 Explain the causes, pathophysiology signs, symptoms, clinical manifestations and management of shock.
- 20.3.2 Describe the indications for intravenous fluid replacement.
- 20.3.3 Calculate fluid administration rates for intravenous fluids utilizing a variety of administration sets.
- 20.3.4 Demonstrate resuscitation of shock patient.
- 20.3.5 Identify the need for rapid transport when confronted with continuing hypoperfusion.
- 20.3.6 Manage patients with signs and symptoms of hemorrhagic, compensated hemorrhagic and decompensated hemorrhagic shock.

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates.* (Measurement D, 8-10)
- *Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision.* (Measurement E, 8-10)

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 20.4: **Demonstrate the rapid trauma assessment used to assess a patient based on the mechanism of injury, within the scope of practice.**

Descriptors:

- 20.4.1 Describe the motion and energy considerations of blunt and penetrating mechanisms of injury.
- 20.4.2 Define the role of kinematics as an additional tool for patient assessment.
- 20.4.3 Describe the pathophysiology of the head, spine, thorax and abdomen that result from blunt and penetrating forces.
- 20.4.4 Differentiate between open and closed soft tissues injuries and provide emergency treatment accordingly.
- 20.4.5 Discuss the rapid extrication of a trauma patient.

Correlated Science Academic Content Benchmark

- *Explain the movement of objects by applying Newton's three laws of motion.* (Physical Sciences D, 9-10)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 20.5: **Demonstrate a clinical assessment to determine the proper management mobility for a patient with suspected spinal injury.**

Descriptors:

- 20.5.1 Describe specific mechanisms of injury that can cause spinal injury of various ages.
- 20.5.2 Explain the indications of spinal trauma (e.g., mechanisms of injury, the presence of other trauma due to violent force, specific signs of spinal trauma).

- 20.5.3 Discuss the assessment finding associated with spinal injuries.
- 20.5.4 Immobilize the patient with assessment findings indicative of spinal injury (e.g., supine, prone, semi-prone, sitting, standing).
- 20.5.5 Stabilize the c-spine of a patient wearing a helmet.

Correlated Science Academic Content Benchmark

- *Explain the movement of objects by applying Newton’s three laws of motion.* (Physical Sciences D, 9-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 20.6: Demonstrate techniques for managing thoracic injuries, within the scope of practice.

Descriptors:

- 20.6.1 Define the associated physiology and pathophysiology pertinent to the ventilation interventions on trauma patients.
- 20.6.2 Describe the signs and symptoms of flail chest; simple pneumothorax, tension pneumothorax and hemothorax; pericardial tamponade; aortic, tracheal and bronchial rupture.
- 20.6.3 Perform needle decompression; fracture stabilization; intubation of the apneic patient, ECG monitoring; and oxygenation and ventilation techniques.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 20.7: Demonstrate a clinical assessment to determine the proper plan for a patient with suspected abdominal trauma, within the scope of practice.

Descriptors:

- 20.7.1 Define the associated physiology and pathophysiology of blunt and penetrating injury to the abdomen.
- 20.7.2 Describe specific mechanisms of injury that can cause abdominal trauma.
- 20.7.3 Identify the need for rapid intervention and transport when appropriate.

- 20.7.4 Identify the anatomic and physiologic changes that occur in pregnancy.
- 20.7.5 Identify the proper position for transport of the pregnant trauma patient.

Correlated Science Academic Content Benchmark

- *Explain the movement of objects by applying Newton’s three laws of motion.* (Physical Sciences D, 9-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 20.8: Demonstrate a clinical assessment to determine the proper plan for a patient with musculoskeletal trauma, within the scope of practice.

Descriptors:

- 20.8.1 Identify various types of musculoskeletal injuries.
- 20.8.2 Define the initial and focused assessments as related to extremity trauma.
- 20.8.3 Describe major pathophysiology problems that require management in extremity injuries.
- 20.8.4 Indicate the relationship between hemorrhage and open and closed fractures.
- 20.8.5 Immobilize and care for suspected fractures, dislocations, sprains and strains.
- 20.8.6 Describe the primary signs and symptoms of extremity trauma.
- 20.8.7 Explain the management of extremity trauma, especially in the presence of life-threatening injuries.
- 20.8.8 Describe the management of amputations.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 20.9: Demonstrate a clinical assessment to determine the proper plan for a patient with head trauma, within the scope of practice.

Descriptors:

- 20.9.1 Define the physiology and pathophysiology of hypoperfusion, concussion, contusion, laceration, hematoma and fractures pertaining to the head.
- 20.9.2 Differentiate between different types of facial injuries (e.g., eye, ear, mouth, throat).
- 20.9.3 Define the increased intracranial pressure and list the progression events as pressure rises.
- 20.9.4 Identify the need for rapid transport of a patient with a decreased level of consciousness from a significant head injury.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)
- *Explain the movement of objects by applying Newton’s three laws of motion.* (Physical Sciences D, 9-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 20.10: Demonstrate a clinical assessment to determine the proper plan for a patient with thermal trauma, within the scope of practice.

Descriptors:

- 20.10.1 Describe the basic criteria for assessing burn severity.
- 20.10.2 Calculate percentage of body surface area burned, and apply various formulas for calculating fluid resuscitation.
- 20.10.3 Identify life-threatening injuries resulting from burns that require pre-hospital treatment.
- 20.10.4 Describe signs that indicate inhalation injury and possible respiratory sequelae after burn injury.
- 20.10.5 Define the rule of nines for adult and pediatric patients.
- 20.10.6 Manage a burn victim with or without associated injuries.

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates.* (Measurement D, 8-10)
- *Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision.* (Measurement E, 8-10)

Unit 21: EMS Specialization: Pediatrics
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 21.1: Analyze techniques for successful assessment and treatment of infants and children, within the scope of practice.

Descriptors:

- 21.1.1 Explain the variables that require different assessments and treatments for infants and children.
- 21.1.2 Discuss anatomical features of children that predispose them to or protect them from certain injuries.
- 21.1.3 Identify common lethal mechanism of injury in infants and children.
- 21.1.4 Discuss the indications, dosages, routes of administration and special considerations for administering medication.
- 21.1.5 Describe diseases and injuries common to infants and children.

BIL: Essential

EDU:	12	AD
	P	R

Competency 21.2: Assess and manage patient care for infants and children, within the scope of practice.

Descriptors:

- 21.2.1 Demonstrate appropriate intervention techniques with families of acutely ill or injured infants and children.
- 21.2.2 Perform appropriate assessments for different developmental age groups.
- 21.2.3 Demonstrate the various treatments for infants and children with medical emergencies and/or in trauma.

Correlated English Language Arts Academic Content Benchmarks

- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 21.3: **Demonstrate a clinical assessment to determine the proper plan for a pediatric trauma patient, within the scope of practice.**

Descriptors:

- 21.3.1 Explain the special importance of managing the airway and restoring adequate tissue oxygenation in pediatric patients.
- 21.3.2 Identify the quantitative vital signs for pediatrics.
- 21.3.3 Demonstrate assessment techniques for the variety of injuries found in pediatric patients.

Unit 22: EMS Specialization: Obstetrics and Gynecology
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 22.1: Explain the assessment, care and management of an obstetric patient, within the scope of practice.

Descriptors:

- 22.1.1 Review the anatomic structures and physiology of the reproductive system.
- 22.1.2 Identify the stages of labor and the EMS providers role in each stage.
- 22.1.3 Differentiate between normal and abnormal delivery.
- 22.1.4 Assist a patient with a gynecological complaint.
- 22.1.5 Describe procedures for handling complications of labor.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 22.2: Demonstrate how to provide care for a patient with excessive vaginal bleeding, abdominal pain, hypertensive crisis and sexual assault.

Descriptors:

- 22.2.1 Describe complications associated with pregnancy and delivery.
- 22.2.2 Discuss the need to provide physical and emotional care for a patient of sexual assault, while still preventing destruction of crime scene information.

BIL: Essential

EDU:	12	AD
	P	R

Competency 22.3: Demonstrate how to assist the obstetric patient in the delivery of a baby, within the scope of practice.

Descriptors:

- 22.3.1 Explain and utilize the contents of the obstetric kit.
- 22.3.2 Describe pre-delivery emergencies and indications of imminent delivery.
- 22.3.3 Describe the steps in the pre-delivery preparation of the mother.
- 22.3.4 Establish a relationship between body substance isolation and childbirth.
- 22.3.5 Describe the steps to assist in the delivery of a newborn.
- 22.3.6 Explain how to deliver the placenta.

- 22.3.7 Describe how and when to cut the umbilical cord.
- 22.3.8 Explain the procedures for handling abnormal deliveries.
- 22.3.9 Maintain a patient's modesty and privacy during assessment and delivery.

BIL: Essential

EDU:	12	AD
	P	R

Competency 22.4: Demonstrate post-delivery care of the mother and newborn, within the scope of practice.

Descriptors:

- 22.4.1 Describe newborn care procedures.
- 22.4.2 Discuss care for the mother with delivery complications.
- 22.4.3 Describe special considerations when meconium is present in amniotic fluid or during delivery.
- 22.4.4 Discuss special considerations for premature delivery.
- 22.4.5 Demonstrate a variety of procedures associated with the care of a newborn.

Unit 23: EMS Specialization: Geriatrics
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 23.1: Discuss special factors associated with geriatric patients, within the scope of practice.

Descriptors:

- 23.1.1 Discuss aging in society today in terms of demographics, longevity, cultural differences, medical care, major diseases and disorders, special needs, psychological changes, mobility, etc.
- 23.1.2 Describe the differences in the mechanism of injury in the elderly.
- 23.1.3 Discuss the challenges in communicating with the older person.
- 23.1.4 Discuss the effects of medications taken by the elderly.
- 23.1.5 Discuss factors related pending death (e.g., hospice, terminal patients, do not resuscitate orders [DNR and DNR-CC arrest], grief).
- 23.1.6 Define implied consent and explain the usually limited role of the third party powers in trauma scene decision making.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how issues may be viewed differently by various cultural groups.* (People in Societies A: Cultures, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 23.2: Analyze risk factors associated with geriatric patients, within the scope of practice.

Descriptors:

- 23.2.1 Compare and contrast older and younger patient assessments and their respective normal and abnormal findings.
- 23.2.2 Describe common complaints (e.g., shortness of breath, chest pain, dizziness).
- 23.2.3 Discuss the epidemiology of trauma in the older population including motor vehicle crashes, pedestrian accidents, falls, burns, etc.
- 23.2.4 Describe assessment findings common in older patients (e.g., musculoskeletal, orthopedic).
- 23.2.5 Discuss medical risks factors, medications and environmental risk factors.

BIL: Essential

EDU:	12	AD
	P	R

Competency 23.3: Explain assessment and management of geriatric patients, within the scope of practice.

Descriptors:

- 23.3.1 Describe the signs and symptoms, precipitating factors and management of cardiac arrest.
- 23.3.2 Discuss the assessment of the geriatric patient complaints related to the cardiovascular system.
- 23.3.3 Discuss abnormal changes of the nervous system and the epidemiology of nervous system diseases.
- 23.3.4 Describe the epidemiology of depression, suicide and substance abuse.
- 23.3.5 Discuss abnormal changes in the gastrointestinal, integumentary and endocrine systems with age.
- 23.3.6 Define elder abuse and neglect, and describe reporting procedures.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

Exercise Science: Sports and Recreational Health Care Specialization

Unit 24: Exercise Science: Sports and Recreational Health Care Orientation (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 24.1: Identify exercise science and sports health career options.

Descriptors:

- 24.1.1 Identify types of exercise science and sports health care related businesses.
- 24.1.2 Identify educational requirements, certification and licensure required in these careers.
- 24.1.3 Explore career and employment opportunities for exercise science and sports health care.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources.* (Research C, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 24.2: Assess the role of technology in the sports health care and exercise science industry.

Descriptors:

- 24.2.1 Describe knowledge of current technology trends in the industry.
- 24.2.2 Evaluate and select software, hardware and training appropriate for identified needs.
- 24.2.3 Utilize available technology that supports sports health care and exercise science.

Correlated Science Academic Content Benchmark

- *Explain that science and technology are interdependent; each drives the other.* (Science and Technology B, 9-10)

BIL: Essential

EDU:	12	AD
	I	P

Competency 24.3: Demonstrate principles of facility management and operation.

Descriptors:

- 24.3.1 Identify various job descriptions for employees.
- 24.3.2 Differentiate supervision types and assignments (e.g., roles, scheduling), and evaluations of personnel and services.
- 24.3.3 Identify equipment and supplies for operation of a facility.
- 24.3.4 Inventory and demonstrate appropriate storage and use of supplies and equipment.
- 24.3.5 Demonstrate cleaning and maintenance of facilities and equipment.

Correlated Mathematics Academic Content Benchmark

- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data Analysis and Probability A, 11-12)*

**Unit 25: Exercise Science: Functional Anatomy and Exercise Science
(Industry-Driven Authentic Assessment, See Appendix)**

BIL: Essential

EDU:	12	AD
	I	P

Competency 25.1: Describe basic anatomical structures.

Descriptors:

- 25.1.1 Describe the structural components of the skeletal muscles.
- 25.1.2 Describe the structural components of bone.
- 25.1.3 Describe the structural components of connective tissues.
- 25.1.4 Describe the structural components of the cardiovascular system.
- 25.1.5 Describe the structural components of the respiratory systems.
- 25.1.6 Describe the structural components of the articular (joint) systems.
- 25.1.7 Describe the nervous system’s structure and function.
- 25.1.8 Describe the digestive system’s structure and function.
- 25.1.9 Describe the endocrine system’s structure and function.
- 25.1.10 Describe the reproductive/urinary system’s structure and function.
- 25.1.11 Describe the integumentary system’s structure and function.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 25.2: Locate musculoskeletal landmarks of the human body.

Descriptors:

- 25.2.1 Locate bony landmarks on the human body.
- 25.2.2 Locate soft tissue landmarks on the human body.
- 25.2.3 Group the muscles of the spine by location and primary function.
- 25.2.4 Classify the muscles of the upper quarter by location and primary function.
- 25.2.5 Classify the muscles of the lower quarter by location and function.

BIL: Essential

EDU:	12	AD
	I	P

Competency 25.3: Examine the principles and concepts of human movement.

Descriptors:

- 25.3.1 Describe the classifications of joints.
- 25.3.2 Describe muscle structures responses to movement.
- 25.3.3 Describe the physiological kinesthetic events associated with muscle contraction.
- 25.3.4 Describe and apply the principles of kinesthesia and proprioception.

Correlated Science Academic Content Benchmarks

- *Explain the movement of objects by applying Newton's three laws of motion.* (Physical Sciences D, 9-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 25.4: Define the components of physical fitness.

Descriptors:

- 25.4.1 Define cardiorespiratory fitness (e.g., Maximal Oxygen Consumption).
- 25.4.2 Define muscular strength, endurance and power.
- 25.4.3 Define neuromuscular flexibility (i.e. static stretching techniques, proprioceptive neuromuscular facilitation (PNF), dynamic and ballistic stretching techniques)
- 25.4.4 Define body composition.
- 25.4.5 Define agility, balance, coordination and proprioceptions.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 25.5: Describe the physiological responses to static and dynamic exercise.

Descriptors:

- 25.5.1 Define physiological changes and recognize variables associated with work.
- 25.5.2 Describe the heart rate's response to exercise.
- 25.5.3 Describe the blood pressure's response to exercise.

- 25.5.4 Describe oxygen consumption's response to exercise.
- 25.5.5 Describe muscular/skeletal response to exercise.
- 25.5.6 Describe the common theories of muscle soreness.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 25.6: Utilize common techniques to enhance neuromuscular flexibility.

Descriptors:

- 25.6.1 Demonstrate static stretching techniques.
- 25.6.2 Demonstrate proprioceptive neuromuscular facilitation (PNF).
- 25.6.3 Demonstrate dynamic stretching techniques.
- 25.6.4 Demonstrate ballistic stretching techniques.

BIL: Essential

EDU:	12	AD
	I	P

Competency 25.7: Demonstrate training techniques to enhance muscle strength, endurance and flexibility.

Descriptors:

- 25.7.1 Describe and demonstrate isometric exercises and isotonic and isokinetic training techniques.
- 25.7.2 Describe and demonstrate concentric and eccentric strengthening.
- 25.7.3 Describe and demonstrate aerobic, strength, power and flexibility programs.

Unit 26: Exercise Science: Health Appraisal and Fitness Testing
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	I	P

Competency 26.1: Administer a health history appraisal form.

Descriptors:

- 26.1.1 Perform a health history, including medications.
- 26.1.2 Identify and assess components of a medical clearance form.
- 26.1.3 Identify purpose of an informed consent, and demonstrate how it is to be completed.
- 26.1.4 Identify orthopedic limitations and activity patterns.
- 26.1.5 Identify a patient’s stressors and/or anxiety levels.
- 26.1.6 Identify the medical clearance process following appraisal.
- 26.1.7 Identify risk factors for high-risk populations.

Correlated English Language Arts Academic Content Benchmarks

- *Evaluate how features and characteristics make information accessible and usable and how structures help authors achieve their purposes.* (Reading Applications: Informational, Technical and Persuasive Text A, 8-10)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 26.2: Examine testing data.

