Washington Office of Superintendent of
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CTE

Statewide Framework Document for: 260103

Biomedical-Human Body Systems

Standards may be added to this document prior to submission but may not be removed from the framework to meet state credit equivalency requirements. Performance assessments and leadership alignment may be developed at the local level. In order to earn state approval, performance assessments must be submitted within this framework. **This course is eligible for one credit of lab science.** The Washington State Science Standards performance expectations for high school blend core ideas (Disciplinary Core Ideas, or DCIs) with scientific and engineering practices (SEPs) and crosscutting concepts (CCCs) to support students in developing usable knowledge that can be applied across the science disciplines. These courses are to be taught in a three-dimensional manner. The details about each performance expectation can be found at Next Generation Science Standards, and the supporting evidence statements can be found under Resources.

School District Name	
Course Title: Biomedical-Human Body Systems	**Total Framework Hours:** 180
CIP Code: 260103 ☒ Exploratory ☐ Preparatory	**Date Last Modified:** October 30, 2020
Career Cluster: Health Science	**Cluster Pathway:** Therapeutic, Diagnostic, Informatics, Biotechnology Research and Development
Course Summary: Biomedical–Human Body Systems is a 180-hour course. Students engage in a series of hands-on laboratory and special projects about human anatomy and physiology. The goal of the course is to prepare and equip students with basic skills and terminology they will need for college and career development in the medical field. Students learn about a variety of human organ systems, diseases associated with each, and how each system is connected with another. With each of the systems, students will also learn and exercise basic medical skills such as taking vitals, administering CPR and first aid, wrapping sports injuries, and measuring specific body functions. Students will explore other areas that are relevant to the medical field, such as teamwork, treatment, and ethics. Where available, medical professionals will give students practical work experience as students monitor the workplace and exercise basic job responsibilities.	
Eligible for Equivalent Credit in: Science	**Total Number of Units:** 17

Unit 1: Safety Practices in the Laboratory	**Total Learning Hours for Unit:** 3

Unit Summary:
Health care workers accurately read, interpret, and demonstrate adherence to safety guidelines that are appropriate for their roles and responsibilities. They prevent injury or illness through safe work practices, the use of adequate personal protection equipment, and by following health and safety policies and procedures. Health care workers understand the existing and potential hazards to themselves and others, demonstrate safety techniques, and follow all policies and procedures as directed by Occupational Safety and Health Administration guidelines.

In this unit, students:

- Identify laboratory equipment including types of pipettes, different glassware, and the parts of a microscope and a centrifuge.
- Demonstrate the safe use of the laboratory equipment listed above.
- Understand how to comply with institutional, local, state and federal regulations.
- Become familiar with the different levels of personal safety procedures that apply when working with different types of microorganisms and chemicals.
- Understand how to identify the hazards and disposal procedures relevant to each experiment.
- Understand where to find safety information relevant to the procedure in question.
- Understand implications of hazardous materials.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
It is expected that students:

- Pass a lab safety exam.
- Use appropriate communication techniques (e.g. role play or informal presentations) to present information to others that contributes to the determination of the appropriate Personal Protective Equipment and measures required to work with different biological and chemical agents.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students demonstrate that they can manage projects and be responsible to others as they take personal responsibility to demonstrate and practice good laboratory practices and use of Personal Protective Equipment (PPE).
- Students communicate clearly and think creatively as they demonstrate the use of PPE in a classroom of younger students in order to explain principles of infection control.
- Students may also create media products while preparing a PPE presentation for an advisory committee, a community group, or a Career and Technical Student Organization activity.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 7: Safety Practices

Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

7.1 Infection Control

7.1.1 Explain principles of infection control.

a. Identify classifications of pathogens

- Bacteria
- Fungi
- Parasites
- Protozoa
- Viruses

b. Describe characteristics of microorganisms

- Aerobic
- Anaerobic
- Non-pathogenic
- Pathogenic

c. Recognize chain of infection

d. Describe mode of transmission

- Common vehicle (air, food water)
- Direct
- Healthcare-associated infections (nosocomial)
- Indirect
- Opportunistic
- Vectors

7.1.2 Differentiate methods of controlling the spread and growth of microorganisms.

a. Aseptic control

- Sanitization
- Antisepsis
- Disinfection
- Sterile technique
- Sterilization

b. Standard precautions

- Handwashing
- Gloving
- Personal Protective Equipment (PPE)
- Environmental cleaning

c. Isolation precautions

- Transmission-based contact

d. Blood borne pathogen precautions

e. Vaccinations

7.2 Personal Safety

7.2.1 Apply personal safety procedures based on Occupational Safety and Health Administration (OSHA) and Centers for Disease Control (CDC) regulations.

7.2.3 Demonstrate and apply the use of personal protective equipment (PPE)

7.3 Environmental Safety

7.3.1 Apply safety techniques in the work environment.

- Ergonomics
- Safe operation of equipment
- Patient/client/employee safety measures

7.4 Common Safety Hazards

7.4.2 Comply with safety signs, symbols, and labels

Aligned Washington State Academic Standards

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

Unit 2: Scientific Record Keeping	**Total Learning Hours for Unit:** 3

Unit Summary:

Medical researchers will know how to keep track of their experimental design and results using a laboratory notebook. They will understand the importance of accurate record keeping in laboratory research, and the implications for intellectual property and ethics.

In this unit, students:

- Define the elements that need to be included in a laboratory report.
- Understand the style of a laboratory notebook report.
- Understand different methods of data collection for records and lab reports in health science.
- Demonstrate the use of information technology in electronic record keeping.
- Learn the importance of using the right terminology to communicate information.

Performance Assessments: (Districts to complete for each unit)

Example assessments for this unit include:

It is expected that students:

- Create a laboratory notebook containing detailed reports from each of the activities/projects conducted throughout the units. These reports will include all required elements as described in the course materials. The laboratory notebook will use an accepted style, medical and scientific terminology, abbreviations, spelling, grammar and format.
- Accurately write lab reports.

- Demonstrate written medical records according to industry standards.
- Keep a journal up to date and organized using dates, page numbers, highlights, footnotes, etc.
- Create a scientific journal that contains:
  - Lab reports.
  - Observational notes & records.
  - Diagrams and illustrations.
  - Mathematical conversions.
  - Solution recipes.
- Make accurate measurements and adjust for concentrations.
- Keep recipes of common pH and molarity solutions.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students demonstrate that they can produce results and reason effectively as they take personal responsibility for documenting experimental and clinical outcomes.
- Students use both creativity and critical thinking while maintaining a journal.
- Students communicate and work with others within their groups to achieve a finished product.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 2: Communications
Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.2 Medical Terminology

2.2.2 Interpret common medical abbreviations to communicate information.

a. Common abbreviations
b. Joint Commission official "Do Not Use List"

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).

Aligned Washington State Academic Standards

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

LEVELS OF ORGANIZATION IN THE HUMAN BODY **Unit 3:** Cells and Tissue	**Total Learning Hours for Unit:** 15
Unit Summary:	

Health care workers understand the organization and structure of the human body.
In this unit, students:

- Describe the central dogma of molecular biology and how understanding this process impacts biotechnology research and development.
- Define anatomy, physiology, homeostasis, metabolism and cellular respiration.
- Define terminology related to the structure of the human body (Cell, Endocytosis, Exocytosis, Meiosis, Microscopic, Mitosis, Organ, Phagocytosis, Pinocytosis, System, Tissue).
- Use appropriate terminology when documenting procedures and information in simulated electronic records.
- Use medical terminology within a scope of practice in order to interpret, transcribe, and communicate information, data and observations.

Classify and analyze the basic structural and functional organization of the human body beginning at the cellular level to also include tissue, organ, and system.

- Describe the six levels of structural organization of the human body (chemical, cellular, tissue, organ, system, organism).
- Define, draw, and label each of the four basic cell types that make-up the entire body.
- Identify the structural components of a typical cell.
- Examine the structures, components, and functions of a typical cell.
- Describe the basic structures and functions of cells and how this knowledge is used in biotechnology.
- Select cellular barriers to be overcome for a biotechnology product to work inside a cell.
- Identify and describe the functions and relationship of each cell structure (nucleolus, gene, chromatin, chromosome, DNA, ribosomes, endoplasmic reticulum, Golgi complex, mitochondria, lysosomes, vacuole, peroxisomes, microfilaments, microtubules, centrioles, centrosomes, flagella, cilia, microvilli).
- Investigate the interdependence of the various body systems to each other and to the body as a whole.
- Describe the steps of cell differentiation and the role of stem cells.
- Compare and contrast the stages of cell division (mitosis and meiosis).
- Diagram the structure of the nucleic acid DNA.
- Demonstrate DNA replication graphically and its importance to biotechnology product development.

Differentiate between the four basic types of membranes (mucous, serous, synovial, cutaneous).

- Explore and explain the processes that move materials in and out of cells. (Passive processes: diffusion, osmosis, facilitated diffusion, dialysis, and filtration. Active processes: phagocytosis; exocytosis and active transport; endocytosis and pinocytosis.)
- Identify the general characteristics and functions of each of the four principle types of tissues. (Epithelia: strategies for tissue identification including arrangement and cell shape; Connective: adipose, cartilage, dense fibrous, blood, bone; Muscular: skeletal, smooth, cardiac; and Nervous.)
- Define and explain the relationship of cells, tissue, organs and systems.
- Describe metabolism and its anabolic and catabolic processes.

Identify, describe, and apply directional terms used in human anatomy (posterior/anterior, medial/lateral, proximal/distal, superficial/deep, superior/inferior)

- Demonstrate and describe anatomical positions utilizing directional terms.
- Apply commonly used planes to divide the body. (sagittal, midsagittal, transverse [horizontal], frontal [coronal])
- Identify and label the following body cavities and the main organs found in each cavity on an anatomical model.
    - Dorsal Cavity
        - Vertebral-spinal cord
        - Cranial-brain
    - Ventral Cavity
        - Thoracic-heart, lungs
        - Mediastinum-heart, bronchi, esophagus, thymus
        - Pericardial-heart
        - Pleural-lungs
    - Abdominopelvic Cavity-liver, spleen, intestines, kidneys, stomach,
    - Pelvic-intestines, urinary bladder, sex organs
- Name the abdominal regions and identify the major organ(s) in each abdominal quadrant
    - RUQ (right upper quadrant): liver, gallbladder, right kidney
    - RLQ (right lower quadrant): cecum, appendix, right ovary
    - LUQ (left upper quadrant): spleen, stomach, left kidney
    - LLQ (left lower quadrant): left ovary
- Demonstrate recognition of subjective and objective observations, document signs and symptoms.
- Describe homeostasis and how it is maintained in the human body through the processes negative and positive feedback.
- Explain the role of homeostasis and its mechanisms as these relate to the body as a whole and predict the consequences of the failure to maintain homeostasis.
- Examine the relationship between homeostasis and stress.
- Describe common diseases associated with homeostatic imbalances associated with the various cells of the body.
- Predict abnormalities that can occur with disorders of cell structures.
- Examine various conditions that change normal body functions (e.g., tissue rejection, allergies, injury, diseases and disorders) and how the body responds.
- Describe the effects of aging on all body systems.
- Research and understand fundamentals of wellness and prevention of disease processes.