Descriptors:

- 26.2.1 Conduct and record various test data.
- 26.2.2 Interpret various types of test data.
- 26.2.3 Recognize and respond to abnormal test findings.

Correlated Mathematics Academic Content Benchmarks

- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)
- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 26.3: Describe the testing environment.

Descriptors:

- 26.3.1 Describe the preferred testing environment.
- 26.3.2 Describe the recommended personnel for various testing situations.
- 26.3.3 Describe the testing equipment used for various physiological tests.
- 26.3.4 Describe various accommodations for use with special populations.

BIL: Essential

EDU:	12	AD
	I	P

Competency 26.4: Demonstrate testing procedures and equipment calibration.

Descriptors:

- 26.4.1 Describe and demonstrate a treadmill, cycle and arm ergometer test, including equipment calibration.
- 26.4.2 Describe and demonstrate a physiological test using an ECG, EMG, spirometer and sphygmomanometer.

Correlated English Language Arts Academic Content Benchmark

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.*
(Acquisition of Vocabulary D, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 26.5: Describe the selection of exercise test protocols.

Descriptors:

- 26.5.1 Describe the appropriate mode of exercise for the test.
- 26.5.2 Describe the appropriate starting level for various tests.
- 26.5.3 Describe the work increments and length of stages of the testing protocol.
- 26.5.4 Describe the frequency and types of physiological assessment.
- 26.5.5 Describe performance measures and limitations for special populations.

BIL: Essential

EDU:	12	AD
	P	R

Competency 26.6: Measure and record vital signs.

Descriptors:

- 26.6.1 Measure and record temperature.
- 26.6.2 Measure and record pulse.
- 26.6.3 Measure and record blood pressure.
- 26.6.4 Measure and record respiration.

Correlated Mathematics Academic Content Benchmarks

- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)
- *Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histograms, scatterplots, measures of center and variability.* (Data Analysis and Probability A, 8-10)

BIL: Essential

EDU:	12	AD
	I	P

Competency 26.7: Conduct a fitness assessment.

Descriptors:

- 26.7.1 Identify the components of a total physical fitness assessment.
- 26.7.2 Outline the methodology used to assess body composition.
- 26.7.3 Examine cardiorespiratory fitness using multiple test protocols.
- 26.7.4 Examine muscular strength and endurance through strength testing protocols.
- 26.7.5 Perform muscular flexibility tests.
- 26.7.6 Use performance tests to assess skill-related fitness.
- 26.7.7 Perform skin fold and girth measurements.
- 26.7.8 Describe the principle and technique of underwater weighing.
- 26.7.9 Perform height and weight measurements.

Correlated Mathematics Academic Content Benchmarks

- *Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision.* (Measurement E, 8-10)
- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 26.8: Interpret a fitness assessment

Descriptors:

- 26.8.1 Estimate weight according to recommended percent body fat values.
- 26.8.2 Interpret cardiorespiratory endurance assessment test results.
- 26.8.3 Predict oxygen uptake and caloric expenditure from exercise heart rate.
- 26.8.4 Interpret strength testing results.
- 26.8.5 Interpret flexibility test results.
- 26.8.6 Compare Maximal Oxygen Consumption values with performance.

Correlated Mathematics Academic Content Benchmarks

- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)
- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)

Unit 27: Exercise Science: Exercise Programming
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	I	P

Competency 27.1: Construct components of exercise programming.

Descriptors:

- 27.1.1 Define intensity, frequency, duration and mode.
- 27.1.2 Define volume (e.g., sets, repetitions).
- 27.1.3 Define periodization.
- 27.1.4 Describe and apply interval training techniques.
- 27.1.5 Describe and apply continuous training techniques.
- 27.1.6 Describe and apply circuit training techniques.
- 27.1.7 Differentiate and apply aerobic and anaerobic training techniques.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 27.2: Demonstrate the principles of exercise programming.

Descriptors:

- 27.2.1 Define and apply the overload principle.
- 27.2.2 Define and apply the principle of specificity.
- 27.2.3 Define and apply the principle of individual differences.
- 27.2.4 Define and apply the principle of detraining.
- 27.2.5 Discuss the factors associated with exercise selection, programming and testing.
- 27.2.6 Demonstrate appropriate warm-up and cool-down procedures (e.g., cardiovascular, weight training, special sports events).

BIL: Essential

EDU:	12	AD
	I	P

Competency 27.3: Demonstrate the ability to recognize proper technique with exercise.

Descriptors:

- 27.3.1 Describe and demonstrate proper body mechanics with performing lifts.
- 27.3.2 Describe and demonstrate proper positioning when lifting.

- 27.3.3 Describe and demonstrate appropriate settings on cardiovascular equipment.
- 27.3.4 Describe and perform proper monitoring techniques.
- 27.3.5 Describe and demonstrate safety considerations.

BIL: Essential

EDU:	12	AD
	I	P

Competency 27.4: Describe aquatic exercise regimen.

Descriptors:

- 27.4.1 Describe the advantages and disadvantages of aquatic exercise.
- 27.4.2 Describe the control indications and safety considerations of aquatic exercise.
- 27.4.3 Describe the physiological effects of aquatic exercise.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*

BIL: Recommended

EDU:	12	AD
	I	P

Competency 27.5: Design various exercise programs.

Descriptors:

- 27.5.1 Design strength, power and flexibility programs.
- 27.5.2 Design age-appropriate training.
- 27.5.3 Design programs for improving cardiovascular performance.
- 27.5.4 Design program procedures for special populations.
- 27.5.5 Design programs associated with specific health conditions.

Correlated Science Academic Content Benchmark

- *Explain the ways in which the processes of technological design respond to the needs of society. (Science and Technology A, 9-10)*

Unit 28: Exercise Science: Nutrition and Weight Management
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 28.1: Describe the functions of the nutrients in the body.

Descriptors:

- 28.1.1 Describe basic nutritional concepts.
- 28.1.2 Identify the sources and functions of carbohydrates.
- 28.1.3 Identify the sources and functions of fats.
- 28.1.4 Identify the sources and functions of protein.
- 28.1.5 Identify the sources and functions of vitamins and minerals.
- 28.1.6 Identify the function of water to the human body.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 28.2: Evaluate the concepts of weight management.

Descriptors:

- 28.2.1 Define obesity (e.g., body mass index [BMI]).
- 28.2.2 Define percent body fat.
- 28.2.3 Calculate the energy of carbohydrates, proteins and fats.
- 28.2.4 Calculate the kcal needed to induce weight loss or gain.
- 28.2.5 Explain adjuncts for weight control (e.g., calorie counting, diary).
- 28.2.6 Describe the relationship of exercise to weight management.

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number, Number Sense and Operations G, 8-10)*
- *Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision. (Measurement E, 8-10)*
- *Apply various measurement scales to describe phenomena and solve problems. (Measurement B, 11-12)*
- *Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis and Probability F, 8-10)*

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 28.3: Identify medically related nutrition issues.

Descriptors:

- 28.3.1 Define anorexia and bulimia eating disorders.
- 28.3.2 Define disordered eating (e.g., wrestling, weight losses, overindulgence eating).
- 28.3.3 Define diabetes.
- 28.3.4 Define osteoporosis.
- 28.3.5 Define amenorrhea.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 28.4: Explain the United States Department of Agriculture (USDA) nutritional guidelines.

Descriptors:

- 28.4.1 Define the major food groups and serving sizes for each group.
- 28.4.2 Describe the history and changes of dietary guidelines over the years.
- 28.4.3 Compare/contrast nutritional habits using the nutritional guidelines.
- 28.4.4 Identify regional, cultural and religious food preferences.
- 28.4.5 Identify safety issues regarding food handling and storage.
- 28.4.6 Discuss consumer nutritional health product and practice awareness.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how issues may be viewed differently by various cultural groups.* (People in Societies A, 11-12).
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12).

Unit 29: Exercise Science: Injury Recognition and Prevention
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 29.1: Discuss risk factors and causes of injury.

Descriptors:

- 29.1.1 Identify intrinsic risk factors for age and gender.
- 29.1.2 Identify specific congenital and acquired abnormalities.
- 29.1.3 Identify sport specific risk factors.
- 29.1.4 Identify environmental risk factors.
- 29.1.5 Identify biomechanical or extrinsic risk factors.
- 29.1.6 Describe the physiological phenomenon of overtraining and overreaching.

Correlated Mathematics Academic Content Benchmarks

- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)
- *Make predictions based on theoretical probabilities and experimental results.* (Data Analysis and Probability K, 8-10)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)

BIL: Essential

EDU:	12	AD
	I	P

Competency 29.2: Describe components of a pre-participation physical examination.

Descriptors:

- 29.2.1 Describe and use appropriate records and forms.
- 29.2.2 Identify the appropriate personnel and roles.
- 29.2.3 Describe the testing stations and their organizational flow.
- 29.2.4 Describe specific procedures and their importance (e.g., blood pressure [B/P], height/weight [HT/WT]).

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Evaluate how features and characteristics make information accessible and usable and how structures help authors achieve their purposes.* (Reading Applications: Informational, Technical and Persuasive Text A, 8-10)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 29.3: Identify and define environmental hazards.

Descriptors:

- 29.3.1 Identify and define heat disorders (e.g., heat cramps, heat exhaustion, heat stroke).
- 29.3.2 Identify and define cold disorders (e.g., chilblains, frostbite, hypothermia).
- 29.3.3 Identify and define altitude-related disorders.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 29.4: Describe recommendations to avoid environmental hazards.

Descriptors:

- 29.4.1 Describe thermal-related prevention procedures (e.g., appropriate clothing, acclimatization techniques, practice scheduling techniques, fluid replacement).
- 29.4.2 Describe weather conditions affecting outside exercise.

BIL: Essential

EDU:	12	AD
	P	R

Competency 29.5: Monitor participants and environmental conditions.

Descriptors:

- 29.5.1 Demonstrate use of appropriate environmental monitoring devices.
- 29.5.2 Make activity recommendations based on findings, including at-risk populations.

Correlated Social Studies Academic Content Benchmarks

- *Use appropriate data sources and geographic tools to analyze and evaluate public policies.* (Geography C, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 29.6: Administer clinical joint measurement techniques.

Descriptors:

- 29.6.1 Perform limb length measurements.
- 29.6.2 Describe common joint biomechanics.
- 29.6.3 Identify typical Range of Motions (ROM) of all joints.
- 29.6.4 Define joint action terminology.
- 29.6.5 Perform active, passive and resistive ROM on the joints of the body.
- 29.6.6 Record ROM for each joint of the body through the use of goniometry.
- 29.6.7 Identify abnormalities in the ROM of joints.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Mathematics Academic Content Benchmark

- *Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision.* (Measurement E, 8-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 29.7: Select and apply appropriate ambulatory aids.

Descriptors:

- 29.7.1 Describe and apply the procedure for fitting ambulatory aids.
- 29.7.2 Perform gait training with ambulatory aids.

BIL: Essential

EDU:	12	AD
	I	P

Competency 29.8: Apply protective taping, wrapping, padding and protective equipment.

Descriptors:

- 29.8.1 Describe the purpose of and apply upper extremities/lower extremities (UE/LE) taping techniques.
- 29.8.2 Describe the purpose of and apply UE/LE wrapping techniques.
- 29.8.3 Describe the purpose of and apply UE/LE padding techniques.
- 29.8.4 Describe the purpose of and apply UE/LE bracing techniques.
- 29.8.5 Describe and apply protective equipment.

BIL: Essential

EDU:	12	AD
	P	R

Competency 29.9: Perform history and observation techniques.

Descriptors:

- 29.9.1 Complete the history portion of an examination.
- 29.9.2 Complete the observation portion of an examination.
- 29.9.3 Document the findings in each section of the examination.
- 29.9.4 Observe and document body posture.

Correlated English Language Arts Academic Content Benchmarks

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 29.10: Identify common injuries to each body part.

Descriptors:

- 29.10.1 Define acute and chronic injuries.
- 29.10.2 Identify injuries to lower extremities.
- 29.10.3 Identify injuries to the hip and spine.
- 29.10.4 Identify injuries to the abdomen, thorax and chest.
- 29.10.5 Identify injuries to the upper extremities.
- 29.10.6 Identify injuries to the head and neck.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 29.11: Administer manual muscle testing techniques.

Descriptors:

- 29.11.1 Perform muscle isolation techniques and segmental stabilization.
- 29.11.2 Identify and apply appropriate resistance and pressure.
- 29.11.3 Identify and apply muscle grading.
- 29.11.4 Interpret and document the findings of manual muscle testing.

BIL: Essential

EDU:	12	AD
	I	P

Competency 29.12: Administer clinical exams for bone and soft tissues.

Descriptors:

- 29.12.1 Demonstrate joint positioning for selected body parts.
- 29.12.2 Demonstrate segmental stabilization used during testing.
- 29.12.3 Demonstrate appropriate pressure and resistance techniques.
- 29.12.4 Interpret and document findings based on baseline measures-and bilateral comparisons.

BIL: Essential

EDU:	12	AD
	I	P

Competency 29.13: Administer sensory and motor neurological tests.

Descriptors:

- 29.13.1 Demonstrate and document neurological tests on a conscious and unconscious victim.
- 29.13.2 Demonstrate and document neurological tests on a suspected spinal cord injury.
- 29.13.3 Demonstrate and document neurological tests on nerve root/plexus injuries.
- 29.13.4 Demonstrate and document peripheral nerve injury tests.

BIL: Essential

EDU:	12	AD
	I	P

Competency 29.14: Describe the characteristic pathology of selected injuries.

Descriptors:

- 29.14.1 Identify characteristics and Mechanism of Injuries (MOIs) of closed soft tissue injuries.
- 29.14.2 Identify characteristics and MOIs of open soft tissue injuries.
- 29.14.3 Identify characteristics and MOIs of bone injuries.
- 29.14.4 Identify characteristics and MOIs of neurological injuries.

BIL: Essential

EDU:	12	AD
	I	P

Competency 29.15: Identify physical activity concerns and modifications for specific medical conditions.

Descriptors:

- 29.15.1 Identify limitations on physical activities related to asthma and other chronic lung disorders.
- 29.15.2 Identify limitations on physical activity related to sickle cell anemia and other blood disorders.
- 29.15.3 Identify limitations on physical activity related to diabetes and other endocrine disorders.
- 29.15.4 Identify limitations on physical activity related to osteoporosis, postural deformities and other skeletal disorders.
- 29.15.5 Identify modifications of physical activity across the changes of life (e.g., age, obesity, pregnancy).

Unit 30: Exercise Science: Rehabilitation and Treatment
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 30.1: Explain how the body reacts to injury.

Descriptors:

- 30.1.1 Describe the pain-spasm cycle.
- 30.1.2 List ways to disrupt the pain-spasm cycle.
- 30.1.3 Explain the body’s response to injury (e.g., inflammatory process).
- 30.1.4 Explain the healing process.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 30.2: Describe general physiological effects of inactivity and immobilization.

Descriptors:

- 30.2.1 Describe the effects of cardiovascular detraining.
- 30.2.2 Describe the effects of muscle atrophy during immobilization.
- 30.2.3 Describe techniques to prevent the effects of inactivity.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 30.3: Discuss typical psychological and emotional responses to trauma and forced physical inactivity affecting the rehabilitation process.

Descriptors:

- 30.3.1 Describe common motivational techniques.
- 30.3.2 Identify methods to reduce anxiety.
- 30.3.3 Describe apprehension reduction.
- 30.3.4 Describe the five phases of emotional responses to injury.

BIL: Essential

EDU:	12	AD
	I	P

Competency 30.4: Apply basic components of a comprehensive rehabilitation program.

Descriptors:

- 30.4.1 Define therapeutic goals and objectives.
- 30.4.2 Apply appropriate therapeutic modalities and exercises.
- 30.4.3 Demonstrate methods of evaluating and recording rehabilitation progress.
- 30.4.4 Identify criteria for progression and return to competition.
- 30.4.5 Identify appropriate manual therapy techniques.

BIL: Essential

EDU:	12	AD
	I	P

Competency 30.5: Apply physical parameters to be evaluated for the development of individualized rehabilitation programs.

Descriptors:

- 30.5.1 Describe and apply parameters for the measurement of strength, power and endurance.
- 30.5.2 Describe and apply parameters for the use of dynamometry and goniometry.
- 30.5.3 Describe the use of isometric, isotonic and isokinetic testing devices.
- 30.5.4 Describe and apply functional progression tests.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 30.6: Demonstrate contemporary therapeutic modalities.

Descriptors:

- 30.6.1 Discuss the techniques of cryotherapy, thermotherapy, hydrotherapy and electrotherapy.
- 30.6.2 Utilize appropriate cardiovascular equipment.
- 30.6.3 Apply passive, active, active assistive and resistive exercises through the use of manual exercise and contemporary commercial exercise equipment.
- 30.6.4 Apply aquatic exercise for improvement of joint Range of Motion (ROM) and strength.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: **Recommended**

EDU:	12	AD
	I	R

Competency 30.7: Prepare contemporary immobilization devices.

Descriptors:

- 30.7.1 Fabricate protective pads and moldable splints.
- 30.7.2 Adjust and fit selected braces.
- 30.7.3 Demonstrate taping and wrapping procedures.

Unit 31: Exercise Science: Education and Counseling
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	I	P

Competency 31.1: Describe the physiological effects, comparative benefits and contraindications of ergogenic aids.