Research careers in health care.

- Investigate career possibilities in the field of histology.
- Demonstrate professionalism and key employability skills.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
It is expected that students:

- Trace the outline of a partner and label the anatomical regions, planes, and directions.
- Illustrate body regions, planes, directions, and cavities while labeling anatomical references and diagrams using correct medical terminology.
- Construct or label a model of the human cell.
- Observe, draw, or label various types of human tissue.
- Conduct lab reports: microscopic viewing of living and prepared slides of cells; osmosis in plant cells.
- Examine histological slides and identify distinguishing features.
- Demonstrate biology lab skills: compound microscope use, solution making, wet mount preparation, micro measurement, and uncertainty estimates.
- Manage a lab portfolio.
- Complete an inquiry-based cell organelle activity.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students collaborate with others to learn the general medical anatomy of the human body. They work creatively with others to practice directional terms that are used to locate specific regions of the body.
- In a problem-solving session, students will be given purposely vague descriptions and be challenged to reason effectively to identify the correct medical description of the body region.
- Students collaborate in open-ended lab scenarios focusing on cells and tissues of the human body.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 1: Academic Foundation
Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms

a. Identify Levels of Organization

- Chemical
- Cellular
- Tissue
- Organs
- Systems
- Organism

b. Demonstrate anatomical position

c. Identify body planes
- Sagittal
- Midsagittal
- Coronal/Frontal
- Transverse/Horizontal

d. Use directional terms
- Anterior/Posterior
- Medial/Lateral
- Proximal/Distal
- Superficial/Deep
- Superior/Inferior
- Ventral/Dorsal

e. Identify body cavities
- Abdominal
- Cranial
- Dorsal
- Pelvic
- Spinal
- Thoracic

f. Identify the components of the abdominal quadrants
- Right upper
- Right lower
- Left upper
- Left lower

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:
- Arthritis
- Asthma
- Cancer
- Cataracts
- Concussion/Traumatic Brain Injury (TBI)
- Cystic fibrosis
- Diabetes mellitus
- Dementia
- Gastric ulcer

- Hepatitis
- Hypertension
- Melanoma
- Muscular Dystrophy
- Myocardial Infarction
- Sexually Transmitted Infection (STI)
- Stroke/Cardiovascular Accident (CVA)
- Tuberculosis
- Urinary Tract Infection (UTI)

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy
- Cloning
- Stem cell research

Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.

2.2.2 Interpret common medical abbreviations to communicate information.

Foundation Standard 4: Employability Skills

Use employability skills to enhance employment opportunities and job satisfaction.

4.3 Career Decision-Making

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.

Foundation Standard 9: Health Maintenance Practices

Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.

9.1 Healthy Behaviors

9.1.1 Promote behaviors of health and wellness.

- Exercise
- Nutrition
- Relationships
- Sleep habits
- Stress management
- Weight Control

9.1.3 Describe strategies for the prevention of diseases.

- Community health education outreach programs
- Immunizations
- Medical, dental, and mental health screenings
- Routine physical exams
- Stress management

Aligned Washington State Academic Standards	
Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

MOVEMENT AND SUPPORT IN THE HUMAN BODY: Includes the Integumentary System, Skeletal System, and Muscular System	
Unit 4: The Integumentary System	**Total Learning Hours for Unit:** 7

Unit Summary:
This unit focuses on the analysis and investigation of the anatomy, physiology and basic pathophysiology of the integumentary system.

In this unit, students:

- Define terminology related to the integumentary system (Dermis, Epidermis, Integumentary, Kertin, Melanin, Melanocyte, Pigmentation, Skin).
- Use appropriate terminology when documenting information in a simulated electronic record.
- Demonstrate recognition of subjective and objective observations.

- Use medical terminology within a scope of practice in order to interpret, transcribe, and communicate information, data, and observations.
- Describe the functions and structures of the integumentary system (skin, glands, hair, nails).
- Describe the layers of the skin (epidermis, dermis, subcutaneous [hypodermis]).
- Identify the appendages of the skin - label and describe the functions of each appendage.
- Describe the functions of sudoriferous (sweat) and sebaceous (oil) glands.

Study diseases and disorders.