Descriptors:

- 31.1.1 Identify physical agents and their effects in physiological functions and performance.
- 31.1.2 Identify therapeutic drugs used and their effects in physiological functions and performance.
- 31.1.3 Identify nontherapeutic “drugs” and their effects in physiological functions and performance.

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 31.2: Describe techniques and methods of disseminating injury prevention and health care information.

Descriptors:

- 31.2.1 Identify appropriate information for distribution to athletes, coaches, and parents.
- 31.2.2 Identify appropriate information for distribution to the general public.
- 31.2.3 Describe methods of information dissemination at meetings or workshops.
- 31.2.4 Describe how to read and assess research articles.

Correlated English Language Arts Academic Content Benchmarks

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)
- *Evaluate the usefulness and credibility of data and sources.* (Research B, 8-10)
- *Organize information from various resources and select appropriate sources to support central ideas, concepts and themes.* (Research C, 8-10)

BIL: Essential

EDU:	12	AD
	I	P

Competency 31.3: Apply psychological principles associated with health behavior changes.

Descriptors:

- 31.3.1 Describe behavior modification techniques associated with wellness.
- 31.3.2 Examine readiness for exercise program.
- 31.3.3 Outline goal setting procedures in fitness.
- 31.3.4 Examine the importance of social support in exercise.
- 31.3.5 Describe the influences of peer groups and how to manage them in exercise programs.
- 31.3.6 Identify Stage of Change (transtheoretical model).

BIL: Essential

EDU:	12	AD
	I	P

Competency 31.4: Describe psychological factors that may affect exercise.

Descriptors:

- 31.4.1 Characterize the effect of depression on wellness behavior.
- 31.4.2 Outline how anxiety affects an individual in a wellness program.
- 31.4.3 Define how psychosis and neurosis can affect an individual's performance and compliance.
- 31.4.4 Describe the psychological phenomenon of overtraining and overreaching.

**HEALTH INFORMATION
MANAGEMENT (HIM) SERVICES
PATHWAY**

Unit 32: Health Information Management (HIM) Services
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Recommended

EDU:	12	AD
	I	P

Competency 32.1: Discuss the field of health information management as it applies to health care.

Descriptors:

- 32.1.1 Define information management.
- 32.1.2 Describe database concepts.
- 32.1.3 List the various career options in health information.
- 32.1.4 Identify major issues associated with computerized health information.
- 32.1.5 Discuss the department’s business rules related to health information management.
- 32.1.6 Discuss the department’s workflow related to health information management.
- 32.1.7 Describe organizational and project management skills needed by providers.
- 32.1.8 Discuss emerging technologies that support an electronic health record system.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources.* (Research C, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 32.2: Identify and apply health data structure, content and standards.

Descriptors:

- 32.2.1 Collect and maintain health data (e.g., data elements, data sets databases).
- 32.2.2 Conduct analysis to ensure documentation in the health record supports the diagnosis and reflects the patient’s progress, clinical findings and discharge status.
- 32.2.3 Apply policies and procedures to ensure the accuracy of health data.
- 32.2.4 Apply clinical vocabularies and terminologies used in the organization’s health information systems.
- 32.3.5 Verify timeliness, completeness, accuracy and appropriateness of data and data sources for patient care, management, billing reports, registries and/or databases.
- 32.3.6 Define purpose of documentation and components of the health record.

Correlated English Language Arts Academic Content Benchmarks

- *Use appropriate self-monitoring strategies for comprehension.* (Reading Process C, 8-10; Reading Process C, 11-12)
- *Evaluate how features and characteristics make information accessible and usable and how structures help authors achieve their purposes.* (Reading Applications: Informational, Technical and Persuasive Text A, 8-10)

Correlated Mathematics Academic Content Benchmarks

- *Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis.* (Data Analysis and Probability E, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 32.3: Utilize health information and communication technologies.

Descriptors:

- 32.3.1 Use technology, including hardware and software, to ensure data collection, storage, analysis and reporting of information.
- 32.3.2 Use common software applications (e.g., spreadsheets, databases, word processing, graphics, e-mail) to execute work processes.
- 32.3.3 Use specialized software in the completion of HIM processes, such as record tracking, release of information, coding, grouping, registries, billing, quality improvement and document imaging.
- 32.3.4 Apply policies and procedures to the use of networks, including intranet and Internet applications to facilitate the electronic health record, personal health record (PHR) and public health records.
- 32.3.5 Apply knowledge of database architecture and design to meet departmental needs (e.g., data dictionary, data modeling, data warehousing).
- 32.3.6 Use appropriate electronic or imaging technology for data/record storage.
- 32.3.7 Query and generate reports to facilitate information retrieval.
- 32.3.8 Generate reports using appropriate software.
- 32.3.9 Maintain archival and retrieval systems for patient information stored in multiple formats.
- 32.3.10 Coordinate, use and maintain systems for document imaging and storage.
- 32.3.11 Describe natural language processing technology method of extracting and translating data for a text report.
- 32.3.12 Analyze the impact of e-health on the evolving health care system.
- 32.3.13 Discuss e-health initiatives as they relate to businesses and consumers (e.g., personal health, scheduling, screenings, evaluations, assessments, health information related to new developments).
- 32.3.14 Identify the barriers associated with computerized health data.

Correlated English Language Arts Academic Content Benchmark

- *Use appropriate self-monitoring strategies for comprehension.* (Reading Process C, 8-10; Reading Process C, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 32.4: **Apply data security.**

Descriptors:

- 32.4.1 Apply confidentiality and security measures to protect electronic health information.
- 32.4.2 Protect data integrity and validity using software or hardware technology.
- 32.4.3 Apply departmental and organizational data and information system security policies.
- 32.4.4 Use and summarize data compiled from audit trail and data quality monitoring programs.
- 32.4.5 Recognize components of risk management, contingency planning and data recovery procedures.

Correlated English Language Arts Academic Content Benchmark

- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Mathematics Academic Content Benchmark

- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)

Correlated Social Studies Academic Content Benchmark

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 32.5: **Participate in implementation of health care information systems.**

Descriptors:

- 32.5.1 Participate in the planning, design, selection, implementation, integration, testing, evaluation and support for organization-wide information systems.
- 32.5.2 Use the principles of ergonomics and human factors in workplace design.

BIL: Essential

EDU:	12	AD
	I	P

Competency 32.6: Apply health care information requirements and standards.

Descriptors:

- 32.6.1 Monitor and apply organization-wide health record documentation guidelines.
- 32.6.2 Apply policies and procedures to ensure organizational compliance with regulations and standards.
- 32.6.3 Report compliance findings according to organizational policy.
- 32.6.4 Maintain the accuracy and completeness of the patient record as defined by organizational policy and external regulations and standards.
- 32.6.5 Assist in preparing the organization for accreditation, licensing and/or certification surveys.

Correlated English Language Arts Academic Content Benchmarks

- *Use appropriate self-monitoring strategies for comprehension.* (Reading Process C, 8-10; Reading Process C, 11-12)
- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly.* (Writing Applications C, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 32.7: Utilize clinical classification systems.

Descriptors:

- 32.7.1 Describe computer-based information systems including computer hardware, software and service components.
- 32.7.2 Locate information in the record for various purposes (e.g., filing, coding, information processing).
- 32.7.3 Recognize standardized coding systems and uniform data definitions.
- 32.7.4 Demonstrate information literacy skills.
- 32.7.5 Use and maintain electronic applications and work processes to support clinical classification and coding.
- 32.7.6 Apply diagnostic/procedure codes using International Classification of Diseases 9th Revision, Clinically Modified (ICD-9-CM).
- 32.7.7 Apply procedure codes using Common Procedural Terminology (CPT) and Health care Common Procedural Coding System (HCPCS).
- 32.7.8 Ensure accuracy of diagnostic/procedural groupings such as Diagnostic Related Groups (DRG) and Ambulatory Payment Classification (APC).
- 32.7.9 Adhere to current regulations and established guidelines in code assignment.
- 32.7.10 Validate coding accuracy using clinical information found in the health record.

- 32.7.11 Use and maintain applications and processes to support other clinical classification and nomenclature systems (e.g., International Classification of Diseases 10th Revision, Clinically Modified [ICD-10-CM], Systematized Nomenclature of Human and Veterinary Medicine [SNOMED]).
- 32.7.12 Resolve discrepancies between coded data and supporting documentation.

Correlated English Language Arts Academic Content Benchmark

- *Use appropriate self-monitoring strategies for comprehension.* (Reading Process C, 8-10; Reading Process C, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Analyze the role of fiscal and regulatory policies in a mixed economy.* (Economics D, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 32.8: Control access and release of health care information.

Descriptors:

- 32.8.1 Participate in the implementation of legal and regulatory requirements related to the health information infrastructure.
- 32.8.2 Apply policies and procedures for access and disclosure of personal health information.
- 32.8.3 Release patient-specific data to authorized users.
- 32.8.4 Maintain user access logs/systems to track access to and disclosure of identifiable patient data.
- 32.8.5 Conduct privacy and confidentiality training programs.
- 32.8.6 Investigate and recommend solutions to privacy issues/problems.
- 32.8.7 Apply and promote ethical standards of practice.

Correlated English Language Arts Academic Content Benchmark

- *Give informational presentations that contain a clear perspective; present ideas from multiple sources in logical sequence; and include a consistent organizational structure.* (Communication: Oral and Visual E, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 32.9: Apply reimbursement methodologies.

Descriptors:

- 32.9.1 Apply policies and procedures for the use of clinical data required in reimbursement and prospective payment systems (PPS) in health care delivery.
- 32.9.2 Support accurate billing through coding, chargemaster, claims management and bill reconciliation processes.
- 32.9.3 Use established guidelines to comply with reimbursement and reporting requirements, such as the National Correct Coding Initiative.
- 32.9.4 Compile patient data and perform data quality reviews to validate code assignment and compliance with reporting requirements, such as outpatient prospective payment systems.

Correlated English Language Arts Academic Content Benchmark

- *Use appropriate self-monitoring strategies for comprehension.* (Reading Process C, 8-10; Reading Process C, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Analyze the role of fiscal and regulatory policies in a mixed economy.* (Economics D, 11-12).

BIL: Essential

EDU:	12	AD
	I	P

Competency 32.10: Prepare health care statistics.

Descriptors:

- 32.10.1 Abstract and maintain data for clinical databases and registries.
- 32.10.2 Collect, organize and present data for quality management, utilization management, risk management and other related studies.
- 32.10.3 Compute and interpret health care statistics.
- 32.10.4 Apply Institutional Review Board (IRB) processes and policies.
- 32.10.5 Use specialized databases to meet specific organization needs, such as medical research and disease registries.

Correlated English Language Arts Academic Content Benchmark

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability.* (Data Analysis and Probability B, 11-12)
- *Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.* (Mathematical Processes I, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 32.11: **Analyze data for quality management and performance improvement.**

Descriptors:

- 32.11.1 Abstract and report data for facility-wide quality management and performance improvement programs.
- 32.11.2 Identify trends that demonstrate quality, safety and effectiveness of health care.

Correlated Mathematics Academic Content Benchmarks

- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability.* (Data Analysis and Probability B, 11-12)
- *Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.* (Mathematical Processes I, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 32.12: Integrate information for various health care delivery systems.

Descriptors:

- 32.12.1 Apply information systems policies and procedures required by national health information initiatives on the health care delivery system.
- 32.12.2 Apply current laws, accreditation, licensure and certification standards related to health information initiatives from the national, state, local and facility levels.
- 32.12.3 Apply policies and procedures to comply with the changing regulations among various payment systems for health care services, including Medicare, Medicaid and managed care.
- 32.12.4 Differentiate the roles of various providers and disciplines throughout the continuum of health care, and respond to their information needs.

Correlated English Language Arts Academic Content Benchmark

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

SUPPORT SERVICES PATHWAY

Unit 33: Support Services
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 33.1: Assess basic operating procedures of support services careers within their roles.

Descriptors:

- 33.1.1 Develop and implement a mission statement, goals and objectives.
- 33.1.2 Develop required policies and procedures (written format).
- 33.1.3 Develop systems and procedures that minimize customer cost of ordering, storing and using supplies, services and equipment.
- 33.1.4 Integrate infection control standards with design and construction activities.
- 33.1.5 Implement purchasing and procurement techniques.
- 33.1.6 Develop a preventative maintenance program for equipment and services.
- 33.1.7 Identify activities that require coordination between various departments.
- 33.1.8 Describe federal, state and local laws and regulations that affect support services.
- 33.1.9 Discuss the relationships among organization structures, policies, procedures and quality assurance.

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Select and use an appropriate organizational structure to refine and develop ideas for writing.* (Writing Processes B, 11-12)
- *Use a variety of strategies to revise content, organization and style, and to improve word choice, sentence variety, clarity and consistency of writing.* (Writing Processes C, 11-12)
- *Prepare writing for publication that follows an appropriate format and uses a variety of techniques to enhance the final product.* (Writing Processes F, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)

Correlated Social Studies Academic Content Benchmarks

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 33.2: Assess and maintain materials for quality management.

Descriptors:

- 33.2.1 Perform quality control activities.
- 33.2.2 Use manuals and follow directions appropriately.
- 33.2.3 Maintain equipment (e.g., imaging, laboratory).
- 33.2.4 Send, receive and distribute material for services.
- 33.2.5 Organize inventory, purchase orders and products.
- 33.2.6 Describe risk management strategies.
- 33.2.7 Inspect facilities to ensure compliance with standards, regulations and codes.
- 33.2.8 Assess procedures and processes to select, acquire and maintain inventory.
- 33.2.9 Describe the use of calibration.
- 33.2.10 Evaluate cost effectiveness of alternative methods.

Correlated English Language Arts Academic Content Benchmark

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)
- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices.* (Economics A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 33.3: Comply with regulations related to support services.

Descriptors:

- 33.3.1 Adhere to a code of ethics to ensure corporate compliance.
- 33.3.2 Ensure compliance with legal, regulatory and accreditation standards.

Correlated English Language Arts Academic Content Benchmark

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 33.4: Evaluate how risk management can apply to support services functions.

Descriptors:

- 33.4.1 Recognize physical, procedural and electronic barriers.
- 33.4.2 Use appropriate action (e.g., report, make recommendations or repair).

BIL: Essential

EDU:	12	AD
	P	R

Competency 33.5: Analyze sanitation and infection control procedures required in support service careers.

Descriptors:

- 33.5.1 Demonstrate various decontamination techniques.
- 33.5.2 Explain standard precautions guidelines.
- 33.5.3 Describe the care needed when handling chemicals.
- 33.5.4 Analyze potential causes and methods of transmitting infection.

BIL: Essential

EDU:	12	AD
	P	R

Competency 33.6: Analyze practices that contribute to a safe work environment.

Descriptors:

- 33.6.1 Discuss policies and procedures to monitor, distribute and consume materials.
- 33.6.2 Identify how waste is handled, packaged, stored and disposed of in accordance with federal, state and local regulations including hazardous chemicals, biohazards and radioactive materials.
- 33.6.3 Describe basic emergency procedures used to respond to a hazardous spill.
- 33.6.4 Identify protection from blood-borne pathogens and identify unsafe conditions for corrective action.
- 33.6.5 Explain standard precautions guidelines.
- 33.6.6 Demonstrate proper hand hygiene.
- 33.6.7 Use appropriate Personal Protective Equipment (PPE).

Correlated English Language Arts Academic Content Benchmark

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 33.7: Demonstrate handling and storage of materials.

Descriptors:

- 33.7.1 Use appropriate safety equipment.
- 33.7.2 Demonstrate appropriate inventory control systems (e.g., distribution, consumption, unintentional loss of materials or supplies).
- 33.7.3 Demonstrate proper care in handling and storage of sterile and non-sterile items.
- 33.7.4 Explain inventory control.
- 33.7.5 Describe and implement a program to purchase materials, supplies and capital equipment with allocated resources.

Correlated Mathematics Academic Content Benchmarks

- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.* (Mathematical Processes I, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices.* (Economics A, 11-12)

BIL: **Recommended**

EDU:	12	AD
	I	R

Competency 33.8: **Analyze the business structure of supply and service management.**

Descriptors:

- 33.8.1 Describe the components of a purchasing agreement.
- 33.8.2 Discuss the cost benefits of supply and service selection.
- 33.8.3 Explain bids and quotes for supply and service selection.
- 33.8.4 Explain competitive pricing.
- 33.8.5 Analyze the impact of timely order placement and supplier performance.
- 33.8.6 Assess integration of resource functions.
- 33.8.7 Assess purchasing and procurement techniques that improve quality and supply.
- 33.8.8 Describe the supply chain process.
- 33.8.9 Utilize technology to support the supply chain process.

Correlated English Language Arts Academic Content Benchmark

- *Evaluate how features and characteristics make information accessible and usable and how structures help authors achieve their purposes.* (Reading Applications: Informational, Technical and Persuasive Text A, 8-10)

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices.* (Economics A, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Recommended

EDU:	12	AD
	I	R

Competency 33.9: Explain staffing needs and productivity.

Descriptors:

- 33.9.1 Develop reporting mechanisms for measuring productivity.
- 33.9.2 Determine type and number of staff needed.
- 33.9.3 Analyze and construct a staffing schedule.