- Explore causes of abnormal skin colors.
- Describe common disorders of the integumentary system (acne, skin cancers [basal cell carcinoma, squamous cell carcinoma, malignant melanoma], and decubitus ulcers).
- Make observations of the skin to include color, temperature to touch, scarring, bruising, abrasions, lacerations, or other abnormalities.
- Describe the process of wound healing.
- Describe and discuss the role of the integumentary system in homeostasis regarding body temperature.
- Demonstrate measuring and recording of temperature, and identify abnormal results.
- Research and understand fundamentals of wellness and prevention of disease processes of the integumentary system.
- Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease of the integumentary system.
- Describe strategies for the prevention of diseases including health screenings and examinations of the integumentary system.
- Investigate career possibilities in the field related to the integumentary system.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
It is expected that students:

- Construct, draw, or label a model of skin layers, identifying the unique features and functions of each layer as they relate to the integumentary function as a whole.
- Conduct labs: microscopic viewing of skin and its features and layers; distribution of sweat glands.
- Research various types of injuries and burns affecting the skin and perform the mathematical calculations utilizing the Rule of Nines.
- Research a disease or disorder of the integumentary system, write a research paper on the disease or disorder, and present it electronically.
- Demonstrate biology lab skills: skin color, touch receptors, two-point threshold, tactile localization.
- Manage a lab portfolio.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students work creatively with others to complete a fictional case study of a burn victim, including history and physical exam, lab tests and radiological reports, diagnosis, and treatment options with prognosis.
- Students research independently and apply technology effectively as they create a display showing their understanding of local, national and international public health and safety issues regarding "skin health" awareness.

Industry Standards and/or Competencies:

National Health Science Standards:

Foundation Standard 1: Academic Foundation
Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization
- Chemical
- Cellular
- Tissue
- Organ
- System
- Organism

1.1.2 Identify basic structures and describe functions of human body systems.

c. Integumentary
- Structures of the integumentary system
  - Identify integumentary components
  - Label the layers of skin
- Functions of the integumentary system
  - Vitamin D production
  - Sensory organ
  - Infection protection
  - Temperature regulation
  - UV light protection

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:
- Skin cancers (basal cell carcinoma, squamous cell carcinoma, malignant melanoma)
- Acne
- Decubitus ulcers

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.
- Gene testing
- Gene therapy
- Cloning
- Stem cell research

Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.

2.2.2 Interpret common medical abbreviations to communicate information.

Foundation Standard 4: Employability Skills

Use employability skills to enhance employment opportunities and job satisfaction.

4.3 Career Decision-Making

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.

Foundation Standard 9: Health Maintenance Practices

Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.

9.1 Healthy Behaviors

9.1.1 Promote behaviors of health and wellness

- Exercise
- Nutrition
- Relationships
- Sleep habits
- Stress management
- Weight control

9.1.3 Describe strategies for the prevention of diseases.

- Community health education outreach programs
- Immunizations
- Medical, dental, and mental health screenings
- Routine physical exams
- Stress management

9.1.4 Investigate complementary and alternative health practices as they relate to wellness and disease prevention

- Acupuncture
- Eastern medicine
- Holistic medicine
- Homeopathy
- Manipulative therapies
- Natural therapies

Aligned Washington State Academic Standards	
Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that

	provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

Unit 5: The Skeletal System	**Total Learning Hours for Unit:** 12

Unit Summary:
In this unit, students analyze and investigate the anatomy, physiology, and basic pathophysiology of the skeletal systems.

In this unit, students:

- Define terminology related to the skeletal system (Appendicular skeleton, Axial skeleton, Cancellous bone, Compact bone, Foramen, Fracture, Joints, Ossification, Osteon, Synovial fluid, Tendons).
- Identify and describe the functions of the skeletal system including the major parts.
- Locate the following skull bones: mandible, maxilla, zygomatic, frontal, parietal, occipital, sphenoid, ethmoid, hyoid, temporal, mastoid process.
- Contrast the average number, location and function of each of the five groups of vertebrae.
- Explain the structural classification of articulations (fibrous, synovial & cartilaginous).

Describe the structure and formation of bone.

- Describe the terms “suture” and “fontanel.”
- Identify the roles of the osteoblasts, osteocytes, and osteoclasts in bone growth and ossification.
- Describe the features of a long bone (periosteum, diaphysis, epiphysis, medullary cavity, red marrow, yellow marrow, articular cartilage, endosteum, compact bone, spongy bone).
- Describe and locate the following bone markings: foramen, meatus, sinus, fossa, condyle, tuberosity, trochanter, tubercle, and process.

Describe the formation of bone (ossification) beginning with infancy and ending with adulthood.

- Discuss bone loss in elderly.
- List factors that contribute to bone loss.
- Identify types of bones with characteristics and examples of each (long, short, flat, irregular).
- Contrast the axial and appendicular skeletons.

Identify the different types of joints and locations in the skeletal system.

- Differentiate between ligaments and tendons.
- Perform range of motion (ROM) for joints such as the shoulder, wrist and ankle.
- Differentiate between active and passive range of motion.

- Demonstrate proper techniques for ambulation with assistive devices (crutches, cane, walker); and identify limitations and abnormalities.

Study diseases and disorders.

- Differentiate among types of bone fractures.
- Explore bone and joint injuries and disorders, identifying the following diseases or disorders of the skeletal system: arthritis, herniated disk, osteoarthritis, osteoporosis, scoliosis, and spina bifida.
- Differentiate between the diseases in a pediatric, adult and elderly person.
- Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease of the skeletal system
- Apply behaviors that promote health and wellness of the skeletal system.
- Describe strategies for the prevention of diseases including health screenings and examinations of the skeletal system.
- Investigate career possibilities in the field related to the skeletal system.