Correlated Mathematics Academic Content Benchmark

- *Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Mathematical Processes B, 8-10)*

BIL: Essential

EDU:	12	AD
	P	R

Competency 33.10: Collect and distribute essential patient information to appropriate team members.

Descriptors:

- 33.10.1 Recognize and report unusual or unsafe environmental conditions.
- 33.10.2 Maintain confidentiality according to the facility's protocol as well as HIPAA.
- 33.10.3 Recognize and report changes in a patient's condition.
- 33.10.4 Document patient response to treatment or procedure results accurately and appropriately.
- 33.10.5 Recognize ethical conflicts related to assessment practices (e.g., labeling, confidentiality).
- 33.10.6 Document actions according to the facility's protocol and regulatory guidelines.

Correlated English Language Arts Academic Content Benchmark

- *Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 33.11: Demonstrate or explain customer-centered model of care.

Descriptors:

- 33.11.1 Define internal and external customers.
- 33.11.2 Explain the importance of customer expectations through satisfaction plans and assessment tools to assure quality service.
- 33.11.3 Describe expectations and satisfaction for products and services.
- 33.11.4 Organize, deliver and present products and services in a quality manner.

- 33.11.5 Explain procedures and related information to patient.
- 33.11.6 Implement process improvements to increase customer satisfaction.
- 33.11.7 Define role in the customer centered model of care.

Correlated English Language Arts Academic Content Benchmarks

- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)
- *Select and use effective speaking strategies for a variety of audiences, situations and purposes.* (Communication: Oral and Visual C, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 33.12: Determine role in emergency preparedness plan.

Descriptors:

- 33.12.1 Describe different types of emergency preparedness plans (e.g., homeland security, natural disaster, pandemic, crisis planning).
- 33.12.2 Explain emergency procedures for staff and supplies in the event of an internal or external disaster.
- 33.12.3 Participate in educational and training programs related to emergency preparedness plan.
- 33.12.4 Discuss the Emergency Preparedness Plan.

Correlated Social Studies Academic Content Benchmarks

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)
- *Work in groups to analyze an issue and make decisions.* (Social Studies Skills and Methods D, 11-12)

BIOSCIENCE RESEARCH and DEVELOPMENT PATHWAY

Unit 34: Demonstrate Scientific Method
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 34.1: Define scientific research methods.

Descriptors:

- 34.1.1 Explain purpose of scientific research.
- 34.1.2 Identify goals of scientific research.
- 34.1.3 Explain scientific method.
- 34.1.4 Distinguish between dependent and independent variables in an experiment.

BIL: Essential

EDU:	12	AD
	P	R

Competency 34.2: Develop a research plan.

Descriptors:

- 34.2.1 Select research question.
- 34.2.2 Design research plan, including significance of problem, purpose, variables, hypotheses, objectives, methods of study and list of materials.
- 34.2.3 Identify deficiencies of a plan.

Correlated English Language Arts Academic Content Benchmark

- *Formulate open-ended research questions suitable for inquiry and investigation and adjust questions as necessary while research is conducted. (Research A, 8-10; Research A, 11-12)*

Correlated Science Academic Content Benchmark

- *Make appropriate choices when designing and participating in scientific investigations by using cognitive and manipulative skills when collecting data and formulating conclusions from the data. (Scientific Inquiry A, 11-12)*

Unit 35: Conducting Experiments
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	I	P

Competency 35.1: Perform routine laboratory support work.

Descriptors:

- 35.1.1 Maintain laboratory and equipment.
- 35.1.2 Order and stock supplies.
- 35.1.3 Operate equipment.
- 35.1.4 Maintain biological stock cultures.
- 35.1.5 Clean and prepare items for lab.
- 35.1.6 Prepare biological and/or chemical materials.
- 35.1.7 Send, receive and distribute biological and chemical materials.
- 35.1.8 Perform routine animal care duties.
- 35.1.9 Communicate with co-workers to ensure quality laboratory work.

BIL: Essential

EDU:	12	AD
	I	P

Competency 35.2: Conduct experiments.

Descriptors:

- 35.2.1 Set up equipment for the production process.
- 35.2.2 Perform and monitor the process to make the product or provide the service.
- 35.2.3 Inspect materials at all stages of process to determine quality or condition.
- 35.2.4 Participate in the installation, modification and upgrade of equipment.
- 35.2.5 Prepare final product for shipping or distribution.
- 35.2.6 Monitor, maintain and troubleshoot equipment, tools and workstations.
- 35.2.7 Communicate with co-workers and/or customers to ensure that production of service meets requirements.
- 35.2.8 Coordinate inventory.

BIL: Essential

EDU:	12	AD
	P	R

Competency 35.3: Record and report experimental results.

Descriptors:

- 35.3.1 Maintain lab notebook.
- 35.3.2 Identify methods of precision and accuracy of experimental data.
- 35.3.3 Document results of the experiment in written report using good laboratory practices or other procedures, which include statement of propose, experimental design, results, conclusions and next steps.
- 35.3.4 Monitor results of an experiment.

- 35.3.5 Maintain log book.
- 35.3.6 Identify components of scientific paper/report.
- 35.3.7 Identify components of oral presentation.
- 35.3.8 Prepare scientific report.
- 35.3.9 Present scientific report orally.
- 35.3.10 Use scientific notation.
- 35.3.11 Recognize that experimental results must be open to scrutiny of others.
- 35.3.12 Demonstrate various ways to display data.

Correlated English Language Arts Academic Content Benchmarks

- *Produce informational essays or reports that establish a clear and distinctive perspective on the subject, include relevant perspectives, take into account the validity and reliability of sources and provide a clear sense of closure.* (Writing Applications D, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Give informational presentations that contain a clear perspective; present ideas from multiple sources in logical sequence; and include a consistent organizational structure.* (Communication: Oral and Visual E, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Use scientific notation to express large numbers and numbers less than one.* (Number, Number Sense and Operations A, 8-10)
- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.* (Mathematical Processes I, 11-12)

Correlated Science Academic Content Benchmark

- *Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations.* (Scientific Inquiry A, 9-10)

Unit 36: Laboratory Safety and Maintenance
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 36.1: Explain the impact of federal, state, local and company regulations and policies on safety, health and environmental concerns of the community, worker and consumer.

Descriptors:

- 36.1.1 Identify the agencies (federal, state, local) that develop and enforce regulations pertaining to chemical and related industries.
- 36.1.2 State the basic philosophy of “Right to Know” legislation.
- 36.1.3 Use computers and other reference sources to access information about procedures for chemical safety, environmental protection and health preservation.
- 36.1.4 Describe basic emergency procedures used to respond to a spill or release.
- 36.1.5 Explain material safety data sheets (MSDS).

Correlated English Language Arts Academic Content Benchmarks

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Science Academic Content Benchmark

- *Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations.* (Scientific Inquiry A, 9-10)

Correlated Social Studies Academic Content Benchmarks

- *Evaluate, take and defend positions about issues concerning the alignment of the characteristics of American democracy with realities in the United States today.* (Government A, 11-12).
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 36.2: Demonstrate personal safety procedures.

Descriptors:

- 36.2.1 Protect against sight loss in the laboratory environment.
- 36.2.2 Use appropriate personal protective equipment (PPE) for a variety of situations involving hazardous chemicals, such as corrosive, explosive, biological and volatile materials.

- 36.2.3 Use safety equipment, such as safety glasses, showers, respirators, eye washes, blankets and portable fire extinguishers.
- 36.2.4 Identify protection from blood-borne pathogens.
- 36.2.5 Maintain a clean and safe workplace.
- 36.2.6 Perform basic first aid skills.
- 36.2.7 Participate in employee safety training.
- 36.2.8 Monitor air quality in a workplace using various types of air monitoring equipment.
- 36.2.9 Identify unsafe conditions and take corrective action.

BIL: Essential

EDU:	12	AD
	P	R

Competency 36.3: Identify general workplace safety hazards.

Descriptors:

- 36.3.1 Identify first aid supplies, personnel, co-worker contact, medical information, emergency protection and evacuation plan.
- 36.3.2 Follow appropriate safety procedures, guidelines and chemical hygiene plans.
- 36.3.3 Maintain required safety training to include location and understanding of MSDS.
- 36.3.4 Observe rules of equipment safety.
- 36.3.5 Identify and obey safety symbols/signs.
- 36.3.6 Maintain work areas free from clutter, food and drinks.
- 36.3.7 Recognize common lab hazards and observe procedures for the safe use of instruments, gas cylinders and chemicals.
- 36.3.8 Utilize safety equipment and personal protection equipment (PPE).
- 36.3.9 Handle common chemical lab equipment safely.
- 36.3.10 Describe the purpose of common chemical laboratory equipment.
- 36.3.11 Manipulate glassware and other apparatus safely, including making connections, cleaning and storing.
- 36.3.12 Demonstrate a basic awareness of electrical safety and its application to the work environment.

Correlated English Language Arts Academic Content Benchmark

- *Use appropriate self-monitoring strategies for comprehension.* (Reading Process C, 8-10; Reading Process C, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 36.4: Handle laboratory equipment safely.

Descriptors:

- 36.4.1 Store compressed gases cylinders correctly and safely.
- 36.4.2 Change compressed gas cylinders correctly and safely.
- 36.4.3 Choose the proper regulations for gases and other materials under pressure or under vacuum.

- 36.4.4 Use equipment such as autoclaves, pressurized reactors, thermal ovens, vacuum reactors/separators, closed systems and a variety of valves safely.
- 36.4.5 Maintain safety equipment.

BIL: Essential

EDU:	12	AD
	I	P

Competency 36.5: Handle chemicals and safety equipment appropriately.

Descriptors:

- 36.5.1 Use appropriate safety equipment (e.g., proper hoods, shields).
- 36.5.2 Identify hazards associated with collecting samples.
- 36.5.3 Label and store all chemicals, materials, tools and equipment with appropriate safety, health, and environmental details.
- 36.5.4 Follow the hazard symbols and toxicology sections of MSDS.
- 36.5.5 Demonstrate the ability to read, interpret and prepare labels for a variety of chemical materials.
- 36.5.6 Use a chemical reference handbook to identify hazards associated with handling and storing chemical materials.
- 36.5.7 Handle corrosive materials properly.
- 36.5.8 Use appropriate techniques to transfer gases, liquids and solids from storage containers to equipment used in laboratory.
- 36.5.9 Use mixing techniques appropriate for the materials, specifically when handling acids, bases, oxidizers and strong reducing agents.
- 36.5.10 Dispose of hazardous materials safely and according to regulatory guidelines.
- 36.5.11 Order and stock supplies.
- 36.5.12 Implement a chemical inventory system for a stockroom that includes all pertinent information regarding stability, hazards and sensitivity.
- 36.5.13 Use (i.e., enter into and query out of) a database for chemical information.

Correlated English Language Arts Academic Content Benchmark

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)

Correlated Social Studies Academic Content Benchmark

- *Obtain and evaluate information from public records and other resources related to a public policy issue.* (Social Studies Skills and Methods A, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 36.6: Describe laboratory safety and biohazard issues.

Descriptors:

- 36.6.1 Outline elements of risk assessment.
- 36.6.2 Name the typical general safety hazards in tissue culture laboratory.
- 36.6.3 Explain proper level of protection for various biohazard procedures.
- 36.6.4 Describe proper disposal procedures for tissue culture materials.
- 36.6.5 Explain usage and exposure of radioisotopes and biohazards.

Unit 37: Instrument Analysis
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 37.1: Demonstrate proficiency in the use of pipeting devices, microwave, scales and pH meters.

Descriptors:

- 37.1.1 Perform measurements using the metric system.
- 37.1.2 Describe the use of pipeting devices for accurate volume measurements.
- 37.1.3 Explain the pH scale.
- 37.1.4 Check calibration of pipeting devices, scales and pH meters.

Correlated Mathematics Academic Content Benchmarks

- *Explain differences among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)*
- *Apply various measurement scales to describe phenomena and solve problems. (Measurement B, 11-12)*

Correlated Science Academic Content Benchmark

- *Explain how atoms react with each other to form other substances and how molecules react with each other or other atoms to form even different substances. (Physical Sciences B, 9-10)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 37.2: Apply principles of filtration.

Descriptors:

- 37.2.1 Filter sterilize a solution.
- 37.2.2 Filter solutions using depth and membrane filters.
- 37.2.3 Choose proper filter for an application.
- 37.2.4 Describe ultrafiltration.

BIL: Essential

EDU:	12	AD
	I	P

Competency 37.3: Perform sedimentation and separation of biological materials using centrifuges.

Descriptors:

- 37.3.1 Explain revolutions per minute (RPM), centrifugal force, differential centrifugation and density gradient centrifugation.
- 37.3.2 Run high speed centrifuge.
- 37.3.3 Run ultracentrifuge.
- 37.3.4 Separate materials by gradient centrifugation.
- 37.3.5 Separate cell components by centrifugation.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 37.4: Demonstrate proficiency in the use of common types of microscopes (e.g., light microscope, phase contrast microscope).

Descriptors:

- 37.4.1 Examine biological specimens using microscopes.
- 37.4.2 Explain the principles of microscopy.
- 37.4.3 Process specimen for light microscopy.

BIL: Essential

EDU:	12	AD
	I	P

Competency 37.5: Demonstrate proficiency in the use of an ultraviolet-visible (UV/visible) spectrophotometer, and construct standard curves.

Descriptors:

- 37.5.1 Obtain and interpret absorption/transmission data for biological samples.
- 37.5.2 Construct a standard curve using a known standard.
- 37.5.3 Describe one use of a blank in obtaining spectrophotometric measurements.
- 37.5.4 Determine the concentration of an unknown sample from the standard curve.
- 37.5.5 Identify wavelength and frequency ranges of ultraviolet (UV), visible and infrared (IR) regions.
- 37.5.6 Show the relationship between concentration of an absorbing species and the transmittance and/or absorbance of energy.

Correlated Mathematics Academic Content Benchmarks

- *Translate information from one representation (words, table, graph or equation) to another representation of a relation or function.* (Patterns, Functions and Algebra C, 8-10)
- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)

Correlated Science Academic Content Benchmark

- *Demonstrate that waves (e.g., sound, seismic, water and light) have energy and waves can transfer energy when they interact with matter.* (Physical Sciences G, 9-10)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 37.6: **Explain the use of thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC).**

Descriptors:

- 37.6.1 Write a description of the principles of thin-layer chromatography (TLC) as a separation tool.
- 37.6.2 Describe uses of TLC as an analytical tool.
- 37.6.3 Describe components of the apparatus used to conduct TLC.
- 37.6.4 Identify effects of temperature, solvents and plate types on conducting TLC separations.
- 37.6.5 Perform a TLC separation of a given mixture of substances, including preparing and conditioning the plates, spotting the samples, scanning the plates and analyzing the data.
- 37.6.6 Identify components in an unknown material using TLC.

Correlated English Language Arts Academic Content Benchmark

- *Produce informational essays or reports that establish a clear and distinctive perspective on the subject, include relevant perspectives, take into account the validity and reliability of sources and provide a clear sense of closure.* (Writing Applications D, 11-12)

Correlated Science Academic Content Benchmarks

- *Describe the identifiable physical properties of substances (e.g., color, hardness, conductivity, density, concentration and ductility). Explain how changes in these properties can occur without changing the chemical nature of the substance.* (Physical Sciences C, 9-10)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 37.7: **Apply basic concepts of spectroscopic analytical methods.**

Descriptors:

- 37.7.1 Draw a diagram of the electromagnetic spectrum indicating wavelength regions from gamma rays to radio waves.
- 37.7.2 Define “spectroscopy” in terms of the interaction of radiant energy and matter.
- 37.7.3 Show the relationship between concentration of an absorbing species and the transmittance or absorbance of energy.
- 37.7.4 Use Beer’s Law.

Correlated English Language Arts Academic Content Benchmark

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Generalize and explain patterns and sequences in order to find the next term and the nth term.* (Patterns, Functions and Algebra A, 8-10)
- *Translate information from one representation (words, table, graph or equation) to another representation of a relation or function.* (Patterns, Functions and Algebra C, 8-10)
- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)

Correlated Science Academic Content Benchmarks

- *Demonstrate that waves (e.g., sound, seismic, water and light) have energy and waves can transfer energy when they interact with matter.* (Physical Sciences G, 9-10)
- *Describe how atoms and molecules can gain or lose energy only in discrete amounts.* (Physical Sciences C, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 37.8: **Apply principles of typical instrumentation in high-performance liquid chromatography (HPLC).**

Descriptors:

- 37.8.1 Write a description of the principles of high-performance liquid chromatography (HPLC) as a separation technique.
- 37.8.2 Describe the principles of HPLC that apply to its use as an analytical tool.
- 37.8.3 Identify components of a high-performance liquid chromatography.
- 37.8.4 Identify various column phases (e.g., normal, reverse) and describe the appropriate use of each.
- 37.8.5 Identify various detectors (e.g., diode array, ultraviolet [UV], mass spectrometry [MS]) used in HPLC instruments and choose the most appropriate for a variety of situations.
- 37.8.6 Identify parameters of a high-performance liquid chromatograph that influence the chromatogram.
- 37.8.7 Install columns into HPLC instruments.
- 37.8.8 Calibrate one or more HPLC instruments.
- 37.8.9 Use HPLC to separate a known mixture; install columns, choose solvents, choose detectors, and perform calibrations; calculate the percentage of components in mixture.
- 37.8.10 Maximize the performance of an HPLC instrument by adjusting parameters to optimize peak width and resolution and minimize tailing.
- 37.8.11 Operate a computer-controlled HPLC instrument.
- 37.8.12 Perform separations of unknown mixtures using HPLC.
- 37.8.13 Troubleshoot common HPLC problems.