Performance Assessments: (Districts to complete for each unit)

Example assessments for this unit include:

It is expected that students:

- Distinguish between four classifications of bones and examine the microscopic development and structure of bone tissue.
- Label a skeletal model or diagram of the bones comprising the axial and appendicular skeletons and discuss their various functions.
- Label on a skeleton the names of the bones for each of the following, identifying points of attachment:
  - Skull 22 bones (cranium 8, facial 14)
  - Spinal column/vertebra 24 with explanation of three parts of a typical vertebra (body, foramen, and processes)
  - Thoracic cavity
  - Upper extremities: shoulder girdle, arms, wrist, and hands including long bone processes, and three parts of each finger
  - Lower extremities: hip girdle, legs, ankles, and feet including long bone parts, and parts of toes
- Demonstrate biology lab skills: bone identification (examine a freshly dissected bone from a local butcher). Describe how the body maintains bone integrity through remodeling and repair.
- Research a disease or disorder of the skeletal system, write a research paper on the disease or disorder and present using an electronic method.
- Conduct lab reports: composition of bones.
- Manage a lab portfolio.

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

- Students think creatively as they compare fictional case studies of bone fracture victims, including history and physical exam, lab tests and radiological reports.
- Students reason effectively as they make a diagnosis and recommend treatment options with a prognosis.
- Students access and evaluate information in order to create the best possible treatment plan for the patients.

Industry Standards and/or Competencies:

National Health Science Standards:

Foundation Standard 1: Academic Foundation

Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization

- Chemical
- Cellular
- Tissue
- Organ
- System
- Organism

1.1.2 Identify basic structures and describe functions of human body systems.

a. Skeletal

- Structures of the skeletal system
  - Distinguish between axial and appendicular skeletons
  - Describe long bone anatomy
  - Identify joint types and movements
  - Name and classify all bones (206)
- Functions of the skeletal system
  - Structure and support
  - Muscle attachment and movement
  - Mineral storage
  - Hematopoiesis

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following: herniated disk, osteoarthritis, osteoporosis, scoliosis, and spina bifida.

- Arthritis
- Herniated disk
- Osteoarthritis
- Osteoporosis
- Scoliosis
- Spina bifida
- Bone cancer

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy

- Cloning
- Stem cell research

1.3 Medical Mathematics

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results.

Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Model verbal and nonverbal therapeutic communication.

- Active listening
- Silence
- Summarizing
- Reflecting

2.1.5 Modify communication to meet the needs of the patient/client and be appropriate to the situation.

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.

2.2.2 Interpret common medical abbreviations to communicate information.

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).

2.3.2 Prepare examples of technical and informative writing.

Foundation Standard 4: Employability Skills

Use employability skills to enhance employment opportunities and job satisfaction.

4.3 Career Decision-Making

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.

4.3.2 Distinguish differences among careers within the health science pathways

- Biotechnology research and development
- Diagnostic services
- Health Informatics
- Support services
- Therapeutic services

4.4 Employability Preparation

4.4.1 Develop components of a personal portfolio.

- Letter of introduction
- Resume

- Sample Projects
- Writing Sample
- Work-based Learning Documentation
- Oral Report
- Community Service/Service Learning
- Credentials
- Technology Skills
- Leadership Examples

Foundation Standard 7: Safety Practices
Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

7.4 Common Safety Hazards

7.4.2 Comply with safety signs, symbols, and labels.

Foundation Standard 9: Health Maintenance Practices
Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.

9.1 Healthy Behaviors

9.1.1 Promote behaviors of health and wellness

- Exercise
- Nutrition
- Relationships
- Sleep habits
- Stress management
- Weight control

9.1.3 Describe strategies for the prevention of diseases.

- Community health education outreach programs
- Immunizations
- Medical, dental, and mental health screenings
- Routine physical exams
- Stress Management

Aligned Washington State Academic Standards	
Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain

	homeostasis.	
Science and Engineering Practice	**Disciplinary Core Idea**	**Crosscutting Concept**

Unit 6: The Muscular System	**Total Learning Hours for Unit:** 12

Unit Summary:
Analyze and investigate the anatomy, physiology, and basic pathophysiology of the muscular system, and perform technical skills related to the system.

In this unit, students:

Analyze the basic structure and functions of the muscular system.

- Define terminology related to the muscular system (Cardiac muscle, Fascia, Muscle, Smooth muscle, Striated muscle, Tendon).
- Identify the principal muscles of the body by name, location, origin, insertion and function.
- Describe the types of muscles - contrast the general location, microscopic appearance, control, and functions of the three specific types of muscle tissue (skeletal, smooth, cardiac).
- Discuss voluntary and involuntary muscles.
- Identify the general functions of muscular system to include explaining the role of prime movers (agonists), antagonists, synergists, and fixators.
- Identify the characteristics of muscles (elasticity, excitability [irritability], extensibility, flexibility).
- Describe movements performed by muscles.
- Contrast thick and thin myofilaments.
- Describe the sliding-filament theory of muscle contraction and how it obtains energy.
- Explain how types of muscular contractions produce body movements and help maintain postures.
- Describe what occurs at the neuromuscular junction.
- Demonstrate muscle movement.
- Practice active and passive range of motion exercises.
- Research different sports to determine which muscles are used; explore the effect of exercise and sports training on muscles.
- Explain the relationship between the muscular and skeletal systems, and identify their interdependence as they relate to body structure, movement, and posture.

Study diseases and disorders.