Correlated English Language Arts Academic Content Benchmarks

- *Produce informational essays or reports that establish a clear and distinctive perspective on the subject, include relevant perspectives, take into account the validity and reliability of sources and provide a clear sense of closure.* (Writing Applications D, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)

Correlated Science Academic Content Benchmark

- *Describe the identifiable physical properties of substances (e.g., color, hardness, conductivity, density, concentration and ductility). Explain how changes in these properties can occur without changing the chemical nature of the substance.* (Physical Sciences C, 9-10)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 37.9: **Calibrate equipment accurately.**

Descriptors:

- 37.9.1 Describe the use of calibration techniques when performing instrumental analysis.
- 37.9.2 Perform calibrations using available instruments.
- 37.9.3 Plot appropriate graphs.
- 37.9.4 Identify the linear portion of a calibration curve.
- 37.9.5 Describe the causes of nonlinearity in calibration.

Correlated Mathematics Academic Content Benchmarks

- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 37.10: **Maintain laboratory instrumentation.**

Descriptors:

- 37.10.1 Use instrument manuals and follow manual directions appropriately.
- 37.10.2 Identify warnings and cautions.
- 37.10.3 Maintain equipment log for instruments in laboratory.
- 37.10.4 Track periodic maintenance schedules.

- 37.10.5 Perform periodic calibration checks on instruments.
37.10.6 Ensure that service contracts for key instruments are current.

Correlated English Language Arts Academic Content Benchmark

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)

Unit 38: Chemical Materials Handling and Sampling (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 38.1: Explain principles and characteristics of chemical materials.

Descriptors:

- 38.1.1 Define chemistry.
- 38.1.2 Define and differentiate elements, compounds, and mixtures.
- 38.1.3 Define “atoms” and “molecules” and demonstrate how atoms combine to form molecules.
- 38.1.4 Draw simple atomic structures for several elements including protons, neutrons and electrons.
- 38.1.5 Explain electronic configuration.
- 38.1.6 Write simple electronic configurations for several elements.
- 38.1.7 Use the periodic table to identify elements to describe atomic structure and to characterize elements based on the group.
- 38.1.8 Calculate formula weight.
- 38.1.9 Write balanced chemical reactions.
- 38.1.10 Balance chemical reactions.
- 38.1.11 Demonstrate how compounds react with other compounds to form new compounds with several examples.
- 38.1.12 Describe the concept of stoichiometry as applied to chemical reactions.
- 38.1.13 Describe chemical bonding and bond types including ionic and covalent.
- 38.1.14 Write the molecular structure of several organic and inorganic compounds using common bond designations.
- 38.1.15 Describe chemical bonding and the relationship of chemical bonding to the physical state of material based on intermolecular bonding; include the concept of hydrogen bonding.
- 38.1.16 Differentiate between organic and inorganic substances.
- 38.1.17 Describe characteristics of organic and inorganic substances.
- 38.1.18 Define “catalyst” and give examples of materials used as catalysts.
- 38.1.19 Give examples of chemical reactions involving catalysts that are important to local industries.
- 38.1.20 Predict endo/exothermic characteristics of a chemical reaction.
- 38.1.21 Calculate heat of reaction for several common reactions.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)

Correlated Science Academic Content Benchmarks

- *Describe that matter is made of minute particles called atoms and atoms are comprised of even smaller components. Explain the structure and properties of atoms.* (Physical Sciences A, 9-10)
- *Explain how atoms react with each other to form other substances and how molecules react with each other or other atoms to form even different substances.* (Physical Sciences B, 9-10)
- *Describe the identifiable physical properties of substances (e.g., color, hardness, conductivity, density, concentration and ductility). Explain how changes in these properties can occur without changing the chemical nature of the substance.* (Physical Sciences C, 9-10)
- *Explain how energy may change form or be redistributed but the total quantity of energy is conserved.* (Physical Sciences F, 9-10)
- *Explain how variations in the arrangement and motion of atoms and molecules form the bases of a variety of biological, chemical and physical phenomena.* (Physical Sciences A, 11-12)

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 38.2: Use both common and chemical nomenclature for inorganic and organic materials.

Descriptors:

- 38.2.1 Use the Periodic Table to identify and name the elements, according to symbol and group.
- 38.2.2 Name common anions and cations and their charges.
- 38.2.3 Write names and formulas for common inorganic compounds.
- 38.2.4 Write names and chemical structures of common hydrocarbons (e.g., aliphatic and aromatic, saturated and unsaturated).
- 38.2.5 Name organic compounds according to functional groups, including ketones, aldehydes, alcohols, ethers, carboxylic acids, esters and amines.
- 38.2.6 Use naming systems, including common and international union of pure and applied chemistry (IUPAC) conventions.
- 38.2.7 Apply various coding systems used for describing the properties of compounds that may be important in hazardous conditions (e.g., Diamond).

Correlated Science Academic Content Benchmark

- *Describe that matter is made of minute particles called atoms and atoms are comprised of even smaller components. Explain the structure and properties of atoms.* (Physical Sciences A, 9-10)

Unit 39: Physical Properties Measurement (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	I	P

Competency 39.1: Apply basic concepts of measurement.

Descriptors:

- 39.1.1 Describe the importance of measurement in chemistry.
- 39.1.2 Define “precision” and “accuracy”; provide examples of each.
- 39.1.3 Calculate mean, median, mode and standard deviation for several data sets.
- 39.1.4 Define “confidence limit” in terms of standard deviation.
- 39.1.5 Describe what is meant by significant figures; give examples.
- 39.1.6 Calibrate analytical balances.
- 39.1.7 Use analytical balances for weighing quantities ranging from 0.001 grams to 100 grams to a specified accuracy and precision.
- 39.1.8 Identify, select and demonstrate proper use of volumetric glassware (e.g., burets, graduated cylinders, flasks and pipets).
- 39.1.9 Calibrate volumetric glassware.
- 39.1.10 Calculate errors in various measurements based on data acquired using common laboratory equipment.
- 39.1.11 Apply standard rules for determining the number of significant figures in measurements and in the answers to corresponding calculations.
- 39.1.12 Convert units of measure from English to metric and vice versa.

Correlated Mathematics Academic Content Benchmarks

- *Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates. (Measurement D, 8-10)*
- *Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision. (Measurement E, 8-10)*
- *Explain differences among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)*
- *Apply various measurement scales to describe phenomena and solve problems. (Measurement B, 11-12)*
- *Find, use and interpret measures of center and spread, such as mean and quartiles, and use those measures to compare and draw conclusions about sets of data. (Data Analysis and Probability D, 8-10)*

BIL: Essential

EDU:	12	AD
	P	R

Competency 39.2: Characterize physical properties of gases, liquids and solids.

Descriptors:

- 39.2.1 Describe gases, liquids and solids in terms of their physical properties.
- 39.2.2 Show the relationship to changes in temperature and pressure.
- 39.2.3 Describe how physical properties of materials are related to product specifications.
- 39.2.4 Demonstrate use of appropriate apparatus for making the measurement.
- 39.2.5 Assess the accuracy and precision of analytical equipment used in the measurement of several physical properties.
- 39.2.6 Calculate volume, temperature and pressure for gases, using the ideal gas law, Charles's law and Boyle's law.
- 39.2.7 Describe the effect of changes in temperature and pressure on the physical properties.

Correlated Mathematics Academic Content Benchmarks

- *Explain differences among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations. (Measurement A, 11-12)*
- *Model and solve problem situations involving direct and inverse variation. (Patterns, Functions and Algebra I, 8-10)*

Correlated Science Academic Content Benchmark

- *Describe the identifiable physical properties of substances (e.g., color, hardness, conductivity, density, concentration and ductility). Explain how changes in these properties can occur without changing the chemical nature of the substance. (Physical Sciences C, 9-10)*

Unit 40: Biohazard Storage, Handling and Disposal
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	I	P

Competency 40.1: Handle infectious agents safely.

Descriptors:

- 40.1.1 Explain prevention of exposure to infectious agents.
- 40.1.2 Describe basic strategies in safe handling of agents.
- 40.1.3 Explain importance of labeling.
- 40.1.4 Follow Standard Operating Procedures (SOP).
- 40.1.5 Describe requirements for packaging, shipping and handling of biological specimens.
- 40.1.6 Describe safe package inspection protocol and emergency plans.
- 40.1.7 Explain prevention of aerosol and droplet generation.
- 40.1.8 Demonstrate and analyze production of aerosol.
- 40.1.9 Explain design and use of containment equipment in labs.
- 40.1.10 Define high-efficiency particulate air (HEPA) filter, biological safety cabinet.
- 40.1.11 List personal protection attire.
- 40.1.12 Differentiate between primary and secondary barriers.
- 40.1.13 Discuss laboratory biosafety level criteria.
- 40.1.14 List basic characteristics of each of four biosafety levels for infectious agents.
- 40.1.15 Identify potential sources of infectious agents.

BIL: Essential

EDU:	12	AD
	P	R

Competency 40.2: Explain safe disposal of infectious waste.

Descriptors:

- 40.2.1 Explain infectious potential of laboratory waste.
- 40.2.2 Explain occupational and public health risks of infectious lab waste.
- 40.2.3 Demonstrate responsibility for safe handling and disposal.
- 40.2.4 Explain waste handling methods.
- 40.2.5 Describe containment and personal protection.
- 40.2.6 Explain sterilization and containment methods.
- 40.2.7 Describe decontamination, autoclaving and incineration.
- 40.2.8 Demonstrate effectiveness of various decontamination methods.
- 40.2.9 Sterilize test strips using autoclave.

BIL: Essential

EDU:	12	AD
	I	P

Competency 40.3: Describe methods used to measure and detect radiation.

Descriptors:

- 40.3.1 Describe survey meters used for radiation detection.
- 40.3.2 Describe Liquid Scintillation Counting (LSC).
- 40.3.3 Explain radiation dosimeters and their proper usage.
- 40.3.4 Explain exposure limits.
- 40.3.5 Explain good housekeeping practices to keep radionucleotides outside body.
- 40.3.6 Describe methods for disposing of radioisotopes disposal.
- 40.3.7 Explain emergency procedures and decontamination.
- 40.3.8 Explain uses of radioisotopes in biotechnology.
- 40.3.9 Describe use of radioactivity in medicine and consumer products.
- 40.3.10 Explain NRC guidelines for radiation exposure.

Correlated English Language Arts Academic Content Benchmark

- *Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing).* (Reading Process B, 8-10; Reading Process B, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision.* (Measurement E, 8-10)
- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)

Correlated Science Academic Content Benchmark

- *Recognize that some atomic nuclei are unstable and will spontaneously break down.* (Physical Sciences B, 11-12)

Unit 41: Basic Microbiology
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	I	P

Competency 41.1: Apply microbiological principles and procedures.

Descriptors:

- 41.1.1 Define microbiology.
- 41.1.2 Explain microbial taxonomy and classification.
- 41.1.3 Explain bacterial metabolism, reproduction, cell structures and their functions.
- 41.1.4 Disinfect and sterilize.
- 41.1.5 Explain classification, composition and preparation of culture media.
- 41.1.6 Collect, handle and culture specimens.
- 41.1.7 Identify bacteriologic culture techniques necessary for isolation and identification of organisms.
- 41.1.8 Test for antibiotic susceptibility.
- 41.1.9 Identify commonly encountered aerobic bacteria through morphological, physical and biochemical properties.
- 41.1.10 Prepare Gram stains.
- 41.1.11 Explain collection and handling of specimens for fungal, mycobacterial and viral specimens.
- 41.1.12 Prepare and examine specimens.
- 41.1.13 Identify the difference between autotrophic and heterotrophic microbes.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 41.2: Explain immunological procedures.

Descriptors:

- 41.2.1 Explain immune system and normal immune response.
- 41.2.2 Explain physical and chemical properties of immunoglobulins and complement and their reaction in vitro.
- 41.2.3 Explain principles of basic agglutination, flocculation and precipitation procedures.

- 41.2.4 Perform basic agglutination, flocculation and precipitation procedures.
- 41.2.5 Explain principles of complement fixation, immunoelectrophoresis and enzyme immunoassay.
- 41.2.6 Explain clinical significance of commonly performed serological tests.

Correlated Science Academic Content Benchmarks

- *Explain that cells are the basic unit of structure and function of living organisms, that once life originated all cells come from pre-existing cells, and that there are a variety of cell types. (Life Sciences A, 9-10)*
- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*
- *Describe the identifiable physical properties of substances (e.g., color, hardness, conductivity, density, concentration and ductility). Explain how changes in these properties can occur without changing the chemical nature of the substance. (Physical Sciences C, 9-10)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 41.3: Perform common microbiology procedures.

Descriptors:

- 41.3.1 Operate microscope, compound microscope, incubator, colony counter and other basic microbiology and analytical equipment.
- 41.3.2 Isolate pure cultures.
- 41.3.3 Maintain pure cultures.
- 41.3.4 Analyze fermentation materials.
- 41.3.5 Harvest cells.
- 41.3.6 Transform hosts.
- 41.3.7 Stain cells and/or bacteria.
- 41.3.8 Prepare media.
- 41.3.9 Identify sterile techniques used during handling, sampling and analytical procedures.
- 41.3.10 Explain Koch’s Postulates and their use in determining primary and secondary pathogens.
- 41.3.11 Aseptically transfer microorganisms.
- 41.3.12 Sterilize all materials and equipment to be used in fermentation process.

BIL: Essential

EDU:	12	AD
	P	R

Competency 41.4: Contrast prokaryotic and eukaryotic cells.

Descriptors:

- 41.4.1 Define prokaryotic and eukaryotic cells.
- 41.4.2 List structures of prokaryotic and eukaryotic cells.
- 41.4.3 State function of each cell structure.
- 41.4.4 Distinguish between cell structures common to both and those that are unique.
- 41.4.5 Describe cell wall/cell membrane.
- 41.4.6 Explain the function of an endospore.

- 41.4.7 Identify conditions that favor the formation of endospores.
- 41.4.8 Define plasmid.
- 41.4.9 Identify groups of microorganisms such as bacteria, algae and fungi.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Science Academic Content Benchmark

- *Explain that cells are the basic unit of structure and function of living organisms, that once life originated all cells come from pre-existing cells, and that there are a variety of cell types.* (Life Sciences A, 9-10)

BIL: Essential

EDU:	12	AD
	I	P

Competency 41.5: Explain microbial growth.

Descriptors:

- 41.5.1 Correlate bacterial binary fission with generation time.
- 41.5.2 Describe normal bacteria population growth curve.
- 41.5.3 Indicate methods of enumerating bacteria and measuring bacterial growth.
- 41.5.4 Explain closed bacterial culture.
- 41.5.5 Describe physical factors that affect microbial growth.

Correlated Mathematics Academic Content Benchmarks

- *Translate information from one representation (words, table, graph or equation) to another representation of a relation or function.* (Patterns, Functions and Algebra C, 8-10)
- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.* (Patterns, Functions and Algebra D, 8-10)

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)

Unit 42: Biochemical Technology

(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 42.1: Prepare common laboratory reagents.

Descriptors:

- 42.1.1 Define mole, molarity, normality, percent w/v and percent v/v.
- 42.1.2 Perform serial dilution.
- 42.1.3 Describe and prepare buffers.
- 42.1.4 List useful buffers for biological systems.
- 42.1.5 Adjust the pH of stock reagents.
- 42.1.6 Describe ionic and non-ionic detergents.
- 42.1.7 Dilute stock solutions to working solutions.
- 42.1.8 Prepare sterile solutions.

Correlated English Language Arts Academic Content Benchmarks

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary.* (Acquisition of Vocabulary D, 11-12)
- *Use multiple resources to enhance comprehension of vocabulary.* (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)

Correlated Mathematics Academic Content Benchmark

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)

Correlated Science Academic Content Benchmark

- *Explain how atoms react with each other to form other substances and how molecules react with each other or other atoms to form even different substances.* (Physical Sciences B, 9-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 42.2: Demonstrate basic, one-step chemical laboratory skills.

Descriptors:

- 42.2.1 Identify appropriate glassware for task.
- 42.2.2 Store prepared solutions and stains to maintain in optimal conditions.
- 42.2.3 Operate laboratory instruments.
- 42.2.4 Measure using meter kilogram second (MKS) system (metric).
- 42.2.5 Identify storage containers that are compatible with the materials to be stored.
- 42.2.6 Use safety hoods.
- 42.2.7 Utilize solvents, acids and detergents for cleaning.

- 42.2.8 Prepare solutions.
- 42.2.9 Demonstrate the proper use of pressurized cylinders.
- 42.2.10 Measure volume of a solution to perform a laboratory test.
- 42.2.11 Measure temperatures accurately.
- 42.2.12 Wash laboratory equipment appropriately.
- 42.2.13 Sterilize equipment to decontaminate soiled materials.

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates.* (Measurement D, 8-10)
- *Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision.* (Measurement E, 8-10)

BIL: Essential

EDU:	12	AD
	P	R

Competency 42.3: Demonstrate combinations of chemical laboratory skills.

Descriptors:

- 42.3.1 Describe typical laboratory procedures (e.g., heating, cooling, filtration, glassware, setup, distillation, weighing, measuring, pipetting, volumetrics).
- 42.3.2 Carry out laboratory procedures from a written protocol.
- 42.3.3 Respond to a laboratory spill.
- 42.3.4 Practice safe and proper use of hand tools.
- 42.3.5 Use proper techniques for mixing acids and bases with other materials.
- 42.3.6 Demonstrate proper titration techniques.
- 42.3.7 Describe the physical and chemical properties of common materials and their implications for storage.
- 42.3.8 Transfer liquids, solids and gases properly.
- 42.3.9 Maintain electrodes.
- 42.3.10 Use all common types of volumetric equipment and apparatus.

BIL: Essential

EDU:	12	AD
	I	P

Competency 42.4: Describe the following chemical lab equipment and instruments.

Descriptors:

- 42.4.1 Use titrator.
- 42.4.2 Use Geiger Mueller counter.
- 42.4.3 Use alpha/beta counter.
- 42.4.4 Use oil immersion lens.
- 42.4.5 Use Bunsen/Fisher burner safely.
- 42.4.6 Use autoclaves, hot air oven and disinfectants.

BIL: Essential

EDU:	12	AD
	P	R

Competency 42.5: Perform critical laboratory calculations and measurements.

Descriptors:

- 42.5.1 Calculate quantities needed to perform a test analysis.
- 42.5.2 Calculate unit conversions.
- 42.5.3 Calculate concentrations.
- 42.5.4 Construct graphs.

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number, Number Sense and Operations G, 8-10)*
- *Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates. (Measurement D, 8-10)*
- *Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision. (Measurement E, 8-10)*
- *Apply various measurement scales to describe phenomena and solve problems. (Measurement B, 11-12)*
- *Translate information from one representation (words, table, graph or equation) to another representation of a relation or function. (Patterns, Functions and Algebra C, 8-10)*
- *Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Patterns, Functions and Algebra D, 8-10)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 42.6: Perform sample analysis.

Descriptors:

- 42.6.1 Obtain representative samples.
- 42.6.2 Make observations regarding condition of sample and record any notable characteristics.
- 42.6.3 Identify the appropriate equipment for the type of analysis.
- 42.6.4 Gather and clean the necessary glassware, reagents and chemicals.
- 42.6.5 Calibrate equipment.
- 42.6.6 Prepare and standardize reagents.
- 42.6.7 Prepare samples for analysis (e.g., dissolve, digest, combust, ash).
- 42.6.8 Prepare standards and control samples.
- 42.6.9 Analyze sample.
- 42.6.10 Calculate results to appropriate significant figures.
- 42.6.11 Examine analytical results and respond appropriately.
- 42.6.12 Identify conditions that indicate need for an analysis to be repeated.
- 42.6.13 Record and report data.
- 42.6.14 Return all equipment and material to their original storage locations.

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Explain differences among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations.* (Measurement A, 11-12)
- *Apply various measurement scales to describe phenomena and solve problems.* (Measurement B, 11-12)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability.* (Data Analysis and Probability B, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 42.7: Describe molecular behavior of amino acids and peptides.

Descriptors:

- 42.7.1 Draw a structure of an amino acid.
- 42.7.2 Build model of an amino acid.
- 42.7.3 Identify chemical properties of peptide bond.
- 42.7.4 Identify four factors that determine isoelectric point of an amino acid and a protein.
- 42.7.5 Determine polarity of functional groups on individual amino acids.
- 42.7.6 Explain the solubility of an amino acid and a protein in terms of isoelectric point.
- 42.7.7 Determine the isoelectric point of amino acids and proteins.
- 42.7.8 Predict the effect of the isoelectric point on molecular behavior of amino acid and protein.

Correlated Science Academic Content Benchmarks

- *Explain how atoms react with each other to form other substances and how molecules react with each other or other atoms to form even different substances.* (Physical Sciences B, 9-10)
- *Explain how variations in the arrangement and motion of atoms and molecules form the basis of a variety of biological, chemical and physical phenomena.* (Physical Sciences A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 42.8: Explain protein properties.

Descriptors:

- 42.8.1 Differentiate levels of protein structure.
- 42.8.2 Describe characteristics of each level.
- 42.8.3 Describe methods of denaturing proteins.
- 42.8.4 Describe ways proteins can be renatured.
- 42.8.5 Identify four methods of renaturation.
- 42.8.6 Explain properties that allow for molecular renaturation.

Correlated Science Academic Content Benchmark

- *Explain how variations in the arrangement and motion of atoms and molecules form the basis of a variety of biological, chemical and physical phenomena.* (Physical Sciences A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 42.9: Perform enzyme assays.

Descriptors:

- 42.9.1 Generalize factors affecting rates of reaction.
- 42.9.2 Explain factors optimizing rates of reaction.
- 42.9.3 Distinguish substrate and product from catalyst in function and role.
- 42.9.4 Explain parameters of reaction.
- 42.9.5 Assemble correct supplies needed for assay.
- 42.9.6 Determine kinetics of an enzyme catalyzed reaction.
- 42.9.7 Distinguish various methods to graph data.
- 42.9.8 Perform enzyme-linked immunosorbent assay (ELISA).

Correlated Science Academic Content Benchmark

- *Explain how variations in the arrangement and motion of atoms and molecules form the basis of a variety of biological, chemical and physical phenomena.* (Physical Sciences A, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 42.10: Perform biochemical assays of nucleotides and nucleic acids.

Descriptors:

- 42.10.1 Identify three components of a nucleotide.
- 42.10.2 Differentiate nucleotides and nucleosides.
- 42.10.3 Isolate nucleic acids.
- 42.10.4 Perform UV spectra of proteins and nucleic acids.
- 42.10.5 Explain limitations of techniques.

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 42.11: Explain the relationship between deoxyribonucleic acid (DNA), ribonucleic acid (RNA) and protein.

Descriptors:

- 42.11.1 Explain how DNA functions as genetic material.
- 42.11.2 Discuss transcription of genes.
- 42.11.3 Explain translation of a messenger RNA into protein.
- 42.11.4 Identify the key elements of the transcription and translational machinery.

Correlated Science Academic Content Benchmarks

- *Explain the genetic mechanisms and molecular basis of inheritance.* (Life Sciences C, 9-10)
- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)
- *Explain how the molecular basis of life and the principles of genetics determine inheritance.* (Life Sciences C, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 42.12: Describe deoxyribonucleic acid (DNA) replication.**Descriptors:**

- 42.12.1 Outline DNA replication cycle.
- 42.12.2 Identify conditions under which replication occurs.
- 42.12.3 Differentiate the replication cycles of prokaryotes and eukaryotes.
- 42.12.4 Identify mutagenic and repair mechanisms of DNA.
- 42.12.5 Identify mutagenic processes and repair mechanisms.
- 42.12.6 Explain how mutagenic mechanisms modify organisms.

Correlated Science Academic Content Benchmark

- *Explain the genetic mechanisms and molecular basis of inheritance.* (Life Sciences C, 9-10)

BIL: Essential

EDU:	12	AD
	I	P

Competency 42.13: Describe biochemical assays of carbohydrates.**Descriptors:**

- 42.13.1 Identify components of monosaccharides.
- 42.13.2 Draw structural formula for a disaccharide.
- 42.13.3 Distinguish uses and limitations of various assays.

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)
- *Explain how variations in the arrangement and motion of atoms and molecules form the basis of a variety of biological, chemical and physical phenomena.* (Physical Sciences A, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 42.14: Describe biochemical assays of lipids.

Descriptors:

- 42.14.1 Compare and contrast major classes of lipids.
- 42.14.2 Identify functional groups and chemical reactivity of classes.
- 42.14.3 Identify basis of chemical reactions of assay.

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*
- *Explain how variations in the arrangement and motion of atoms and molecules form the basis of a variety of biological, chemical and physical phenomena. (Physical Sciences A, 11-12)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 42.15: Describe membrane fractionation.

Descriptors:

- 42.15.1 Diagram cell membrane.
- 42.15.2 Outline function of molecules within membrane structure.
- 42.15.3 Relate diagram to explanation of fluid mosaic model.
- 42.15.4 Identify membrane purification/separation techniques.

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*

Unit 43: Molecular Biology Technology
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 43.1: Explain genetics and heredity.

Descriptors:

- 43.1.1 Define and discuss Mendel’s work and research.
- 43.1.2 Describe basic genetic crosses.
- 43.1.3 Describe meiosis and genetic recombination.
- 43.1.4 Diagram linkage mapping and solve linkage problems.
- 43.1.5 Determine whether a trait is dominant or recessive.
- 43.1.6 Determine whether a trait is sex-linked or autosomal.
- 43.1.7 Analyze and solve sex-linkage problems.
- 43.1.8 Apply Mendelian patterns to family trees with medical problems.

Correlated Mathematics Academic Content Benchmarks

- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)
- *Use counting techniques, such as permutations and combinations, to determine the total number of options and possible outcomes.* (Data Analysis and Probability H, 8-10)
- *Compute probabilities of compound events, independent events, and simple dependent events.* (Data Analysis and Probability J, 8-10)
- *Make predictions based on theoretical probabilities and experimental results.* (Data Analysis and Probability K, 8-10)

Correlated Science Academic Content Benchmark

- *Explain the genetic mechanisms and molecular basis of inheritance.* (Life Sciences C, 9-10)

BIL: Essential

EDU:	12	AD
	I	P

Competency 43.2: Describe historical developments leading to modern recombinant deoxyribonucleic acid (DNA) technology.

Descriptors:

- 43.2.1 Describe work of early and recent scientists.
- 43.2.2 Trace developments and discoveries in genetics.
- 43.2.3 Outline and highlight major events in DNA technology history.
- 43.2.4 Analyze trends, controversies and breakthroughs.
- 43.2.5 Explain in writing how early scientists’ work led to gene cloning techniques.

Correlated English Language Arts Academic Content Benchmarks

- *Organize information from various resources and select appropriate sources to support central ideas, concepts and themes.* (Research C, 8-10)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Science Academic Content Benchmarks

- *Summarize the historical development of scientific theories and ideas, and describe emerging issues in the study of life sciences.* (Life Sciences J, 9-10)
- *Summarize the historical development of scientific theories and ideas within the study of life sciences.* (Life Sciences G, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Use historical interpretations to explain current issues.* (History B, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 43.3: **Apply basic concept of recombinant deoxyribonucleic acid (DNA) technology.**

Descriptors:

- 43.3.1 Diagram the relationships among DNA, ribonucleic acid (RNA), and protein.
- 43.3.2 Define basic components of cloning.
- 43.3.3 Identify specific terms: vectors, restriction enzymes, host transformation and electrophoresis.
- 43.3.4 Apply these concepts to simulated applications.
- 43.3.5 Identify unique restriction enzyme sites.
- 43.3.6 Purify DNA.
- 43.3.7 Purify RNA.

Correlated Science Academic Content Benchmarks

- *Explain the genetic mechanisms and molecular basis of inheritance.* (Life Sciences C, 9-10)
- *Summarize the historical development of scientific theories and ideas, and describe emerging issues in the study of life sciences.* (Life Sciences J, 9-10)
- *Explain how processes at the cellular level affect the functions and characteristics of an organism.* (Life Sciences A, 11-12)
- *Explain how the molecular basis of life and the principles of genetics determine inheritance.* (Life Sciences C, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 43.4: Isolate and characterize deoxyribonucleic acid (DNA).

Descriptors:

- 43.4.1 Explain large-scale, double-stranded DNA isolation methods.
- 43.4.2 Explain mini-prep double-stranded DNA isolation of plasmid DNA.
- 43.4.3 Explain genomic DNA isolation from blood samples according to Federal Bureau of Investigation (FBI) protocol.
- 43.4.4 Perform restriction digest.
- 43.4.5 Perform electrophoresis.
- 43.4.6 Prepare graph and assess results.
- 43.4.7 Determine molecular weight of fragments correctly.

Correlated Science Academic Content Benchmarks

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*
- *Describe that matter is made of minute particles called atoms and atoms are comprised of even smaller components. Explain the structure and properties of atoms. (Physical Sciences A, 9-10)*
- *Explain how atoms react with each other to form other substances and how molecules react with each other or other atoms to form even different substances. (Physical Sciences B, 9-10)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 43.5: Clone deoxyribonucleic acid (DNA).

Descriptors:

- 43.5.1 Clone a gene for antibiotic resistance into a vector.
- 43.5.2 Ensure transformed *E. coli* acquire antibiotic resistance.
- 43.5.3 Prepare a report on cloning exercise.
- 43.5.4 Describe terminology and processes in DNA technology.
- 43.5.5 Prepare reagents and materials.

Correlated English Language Arts Academic Content Benchmarks

- *Use multiple resources to enhance comprehension of vocabulary. (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)*
- *Produce informational essays or reports that establish a clear and distinctive perspective on the subject, include relevant perspectives, take into account the validity and reliability of sources and provide a clear sense of closure. (Writing Applications D, 11-12)*

Correlated Mathematics Academic Content Benchmark

- *Use formulas to find surface area and volume for specified three-dimensional objects accurate to a specified level of precision. (Measurement B, 8-10)*

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*

BIL: **Recommended**

EDU:	12	AD
	I	R

Competency 43.6: **Perform advanced techniques in recombinant deoxyribonucleic acid (DNA) technology.**

Descriptors:

- 43.6.1 Perform Southern Blot or colony transfer.
- 43.6.2 Perform probe preparation.
- 43.6.3 Perform hybridization.
- 43.6.4 Identify and organize protocols.
- 43.6.5 Prepare flowchart of overall procedure.
- 43.6.6 Follow tasks in each protocol.
- 43.6.7 Summarize procedures and their results in writing.
- 43.6.8 Explain techniques.
- 43.6.9 Apply concepts of screening, genetic expression, expression vectors and genetic libraries.
- 43.6.10 Perform polymerase chain reaction (PCR) technique.

Correlated English Language Arts Academic Content Benchmarks

- *Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)*
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Research E, 8-10; Research E, 11-12)*

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 43.7: **Relate molecular biology technology to our lives.**

Descriptors:

- 43.7.1 Explain results from the Human Genome project and other sequencing projects.
- 43.7.2 Explain how gene sequencing is performed.
- 43.7.3 Give sequencing examples of medical or agricultural advances.
- 43.7.4 Give examples of how this information is used in today's applications.
- 43.7.5 Relate molecular biology to recent advances in local medicine, food science or agriculture industries.
- 43.7.6 Explain field applications of gene therapy, forensics and animal husbandry.

Correlated Science Academic Content Benchmarks

- *Summarize the historical development of scientific theories and ideas, and describe emerging issues in the study of life sciences. (Life Sciences J, 9-10)*
- *Summarize the historical development of scientific theories and ideas within the study of life sciences. (Life Sciences G, 11-12)*
- *Explain that science and technology are interdependent; each drives the other. (Science and Technology B, 9-10)*

Unit 44: Cell Culturing
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	I	P

Competency 44.1: Describe the history of cell culture.

Descriptors:

- 44.1.1 Identify major historic advances in cell culture.
- 44.1.2 Describe advantages and disadvantages of cell culture.
- 44.1.3 Define different types of cultures.

Correlated Science Academic Content Benchmark

- *Summarize the historical development of scientific theories and ideas within the study of life sciences.* (Life Sciences G, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 44.2: Describe equipment needs for a tissue culture lab.

Descriptors:

- 44.2.1 Describe essential and beneficial equipment for tissue culture facility.
- 44.2.2 Describe other types of equipment found in tissue culture facilities.
- 44.2.3 Describe necessary consumable items used in tissue culture facilities.

BIL: Essential

EDU:	12	AD
	P	R

Competency 44.3: Describe aseptic technique.

Descriptors:

- 44.3.1 Describe objectives of aseptic technique.
- 44.3.2 Describe good technique for work surface, personal hygiene, pipetting and sterile handling.
- 44.3.3 Explain mechanism for laminar flow hoods.

BIL: Essential

EDU:	12	AD
	I	P

Competency 44.4: Explain factors that influence cell growth during incubation.

Descriptors:

- 44.4.1 Compare surfaces and dishes, plates and vessels that cells will grow on.
- 44.4.2 Explain relationship between carbon dioxide, temperature, buffering and pH.
- 44.4.3 Describe basic constituents of media.
- 44.4.4 Contrast advantages and disadvantages of serum-free media.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 44.5: Prepare media for culturing cells.

Descriptors:

- 44.5.1 Clean and sterilize equipment.
- 44.5.2 Prepare media and sterilize by filtration.
- 44.5.3 Test media for sterility.
- 44.5.4 Describe components needed for media.
- 44.5.5 Explain function of each media component .
- 44.5.6 List hormones to stimulate growth.
- 44.5.7 Use serum-free media.

BIL: Essential

EDU:	12	AD
	I	P

Competency 44.6: Maintain the passage of aseptically cultured cells.