- Identify and describe the following muscle diseases, disorders and injuries: (fibromyalgia, muscular dystrophy, shin splints, tendinitis, hernia, strains, cramps, contusion)
- Differentiate between the diseases in a pediatric, adult and elderly person.
- Apply behaviors that promote health and wellness of the muscular system.
- Investigate career possibilities in the field related to the muscular system.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:

It is expected that students:

- Observe, draw, or label the different types of muscle tissues, noting the function and anatomical differences of each type.
- Research a disease or disorder of the muscular system, write a research paper on the disease or disorder, and present it using an electronic method.
- Explain the guidelines used in naming skeletal muscles, such as location, size, direction, etc.
- Develop a graphic that identifies the name of the muscle, the directional motion, location, and function of the following muscle groups: Muscles of facial expressions; muscles of mastication; muscles of the neck; muscles of the trunk and upper extremities; muscles of lower extremities.
- Debate in class, or in written or digital format, the purpose of white and red muscle fibers as related to muscle strength, power and endurance for fitness/athletic training, and rehabilitation of muscles.
- Perform range of motion exercises and evaluate joint angles using a goniometer.
- Conduct lab reports: effect of ATP on rabbit muscle.
- Demonstrate biology lab skills: Muscle identification, Cat dissection, and microscope viewing of skeletal muscle.
- Manage a lab portfolio.

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

- Students interact effectively with others while working in small groups to create a presentation on a disease that affects the muscular system.
- Students demonstrate creativity and innovation as they create a media presentation describing either a muscle disease, disorder or injury.
- Students work creatively with others and produce results as they work to create a clay model of the major muscles of the human body.

Industry Standards and/or Competencies:

National Health Science Standards:

Foundation Standard 1: Academic Foundation

Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization

- Chemical
- Cellular
- Tissue
- Organ
- System
- Organism

1.1.2 Identify basic structures and describe functions of human body systems.

b. Muscular

- Structures of the muscular system

        - Identify types of muscle tissue
        - Identify major muscle groups of neck, shoulder, chest, abdomen, back, arms, and legs
    - Functions of the muscular system
        - Body movement
        - Posture
        - Protection

1.2 Diseases and Disorders

- 1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:
    - Fibromyalgia
    - Shin splints
    - Tendinitis
    - Hernia
    - Strains
    - Cramps
    - Contusion
    - Muscular Dystrophy

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy
- Cloning
- Stem cell research

1.3 Medical Mathematics

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results.

Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Model verbal and nonverbal therapeutic communication.

- Active Listening
- Silence
- Summarizing
- Reflecting

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.

2.2.2 Interpret common medical abbreviations to communicate information.

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).

2.3.2 Prepare examples of technical and informative creative writing.

Foundation Standard 4: Employability Skills

Use employability skills to enhance employment opportunities and job satisfaction.

4.3 Career Decision-Making

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.

4.3.2 Distinguish differences among careers within the health science pathways

- Biotechnology research and development
- Diagnostic services
- Health informatics
- Support services
- Therapeutic services

4.4 Employability Preparation

4.4.1 Develop components of a personal portfolio.

- Letter of introduction
- Resume
- Sample Projects
- Writing Sample
- Work-based Learning Documentation
- Oral Report
- Community Service/Service Learning
- Credentials
- Technology Skills
- Leadership Examples

Foundation Standard 7: Safety Practices

Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

7.4 Common Safety Hazards

7.4.2 Comply with safety signs, symbols, and labels.

Foundation Standard 9: Health Maintenance Practices

Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.

9.1 Healthy Behaviors

9.1.1 Promote behaviors of health and wellness

- Exercise
- Nutrition
- Relationships
- Sleep habits
- Stress management
- Weight control

9.1.3 Describe strategies for the prevention of diseases.

- Community health education outreach programs
- Immunizations
- Medical, dental, and mental health screenings
- Routine physical exams
- Stress management

Aligned Washington State Academic Standards

Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

TRANSPORT IN THE HUMAN BODY: The Cardiovascular System and Lymphatic System **Unit 7:** The Circulatory and Cardiovascular System	**Total Learning Hours for Unit:** 12

Unit Summary:

Analyze and investigate the anatomy, physiology and basic pathophysiology of the circulatory and cardiovascular system, and evaluate and monitor blood pressure and pulse.

In this unit, students:

Describe the components and functions of the blood system.

- Analyze the basic structures and functions of the cardiovascular system.
- Define the parts of the circulatory system. (Arteries, Blood pressure, Capillaries, Osmotic pressure, Plasma, Serum, Veins)
- Distinguish differences in anatomy and physiology of blood vessels to include arteries, arterioles, capillaries, venules, and veins.

- Identify and describe the functions of heart structures (chambers, valves, and associated vessels of the heart).
- Describe the physiology of blood circulation. Identify and trace the flow of blood through the heart, and provide the distinction between the pulmonary and systemic circulation.
- Describe the composition of blood, and the function of each component. Research when blood components are prescribed for a patient and why.
- Discuss blood types.
- Describe the blood-clotting process.
- Name the parts of the conduction system of the heart, and trace the impulses during initiation and conduction.

Study diseases and disorders.

- Explore disorders and diseases of the blood (anemias, hemolytic disease of the newborn, hemophilia, leukemia, mononucleosis, polycythemia).
- Explore disorders of the cardiovascular system (aneurysm, arteriosclerosis, atherosclerosis, cerebrovascular accident/stroke, coronary artery disease, hypertension, murmur, myocardial infarction).
- Connect the regulation of blood volume, heart rate, stroke, volume, cardiac output and blood pressure.
- Demonstrate the measuring and recording of blood pressure and pulse, identifying abnormal results.
- Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease of the circulatory and cardiovascular system.
- Apply behaviors that promote health and wellness of the circulatory and cardiovascular system.
- Describe strategies for the prevention of diseases including health screenings and examinations of the circulatory and cardiovascular system.
- Investigate complementary (alternative) health practices as they relate to wellness and disease prevention of the circulatory and cardiovascular system.
- Investigate career possibilities in the field related to the circulatory and cardiovascular system.