Descriptors:

- 44.6.1 Culture common cell lines without contamination.
- 44.6.2 Establish primary cell culture.
- 44.6.3 Count cells using a hemocytometer.
- 44.6.4 Demonstrate cryopreservation techniques by freezing and thawing cells.

Correlated English Language Arts Academic Content Benchmark

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Acquisition of Vocabulary D, 11-12)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 44.7: Explain methods for analysis of cultured cells.

Descriptors:

- 44.7.1 Describe methods for DNA, RNA and protein analysis of harvested cells.
- 44.7.2 Explain how cell cultures can be used to assay viability and cytotoxicity.
- 44.7.3 Transfect cells with plasmid DNA.
- 44.7.4 Select transfected cells.
- 44.7.5 Clone transfected cells.
- 44.7.6 Describe the fusion process to create hybridoma cells.
- 44.7.7 Describe the use of enzyme-linked immunosorbent assay (ELISA) to screen hybridoma cells for antibody production.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 44.8: Describe basic antibody-mediated immunity.

Descriptors:

- 44.8.1 Describe the basic biology of B cells and T cells.
- 44.8.2 Diagram an antibody molecule.
- 44.8.3 Define and compare polyclonal and monoclonal antibodies.
- 44.8.4 Describe methods and uses for antibodies, enzyme-linked immunosorbent assay (ELISA), Western Blot and hybridoma production.

Correlated Science Academic Content Benchmark

- *Explain how processes at the cellular level affect the functions and characteristics of an organism. (Life Sciences A, 11-12)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 44.9: Describe the use of animals in research.

Descriptors:

- 44.9.1 Describe ethical considerations of animal use.
- 44.9.2 Describe regulations regarding animal care and use.
- 44.9.3 Apply knowledge of federal, state and local animal welfare regulations.
- 44.9.4 Describe proper injection technique for immunization of mice.

Correlated English Language Arts Academic Content Benchmark

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

Correlated Science Academic Content Benchmarks

- *Describe the ethical practices and guidelines in which science operates.* (Scientific Ways of Knowing C, 9-10)
- *Explain how societal issues and considerations affect the progress of science and technology.* (Scientific Ways of Knowing C, 11-12)

Unit 45: Protein Bioseparation Methods (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	I	P

Competency 45.1: Explain basic chromatographic theory.

Descriptors:

- 45.1.1 Define the relationship between chromatography and biphasic separation.
- 45.1.2 Classify chromatographic methods by type.
- 45.1.3 Select appropriate chromatographic method for a particular circumstance/situation.
- 45.1.4 Show diagrammatically a stationary and mobile phase, column and fraction.

Correlated English Language Arts Academic Content Benchmark

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Acquisition of Vocabulary D, 11-12)*

Correlated Science Academic Content Benchmarks

- *Explain how atoms react with each other to form other substances and how molecules react with each other or other atoms to form even different substances. (Physical Sciences B, 9-10)*
- *Describe the identifiable physical properties of substances (e.g., color, hardness, conductivity, density, concentration and ductility). Explain how changes in these properties can occur without changing the chemical nature of the substance. (Physical Sciences C, 9-10)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 45.2: Interpret chromatographic results.

Descriptors:

- 45.2.1 Perform qualitative and quantitative analysis to determine amount and type of unknown sample.
- 45.2.2 Detect uncertainties in analysis.
- 45.2.3 Point out ways to confirm analysis.

Correlated Science Academic Content Benchmarks

- *Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations. (Scientific Inquiry A, 9-10)*
- *Make appropriate choices when designing and participating in scientific investigations by using cognitive and manipulative skills when collecting data and formulating conclusions from the data. (Scientific Inquiry A, 11-12)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 45.3: Prepare and run various types of chromatography separation.

Descriptors:

- 45.3.1 Pour, pack and run gel permeation chromatography column.
- 45.3.2 Separate test mixture into its components.
- 45.3.3 Collect fractions.
- 45.3.4 Examine fractions using spectrophotometer and an electrophoresis.

BIL: Essential

EDU:	12	AD
	I	P

Competency 45.4: Evaluate results of various types of chromatography separation.

Descriptors:

- 45.4.1 Explain results in terms of molecular weight of sample components.
- 45.4.2 Identify unknown correctly.
- 45.4.3 Evaluate chromatograms using measurement skills.
- 45.4.4 Summarize procedures.
- 45.4.5 Document results.
- 45.4.6 Prepare formal report that summarizes interpretation of results in tabular and text form.

Correlated English Language Arts Academic Content Benchmarks

- *Produce informational essays or reports that establish a clear and distinctive perspective on the subject, include relevant perspectives, take into account the validity and reliability of sources and provide a clear sense of closure. (Writing Applications D, 11-12)*
- *Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)*
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Research E, 8-10; Research E, 11-12)*

Correlated Science Academic Content Benchmarks

- *Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations. (Scientific Inquiry A, 9-10)*
- *Make appropriate choices when designing and participating in scientific investigations by using cognitive and manipulative skills when collecting data and formulating conclusions from the data. (Scientific Inquiry A, 11-12)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 45.5: Perform proper maintenance and operation techniques to high-performance liquid chromatography (HPLC) system.

Descriptors:

- 45.5.1 Attach proper column to system.
- 45.5.2 Check for leaks.
- 45.5.3 Check pressure.
- 45.5.4 Prime pump and run test sample.
- 45.5.5 Store column in correct storage solution.
- 45.5.6 Identify components of HPLC system and trace flow of liquid.

BIL: Essential

EDU:	12	AD
	I	P

Competency 45.6: Run and evaluate sample on high-performance liquid chromatography (HPLC) system and interpret results.

Descriptors:

- 45.6.1 Obtain correct separation of sample components.
- 45.6.2 Explain results in terms of reverse phase column and sample interactions.
- 45.6.3 Identify unknown correctly.
- 45.6.4 Evaluate chromatograms using measurement skills.
- 45.6.5 Summarize procedures.
- 45.6.6 Document results.
- 45.6.7 Prepare formal report that includes interpretation of results in tabular and text form.

Correlated English Language Arts Academic Content Benchmarks

- *Produce informational essays or reports that establish a clear and distinctive perspective on the subject, include relevant perspectives, take into account the validity and reliability of sources and provide a clear sense of closure.* (Writing Applications D, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia.* (Research E, 8-10; Research E, 11-12)

Correlated Science Academic Content Benchmarks

- *Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations.* (Scientific Inquiry A, 9-10)
- *Make appropriate choices when designing and participating in scientific investigations by using cognitive and manipulative skills when collecting data and formulating conclusions from the data.* (Scientific Inquiry A, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 45.7: Identify and explain physical and chemical properties of proteins.

Descriptors:

- 45.7.1 Relate physical properties of a protein to separation methods.
- 45.7.2 Relate chemical properties of a protein to separation methods.
- 45.7.3 Describe a separation strategy based on this information.

Correlated Science Academic Content Benchmarks

- *Explain how atoms react with each other to form other substances and how molecules react with each other or other atoms to form even different substances. (Physical Sciences B, 9-10)*
- *Describe the identifiable physical properties of substances (e.g., color, hardness, conductivity, density, concentration and ductility). Explain how changes in these properties can occur without changing the chemical nature of the substance. (Physical Sciences C, 9-10)*

BIL: Essential

EDU:	12	AD
	I	P

Competency 45.8: Desalt protein and change buffer.

Descriptors:

- 45.8.1 Describe how to desalt a sample and change buffer.
- 45.8.2 Identify all steps in desalting process.
- 45.8.3 Perform dialysis.
- 45.8.4 Dialysate with pH of proper buffer, proper conductivity and activity.

BIL: Essential

EDU:	12	AD
	I	P

Competency 45.9: Perform ion exchange chromatography.

Descriptors:

- 45.9.1 Explain principles of chromatographic separation.
- 45.9.2 Explain and distinguish between cationic and anionic exchangers.
- 45.9.3 Set up chromatography column with DEAE.
- 45.9.4 Inspect for correct orientation and no bubbles in connecting tube.
- 45.9.5 Run sample on chromatography column.
- 45.9.6 Collect fractions.
- 45.9.7 Graph data from column fractions.
- 45.9.8 Use assays from extraction in supernatant.
- 45.9.9 Produce concentrated samples.
- 45.9.10 Document and explain procedure.

Correlated English Language Arts Academic Content Benchmarks

- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia.* (Research E, 8-10; Research E, 11-12)

Correlated Science Academic Content Benchmark

- *Describe the identifiable physical properties of substances (e.g., color, hardness, conductivity, density, concentration and ductility). Explain how changes in these properties can occur without changing the chemical nature of the substance.* (Physical Sciences C, 9-10)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 45.10: Perform electrophoresis of protein samples.

Descriptors:

- 45.10.1 Write an explanation of theory of SDS polyacrylamide gel electrophoresis SDS (PAGE) and isoelectric focusing (IEF).
- 45.10.2 Cast a PAGE gel.
- 45.10.3 Run samples on PAGE.
- 45.10.4 Perform Western Blot.
- 45.10.5 Cast an Isoelectric Focusing (IEF) gel.
- 45.10.6 Transfer IEF gel to Sodium Dodecyl Sulfate (SDS PAGE) gel.
- 45.10.7 Run samples.

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 45.11: Perform affinity purification.

Descriptors:

- 45.11.1 Describe immuno-affinity chromatography techniques.
- 45.11.2 Demonstrate protein A/G purification of antibodies.
- 45.11.3 Describe hydrophobic chromatography methods.
- 45.11.4 Describe ligand-receptor for enzyme purification.

Correlated Science Academic Content Benchmark

- *Describe the identifiable physical properties of substances (e.g., color, hardness, conductivity, density, concentration and ductility). Explain how changes in these properties can occur without changing the chemical nature of the substance.* (Physical Sciences C, 9-10)

Unit 46: Fermentation Technology
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	I	P

Competency 46.1: Assess various fermentation and bioprocessing applications and the effects of fermentation operations on cell growth kinetics.

Descriptors:

- 46.1.1 Explain various product types and classes of fermentation or bioprocessing.
- 46.1.2 Describe advantages and disadvantages of various fermentation processes.
- 46.1.3 Outline function of parts of bench-top fermenter.
- 46.1.4 Describe function of parts of bench-top fermenter.
- 46.1.5 Write material balance for substrates and products.
- 46.1.6 Identify factors determining efficiency of process.
- 46.1.7 Apply appropriate mathematical functions to calculations.
- 46.1.8 Describe relationship of oxygen transfer rates to mass transfer.
- 46.1.9 Monitor microorganism growth in appropriate media.
- 46.1.10 Determine viability of stored cells.

Correlated Mathematics Academic Content Benchmarks

- *Describe and interpret rates of change from graphical and numerical data.* (Patterns, Functions and Algebra J, 8-10)
- *Apply mathematical knowledge and skills routinely in other content areas and practical situations.* (Mathematical Processes B, 8-10)

Correlated Science Academic Content Benchmark

- *Explain the flow of energy and the cycling of matter through biological and ecological systems (cellular, organismal and ecological).* (Life Sciences D, 9-10)

BIL: Essential

EDU:	12	AD
	I	P

Competency 46.2: Validate principles and importance of sterility in industrial fermentations.

Descriptors:

- 46.2.1 Explain important features of aseptic technique in terms of absolute sterility.
- 46.2.2 Write explanation of sterility.
- 46.2.3 Explain the temperature/pressure relationship of saturated steam to sterilization.
- 46.2.4 Explain the effect of entrapped air on sterilization effectiveness.
- 46.2.5 Compare sterilization methods using dry heat versus moist heat.
- 46.2.6 Demonstrate sterilization by micro-filtration.
- 46.2.7 Explain the effect of suspended solids in fermentation media on sterilization effectiveness.
- 46.2.8 Prepare an uncontaminated sample for analysis.

Unit 47: Microbiology for Biotechnology
(Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 47.1: Describe the general structure of viruses.

Descriptors:

- 47.1.1 Describe various coverings, central core structures.
- 47.1.2 Describe viral capsid.
- 47.1.3 Distinguish between helical and icosahedral viruses.
- 47.1.4 Describe origin of viral envelope.

Correlated Science Academic Content Benchmark

- *Explain that cells are the basic unit of structure and function of living organisms, that once life originated all cells come from pre-existing cells, and that there are a variety of cell types. (Life Sciences A, 9-10)*

BIL: Essential

EDU:	12	AD
	P	R

Competency 47.2: Explain how chemical energy operates major cell processes (e.g., biosynthesis, movement, transport, growth).

Descriptors:

- 47.2.1 Describe biological oxidation and reduction.
- 47.2.2 Describe structure of adenosine triphosphate (ATP).
- 47.2.3 Illustrate general processes of endergonic and exergonic reactions.
- 47.2.4 Explain concept of reduction and oxidation (REDOX).
- 47.2.5 Relate ATP synthesis to catabolism and anabolism.

Correlated English Language Arts Academic Content Benchmark

- *Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Acquisition of Vocabulary D, 11-12)*

Correlated Science Academic Content Benchmark

- *Explain the flow of energy and the cycling of matter through biological and ecological systems (cellular, organismal and ecological). (Life Sciences D, 9-10)*

BIL: **Essential**

EDU:	12	AD
	P	R

Competency 47.3: Describe active and passive transport.

Descriptors:

- 47.3.1 Identify three types of passive transport.
- 47.3.2 Identify features in active transport systems.
- 47.3.3 Describe two forms of endocytosis.

Correlated Science Academic Content Benchmark

- *Explain the characteristics of life as indicated by cellular processes and describe the process of cell division and development. (Life Sciences B, 9-10)*

Unit 48: Bioethics
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 48.1: Explain the basic principles of ethics.

Descriptors:

- 48.1.1 Define bioethics.
- 48.1.2 Identify importance of replication of experiments.
- 48.1.3 Identify ethical uses of animals in research (e.g., purpose, safety mechanisms, avoidance of unnecessary duplication).
- 48.1.4 Identify ethical and unethical behavior in lab setting.
- 48.1.5 Identify ethical and unethical behavior in personal life.
- 48.1.6 Explain methods for protecting the integrity of data.
- 48.1.7 Explain importance of protecting the integrity of data.

Correlated Science Academic Content Benchmarks

- *Describe the ethical practices and guidelines in which science operates.* (Scientific Ways of Knowing C, 9-10)
- *Explain how societal issues and considerations affect the progress of science and technology.* (Scientific Ways of Knowing C, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 48.2: Apply principles of ethics to scientific problems.

Descriptors:

- 48.2.1 Identify rules for discussion of ethical issues in a public forum.
- 48.2.2 Apply science ethically to a variety of situations.
- 48.2.3 Identify ethical issues specific to a particular company or position.

Correlated English Language Arts Academic Content Benchmarks

- *Formulate open-ended research questions suitable for investigation and adjust questions as necessary while research is conducted.* (Research A, 8-10)
- *Formulate open-ended research questions suitable for inquiry and investigation and adjust questions as necessary while research is conducted.* (Research A, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Science Academic Content Benchmarks

- *Describe the ethical practices and guidelines in which science operates.* (Scientific Ways of Knowing C, 9-10)
- *Explain how societal issues and considerations affect the progress of science and technology.* (Scientific Ways of Knowing C, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 48.3: Discuss regulations.

Descriptors:

- 48.3.1 Describe and comply with the code of federal regulations for good manufacturing practices (GMPs) and good laboratory practices (GLPs).
- 48.3.2 Discuss consequences of non compliances with GLPs and GMPs.
- 48.3.3 Identify the process of on-site facility quality systems inspection by FDA.

Correlated English Language Arts Academic Content Benchmark

- *Apply reading comprehension strategies to understand grade-appropriate text.* (Reading Process A, 8-10; Reading Process A, 11-12)

Correlated Social Studies Academic Content Benchmark

- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

Unit 49: Introduction to Biotechnology Industry
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	P	R

Competency 49.1: Analyze the impact of the biotechnology industry.

Descriptors:

- 49.1.1 Identify industries that use biotechnology.
- 49.1.2 Describe and assess the impact of biotechnology on contemporary society.
- 49.1.3 Differentiate new areas of biotechnology from earlier uses.
- 49.1.4 Identify types of products or processes used by biotechnology companies.
- 49.1.5 Contrast differences between laboratories using biotechnology for research and development versus production facilities.
- 49.1.6 Explain the differences between commercial laboratory endeavors and academic research laboratories.

Correlated English Language Arts Academic Content Benchmark

- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)

Correlated Science Academic Content Benchmarks

- *Explain that science and technology are interdependent; each drives the other.* (Science and Technology B, 9-10)
- *Recognize that scientific literacy is part of being a knowledgeable citizen.* (Scientific Ways of Knowing D, 9-10)

Correlated Social Studies Academic Content Benchmarks

- *Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices.* (Economics A, 11-12)
- *Identify factors which inhibit or spur economic growth and cause expansions or recessions.* (Economics B, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

BIL: Essential

EDU:	12	AD
	P	R

Competency 49.2: Classify applications of biotechnology by major industrial uses.

Descriptors:

- 49.2.1 Discuss areas of human health treatment and diagnosis modified or affected by biotechnology products and processes.
- 49.2.2 Compare current methods of breeding with methods of molecular genetic engineering.