Performance Assessments: (Districts to complete for each unit)

Example assessments for this unit include:

It is expected that students:

- Dissect and identify the parts of a mammalian heart.
- Interpret an electrocardiogram (ECG) of a normal sinus rhythm, identifying the P, Q, R, S, and T and explaining the electrical and mechanical events. Identify ECG strips with explanation of sinus, junctional, and ventricular arrhythmias.
- Develop an informational fact sheet on diseases of the cardiovascular system. Include the signs and symptoms, diagnostic procedures, underlying causes, clinical manifestations, evaluation, and treatment.
- Write a research paper or construct an electronic slide presentation on a cardiovascular system dysfunction and present it to the class. Include an interview with a health professional as a resource for this assignment.
- Conduct lab reports: composition of blood; cardiac cycle using stethoscope.
- Demonstrate biology lab skills: Dissection of cow heart, EKG via local Fire Department, blood pressure, pressure points for pulse rates, structure and name of blood vessels.
- Manage a lab portfolio.

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students demonstrate that they can work creatively with others and manage projects as they participate in a large group simulation and video production to demonstrate cardiovascular circulation. Red balloons are used to represent arterial blood, and blue balloons are used to represent venous blood. Students carry and exchange balloons while navigating through a group of classmates representing different anatomical structures in the heart.
- In small groups, students think creatively, use and manage information, and apply technology effectively as they develop a children's book or play to tell the story of a blood cell's journey through the body. The story should include the flow of blood and the effects it has on organs along the way.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 1: Academic Foundation
Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization

- Chemical
- Cellular
- Tissue
- Organ
- System
- Organism

1.1.2 Identify basic structures and describe functions of human body systems.

d. Cardiovascular

- Structures of the cardiovascular system
  - Identify cardiovascular organs
  - Label the parts of the heart
  - Distinguish blood components
- Functions of the cardiovascular system
  - Blood flow through the heart and body
  - Transports nutrients, waste, antibodies, hormones, and gases
  - Cardiac conduction system

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:

- Anemias
- Hemolytic disease of the newborn
- Hemophilia
- Leukemia
- Mononucleosis
- Polycythemia aneurysm
- Arteriosclerosis
- Atherosclerosis
- Cerebrovascular accident/stroke
- Coronary artery disease
- Hypertension
- Murmur
- Myocardial infarction

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy
- Cloning
- Stem cell research

1.3 Medical Mathematics

1.3.1 Demonstrate competency using basic math skills and mathematical conversions as they relate to healthcare.

a. Metric system

- Kilo-
- Centi-
- Deci-
- Milli-
- Micro-

b. Mathematical

- Average
- Ratios
- Fractions
- Percentages
- Addition/Subtraction
- Multiplication/Division

c. Conversions

- Height (inches/meters)
- Weight/mass (pounds/grams)

- Length (inches/meters)
- Volume (ml/cc)
- Temperature (F/C)
- Household measurements (Tbsp/tsp/cup/oz)

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results.

Foundation Standard 2: Communications
Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Model verbal and nonverbal therapeutic communication.

- Active listening
- Silence
- Summarizing
- Reflecting

2.1.3 Distinguish between subjective and objective information.

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.
2.2.2 Interpret common medical abbreviations to communicate information.

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).
2.3.2 Prepare examples of technical and informative writing.

Foundation Standard 4: Employability Skills
Use employability skills to enhance employment opportunities and job satisfaction.

4.3 Career Decision-Making

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.
4.3.2 Distinguish differences among careers within the health science pathways

- Biotechnology research and development
- Diagnostic services
- Health informatics
- Support services
- Therapeutic services

Foundation Standard 7: Safety Practices

Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

7.2. Personal Safety

7.2.1 Apply personal safety procedures based on Occupational Safety and Health Administration (OSHA) and Centers for Disease Control (CDC) regulations.

7.4 Common Safety Hazards

7.4.2 Comply with safety signs, symbols, and labels.

Foundation Standard 9: Health Maintenance Practices

Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.

9.1 Healthy Behaviors

9.1.3 Describe strategies for the prevention of diseases.

- Community health education outreach programs
- Immunizations
- Medical, dental, and mental health screenings
- Routine physical exams
- Stress management

9.1.4 Investigate complementary and alternative health practices as they relate to wellness and disease prevention

- Acupuncture
- Eastern medicine
- Holistic medicine
- Homeopathy
- Manipulative therapies
- Natural therapies

Foundation Standard 10: Technical Skills

Apply and demonstrate technical skills and knowledge common to health career specialties

10.1 Technical Skills

10.1.1 Demonstrate procedures for measuring and recording vital signs including the normal ranges

- Blood pressure
- Temperature
- Oxygen saturation
- Pain
- Pulse
- Respirations

Foundation Standard 11: Information Technology Applications

Apply information technology practices common across health professions.