- 49.2.3 Discuss how biotechnologies impact crop and plant agriculture and forestry.
- 49.2.4 Describe how biotechnological processes impact food production.
- 49.2.5 Describe pharmaceutical company use of monoclonal antibodies.
- 49.2.6 Discuss applications of biotechnologies in waste removal and cleanup, bioremediation, decontaminating soils, removing organic pollutants from industrial effluents, treating petroleum sludge and oil spills.
- 49.2.7 Project applications of biotechnology to solve health problems.

Correlated Science Academic Content Benchmarks

- *Summarize the historical development of scientific theories and ideas, and describe emerging issues in the study of life sciences.* (Life Sciences J, 9-10)
- *Explain that science and technology are interdependent; each drives the other.* (Science and Technology B, 9-10)
- *Predict how human choices today will determine the quality and quantity of life on Earth.* (Science and Technology A, 11-12)

Correlated Social Studies Academic Content Benchmarks

- *Use historical interpretations to explain current issues.* (History B, 11-12)
- *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

Unit 50: Technical Writing and Documentation
 (Industry-Driven Authentic Assessment, See Appendix A)

BIL: Essential

EDU:	12	AD
	I	P

Competency 50.1: Evaluate technical writing requirements.

Descriptors:

- 50.1.1 Define/prioritize communication needs.
- 50.1.2 Resolve conflicting requirements.
- 50.1.3 Specify project objectives.
- 50.1.4 Determine the size and specifics of the work to be completed.
- 50.1.5 Estimate time, materials and capabilities needed to complete assignment.
- 50.1.6 Identify criteria for successful completion of project.
- 50.1.7 Evaluate strengths and weaknesses of completed project.

Correlated Mathematics Academic Content Benchmark

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)

BIL: Essential

EDU:	12	AD
	I	P

Competency 50.2: Write technical reports.

Descriptors:

- 50.2.1 Determine audience.
- 50.2.2 Access needed information using standard references and sources.
- 50.2.3 Identify type of report needed.
- 50.2.4 Compile relevant data.
- 50.2.5 Organize data into charts and graphs.
- 50.2.6 Analyze data.
- 50.2.7 Draw conclusions from data analysis.
- 50.2.8 Outline report.
- 50.2.9 Draft report.
- 50.2.10 Edit report (e.g., check spelling, grammar, punctuation, sentence structure, accuracy of content).
- 50.2.11 Review report with peers.
- 50.2.12 Revise report as needed based on peer feedback.
- 50.2.13 Proofread revised report.
- 50.2.14 Present reports.

Correlated English Language Arts Academic Content Benchmarks

- *Formulate writing ideas, and identify a topic appropriate to the purpose and audience.* (Writing Processes A, 8-10; Writing Processes A, 11-12)
- *Apply tools to judge the quality of writing.* (Writing Processes E, 8-10; Writing Processes E, 11-12)
- *Select and use an appropriate organizational structure to refine and develop ideas for writing.* (Writing Processes B, 11-12)
- *Prepare writing for publication that follows an appropriate format and uses a variety of techniques to enhance the final product.* (Writing Processes F, 11-12)
- *Produce informational essays or reports that establish a clear and distinctive perspective on the subject, include relevant perspectives, take into account the validity and reliability of sources and provide a clear sense of closure.* (Writing Applications D, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.* (Data Analysis and Probability A, 11-12)
- *Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability.* (Data Analysis and Probability B, 11-12)
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner.* (Mathematical Processes H, 8-10)
- *Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.* (Mathematical Processes I, 11-12)

BIL: **Essential**

EDU:	12	AD
	I	P

Competency 50.3: Conduct technical research.

Descriptors:

- 50.3.1 Identify target audience.
- 50.3.2 Define research questions.
- 50.3.3 Determine priorities for the information that should be gathered.
- 50.3.4 Identify potential sources of information.
- 50.3.5 Target audience/user group as a key information source.
- 50.3.6 Identify subject-matter experts.
- 50.3.7 Evaluate potential sources of information based on established criteria (e.g., affordability, relevance).
- 50.3.8 Conduct interviews with selection human information sources.
- 50.3.9 Gather information from selected print and electronic sources.
- 50.3.10 Determine the accuracy and completeness of the information gathered.

Correlated English Language Arts Academic Content Benchmarks

- *Formulate open-ended research questions suitable for investigation and adjust questions as necessary while research is conducted.* (Research A, 8-10)
- *Formulate open-ended research questions suitable for inquiry and investigation and adjust questions as necessary while research is conducted.* (Research A, 11-12)
- *Compile, organize and evaluate information, take notes and summarize findings.* (Research B, 11-12)
- *Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources.* (Research C, 11-12)
- *Use a variety of strategies to enhance listening comprehension.* (Communication: Oral and Visual A, 8-10; Communication: Oral and Visual A, 11-12)

BIL: Essential

EDU:	12	AD
	I	P

Competency 50.4: Design technical documentation.

Descriptors:

- 50.4.1 Define purpose of documentation.
- 50.4.2 Specify standards for documentation, including critical success criteria.
- 50.4.3 Identify delivery options.
- 50.4.4 Evaluate cost-effectiveness of each delivery option.
- 50.4.5 Select tools appropriate for task purpose.
- 50.4.6 Plan information flow.
- 50.4.7 Select writing style and tone appropriate for given documentation.
- 50.4.8 Determine level of detail needed.
- 50.4.9 Identify visuals appropriate for given documentation.
- 50.4.10 Provide feedback on design to development team/individual.

Correlated English Language Arts Academic Content Benchmarks

- *Formulate writing ideas and identify a topic appropriate to the purpose and audience.* (Writing Processes A, 8-10; Writing Processes A, 11-12)
- *Determine the usefulness of organizers and apply appropriate pre-writing tasks.* (Writing Processes B, 8-10)
- *Use revision strategies to improve the style, variety of sentence structure, clarity of the controlling idea, logic, effectiveness of word choice and transitions between paragraphs, passages or ideas.* (Writing Processes C, 8-10)
- *Prepare writing for publication that follows an appropriate format and uses a variety of techniques to enhance the final product.* (Writing Processes F, 11-12)

Correlated Mathematics Academic Content Benchmarks

- *Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.* (Number, Number Sense and Operations G, 8-10)
- *Construct convincing arguments based on analysis of data and interpretation of graphs.* (Data Analysis and Probability F, 8-10)

BIL: Essential

EDU:	12	AD
	I	P

Competency 50.5: Develop technical documentation.

Descriptors:

- 50.5.1 Determine audience.
- 50.5.2 Identify parameters.
- 50.5.3 Monitor development progress.
- 50.5.4 Interpret specifications or drawings for target audience.
- 50.5.5 Record process (e.g., flowchart, step-by-step narrative).
- 50.5.6 Record data.
- 50.5.7 Maintain test logs.
- 50.5.8 Compile cumulative reference/record.
- 50.5.9 Measure compliance with established parameters.
- 50.5.10 Verify the accuracy and validity of the information.
- 50.5.11 Select information relevant to and appropriate for the given documentation.
- 50.5.12 Organize/synthesize information.
- 50.5.13 Present content in clear and concise way.
- 50.5.14 Translate technical terminology into understandable terms for the audience.
- 50.5.15 Employ presentation tools and techniques appropriate for the given documentation.
- 50.5.16 Obtain feedback on the information provided and its technical accuracy.
- 50.5.17 Draft procedures.
- 50.5.18 Test documentation for usability.
- 50.5.19 Edit documentation for readability, grammar and usage.
- 50.5.20 Publish documentation.
- 50.5.21 Maintain required logs.
- 50.5.22 Track expense.

Correlated English Language Arts Academic Content Benchmarks

- *Formulate writing ideas, and identify a topic appropriate to the purpose and audience. (Writing Processes A, 8-10; Writing Processes A, 11-12)*
- *Use a variety of strategies to revise content, organization and style, and to improve word choice, sentence variety, clarity and consistency of writing. (Writing Processes C, 11-12)*
- *Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)*
- *Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Research E, 8-10; Research E, 11-12)*

Correlated Mathematics Academic Content Benchmarks

- *Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis and Probability F, 8-10)*
- *Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data Analysis and Probability A, 11-12)*
- *Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Mathematical Processes H, 8-10)*
- *Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience. (Mathematical Processes I, 11-12)*

Appendix A

Industry-Driven Authentic Assessment Based on SkillsUSA

Appendix

Industry-Driven Authentic Assessment Based on SkillsUSA

Industry-driven, authentic assessments based on the career-technical student organization, SkillsUSA, are linked to various competencies. This linkage demonstrates the co-curricular nature of the career-technical student organization and provides an opportunity for authentic assessment of a student's knowledge and skills at the local, regional, state and national levels. Complete information on the assessments, including scoring rubrics, can be obtained at www.ohioskillsusa.org.

Unit 2: Business Processes

Chapter Business Procedure – Evaluates a local chapter's ability to work as a team to conduct a meeting using correct parliamentary procedure.

Chapter Display – Evaluates a local chapter's ability to work as a team to construct a promotional display.

American Spirit – Evaluates a local chapter's ability to work as a team in activities such as community service or citizenship projects.

Community Service – Evaluates a local chapter's ability to give leadership to a community service project and to work as a team to realize positive outcomes.

Unit 3: Communications

Prepared Speech – Evaluates an individual's ability to apply concepts of English language arts to prepare and present, clearly and effectively a series of thoughts relating to a central theme.

Extemporaneous Speaking – Evaluates an individual's ability to apply concepts of English language arts and communication to give a speech on an assigned topic with a minimum of advance notice.

Job Interview – Evaluates an individual's ability to apply concepts of English language arts in written, verbal and non-verbal form in employment procedures as applied to an employment opportunity.

Unit 5: Safety, Health and Environmental

Occupational Health and Safety – Evaluates a team's promotion of good health and safety habits in the workplace.

First Aid/CPR – Evaluates an individual's ability to react positively in a simulated situation demanding first aid intervention and to recognize excellence and professionalism in administering first aid and Cardiopulmonary Resuscitation (CPR).

Unit 6: Clinical Health Care Services Core Competencies

Job Skills Demonstration – Evaluates an individual’s ability to apply and verbalize concepts of mathematics, science, and technology to demonstrate and explain an entry level skill used in the occupation area for which he or she is training.

Health Occupations Professional Portfolio – Evaluates an individual’s ability develop a professional portfolio and present oneself using effective communication skills.

Health Knowledge Bowl – Evaluates a Health Occupations team’s knowledge of concepts of mathematics, science, and technology for academic foundations, communication, systems theory, legal/ethical responsibility, safety practices, teamwork and health maintenance practices.

Medical Math – Evaluates an individual’s ability to apply problem-solving skills and mathematical concepts to solve problems commonly found in various health care settings. Math problems will include, but are not limited to, measurements, metric and household measurements, conversions, ratio and proportion, percentage, intake and output, Roman numerals, and dosage calculations.

Unit 8: Practical Nurse Specialization

Job Skills Demonstration – Evaluates an individual’s ability to apply and verbalize concepts of mathematics, science, and technology to demonstrate and explain an entry level skill used in the occupation area for which he or she is training.

Health Occupations Professional Portfolio – Evaluates an individual’s ability develop a professional portfolio and present oneself using effective communication skills.

Health Knowledge Bowl – Evaluates a Health Occupations team’s knowledge of concepts of mathematics, science, and technology for academic foundations, communication, systems theory, legal/ethical responsibility, safety practices, teamwork and health maintenance practices.

Practical Nursing – Evaluates an individual’s ability to apply mathematics, science, and technology to concepts of basic human needs to client care, demonstrate procedures utilizing standard precautions, maintain safe environment, document observations and procedures, problem-solve, organize plan of care and maintain professionalism. Skills include, but are not limited to goal-oriented care, safe and effective treatments and procedures, physiological adaptation, comfort, mobility, psychosocial adaptation, and basic care.

Unit 9: Medical Assisting Specialization

Job Skills Demonstration – Evaluates an individual’s ability to apply and verbalize concepts of mathematics, science, and technology to demonstrate and explain an entry level skill used in the occupation area for which he or she is training.

Health Occupations Professional Portfolio – Evaluates an individual’s ability to develop a professional portfolio and present oneself using effective communication skills.

Health Knowledge Bowl – Evaluates a Health Occupations team’s knowledge of concepts of mathematics, science and technology for academic foundations, communication, systems theory, legal/ethical responsibility, safety practices, teamwork and health maintenance practices.

Medical Assisting – Evaluates an individual’s ability to apply mathematics, science and technology to concepts of communication, safety, infection control and asepsis, ethical and legal, and employment skills. Skills include, but are not limited to general office procedures, general laboratory procedures, pharmaceutical principles, medication administration, clinical office procedures, and preparation of financial and insurance reports.

Unit 11: Nurse Assisting Specialization

Job Skills Demonstration – Evaluates an individual’s ability to apply and verbalize concepts of mathematics, science, and technology to demonstrate and explain an entry level skill used in the occupation area for which he or she is training.

Health Occupations Professional Portfolio – Evaluates an individual’s ability develop a professional portfolio and present oneself using effective communication skills.

Health Knowledge Bowl – Evaluates a Health Occupations team’s knowledge of concepts of mathematics, science, and technology for academic foundations, communication, systems theory, legal/ethical responsibility, safety practices, teamwork and health maintenance practices.

Nurse Assisting – Evaluates an individual’s ability to apply mathematics, science and technology to concepts of communication, safety, infection control and asepsis, ethical/legal, and employment skills. Skills include, but are not limited to, personal needs of clients, assisting with nutrition and elimination, and performing treatments and procedures.

Unit 12: Dental Assisting Specialization

Job Skills Demonstration – Evaluates an individual’s ability to apply and verbalize concepts of mathematics, science, and technology to demonstrate and explain an entry level skill used in the occupation area for which he or she is training.

Health Occupations Professional Portfolio – Evaluates an individual’s ability to develop a professional portfolio and present oneself using effective communication skills.

Health Knowledge Bowl – Evaluates a Health Occupations team’s knowledge of concepts of mathematics, science, and technology for academic foundations, communication, systems theory, legal/ethical responsibility, safety practices, teamwork and health maintenance practices.

Dental Assisting – Evaluates an individual’s ability to apply mathematics, science and technology to academic foundations, communication, safety, infection control and asepsis, ethical/legal and employment skills. Skills include, but are not limited to, patient assessment procedures, preventive procedures, chair side assisting, laboratory procedures, office management and radiology procedures.

Units 15-23: Emergency Medical Service Specialization

Job Skills Demonstration – Evaluates an individual’s ability to apply and verbalize concepts of mathematics, science and technology to demonstrate and explain an entry level skill used in the occupation area for which he or she is training.

Health Occupations Professional Portfolio – Evaluates an individual’s ability to develop a professional portfolio and present oneself using effective communication skills.

Health Knowledge Bowl – Evaluates a Health Occupations team’s knowledge of concepts of mathematics, science, and technology for academic foundations, communication, systems theory, legal/ethical responsibility, safety practices, teamwork and health maintenance practices.

First Aid/CPR – Evaluate an individual’s ability to react positively in a simulated situation demanding first aid intervention and to recognize excellence and professionalism in administering first aid and Cardiopulmonary Resuscitation (CPR).

Unit 24-31: Exercise Science/Sports and Recreation Health Care Specialization

Job Skills Demonstration – Evaluates an individual’s ability to apply and verbalize concepts of mathematics, science and technology to demonstrate and explain an entry level skill used in the occupation area for which he or she is training.

Health Occupations Professional Portfolio – Evaluates an individual’s ability develop a professional portfolio and present oneself using effective communication skills.

Health Knowledge Bowl – Evaluates a Health Occupations team’s knowledge of concepts of mathematics, science, and technology for academic foundations, communication, systems theory, legal/ethical responsibility, safety practices, teamwork and health maintenance practices.

Unit 32: Health Information Management Services Pathway

Job Skills Demonstration – Evaluates an individual’s ability to apply and verbalize concepts of mathematics, science and technology to demonstrate and explain an entry level skill used in the occupation area for which he or she is training.

Health Occupations Professional Portfolio – Evaluates an individual’s ability to develop a professional portfolio and present oneself using effective communication skills.

Health Knowledge Bowl – Evaluates a Health Occupations team’s knowledge of concepts of mathematics, science, and technology for academic foundations, communication, systems theory, legal/ethical responsibility, safety practices, teamwork and health maintenance practices.

Unit 33: Support Services Pathway

Job Skills Demonstration – Evaluates an individual’s ability to apply and verbalize concepts of mathematics, science and technology to demonstrate and explain an entry level skill used in the occupation area for which he or she is training.

Health Occupations Professional Portfolio – Evaluates an individual’s ability develop a professional portfolio and present oneself using effective communication skills.

Health Knowledge Bowl – Evaluates a Health Occupations team’s knowledge of concepts of mathematics, science, and technology for academic foundations, communication, systems theory, legal/ethical responsibility, safety practices, teamwork and health maintenance practices.

Units 34-50: Bioscience Research and Development Pathway

Job Skills Demonstration – Evaluates an individual’s ability to apply and verbalize concepts of mathematics, science and technology to demonstrate and explain an entry level skill used in the occupation area for which he or she is training.

Health Occupations Professional Portfolio- Evaluates an individual’s ability to develop a professional portfolio and present oneself using effective communication skills.

Health Knowledge Bowl – Evaluates a Health Occupations team’s knowledge of concepts of mathematics, science and technology for academic foundations, communication, systems theory, legal/ethical responsibility, safety practices, teamwork and health maintenance practices.