11.1 Key Principles components and practices of Health Information Systems

11.1.1 Identify components of an electronic health record (EHR) and/or electronic medical record (EMR)

- Diagnostic tests
- History and physical
- Medications
- Patient demographics
- Progress notes
- Treatment plan

Aligned Washington State Academic Standards	
Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Science and Engineering Practice	**Disciplinary Core Idea**	**Crosscutting Concept**

Unit 8: The Lymphatic System	**Total Learning Hours for Unit:** 12

Unit Summary:

This unit focuses on the anatomy, physiology, and pathophysiology of the lymphatic system. Students will be able to perform technical skills related to the lymphatic system.

In this unit, students:

Analyze the basic structure and function of the lymphatic system.

- Define terminology related to the lymphatic system (Antibody, Antigen, Immunity, Lymph, Vaccination).
- Analyze the structures of the lymphatic system and their functions.
- Compare and contrast the types of immunity and identify the relationship of the WBC and the lymphatic system.
- Explain the relationship between the lymphatic system and the circulatory system.
- Trace the flow of lymphatic fluid through the human body.

Study diseases and disorders.

- Discuss Acquired Immunodeficiency Syndrome.
- Explore disorders of the lymphatic system (measles, mumps, rubella, tetanus, lupus, mononucleosis).

- Explain the mechanisms surrounding allergic response, autoimmune, and alloimmune diseases. Explain what systems are involved and any preventive measures that can be initiated.
- Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease of the lymphatic system.
- Apply behaviors that promote health and wellness of the lymphatic system.
- Describe strategies for the prevention of diseases including health screenings and examinations of the lymphatic system.
- Investigate complementary (alternative) health practices as they relate to wellness and disease prevention of the lymphatic system.
- Investigate career possibilities in the field related to the lymphatic system.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
It is expected that students:

- Draw and label the structures that comprise the lymphatic system and describe their role in the immune response.
- Describe in a written, oral, or digital format the structure and function of the lymphatic system, lymphatic vessels, and lymph nodes. Differentiate between the cells of the immune response and other defenses, and explain how they work with antigens, antibodies, and individual immunity to maintain homeostasis in the body.
- Write a research paper or construct an electronic slide presentation on an immunological system dysfunction and present it to the class. Include an interview with a health professional as a resource for this assignment.
- Conduct lab reports: ELISA.
- Demonstrate biology lab skills: measuring solutions of small amounts, microscopy, staining and identification of white blood cells.
- Manage a lab portfolio.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students demonstrate that they are able to be responsible to others as they evaluate and compare case studies of HIV/AIDS in order to role-play parts (macrophages, NK cells, B and T lymphocytes) of the immune system. The goal of the activity is to demonstrate the process of fighting off a pathogen. Students identify routes of infection and the immune cells that are responsible for protecting the human body.
- Students think creatively as they meet with an epidemiologist to investigate and analyze a real-life scenario.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 1: Academic Foundation
Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization
   - Chemical
   - Cellular

- Tissue
- Organ
- System
- Organism

1.1.2 Identify basic structures and describe functions of human body systems.

e. Lymphatic/Immune

- Structures of the lymphatic system
  - Identify lymphatic organs
- Functions of the lymphatic system
  - Provide protection against disease
  - Movement of the lymph fluid

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:

- Measles
- Mumps
- Rubella
- Tetanus
- Lupus
- Mononucleosis
- Allergic response
- Autoimmune diseases
- Alloimmune diseases

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy
- Cloning
- Stem cell research

1.3 Medical Mathematics

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results.

Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Model verbal and nonverbal therapeutic communication.

- Active listening

- Silence
- Summarizing
- Reflecting

2.1.4 Interpret elements of communication using basic sender-message-receiver feedback model.

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.

2.2.2 Interpret common medical abbreviations to communicate information.

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).

2.3.2 Prepare examples of technical and informative writing.

Foundation Standard 4: Employability Skills

Use employability skills to enhance employment opportunities and job satisfaction.

4.3 Career Decision-Making

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.

4.3.2 Distinguish differences among careers within the health science pathways

- Biotechnology research and development
- Diagnostic services
- Health informatics
- Support services
- Therapeutic services

4.4 Employability Preparation

4.4.1 Develop components of a personal portfolio.

- Letter of introduction
- Resume
- Sample Projects
- Writing Sample
- Work-based Learning Documentation
- Oral Report
- Community Service/Service Learning
- Credentials
- Technology Skills
- Leadership Examples

Foundation Standard 9: Health Maintenance Practices

Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.

9.1 Healthy Behaviors

9.1.1 Promote behaviors of health and wellness

- Exercise
- Nutrition
- Relationships
- Sleep habits
- Stress management
- Weight control

9.1.3 Describe strategies for the prevention of diseases.

- Community health education outreach programs
- Immunizations
- Medical, dental, and mental health screenings
- Routine physical exams
- Stress management

9.1.4 Investigate complementary and alternative health practices as they relate to wellness and disease prevention

- Acupuncture
- Eastern medicine
- Holistic medicine
- Homeopathy
- Manipulative therapies
- Natural therapies

Aligned Washington State Academic Standards	
Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Science and Engineering Practice	**Disciplinary Core Idea**	**Crosscutting Concept**

INTEGRATION AND COORDINATION IN THE HUMAN BODY SYSTEM: The Nervous System, Sensory System, and Endocrine System	
Unit 9: The Nervous System	**Total Learning Hours for Unit:** 12
Unit Summary: The focus of this unit is on the anatomy, physiology, and basic pathophysiology of the nervous system.	

In this unit, students:

Analyze the basic structure and function of the nervous system.

- Define terminology related to the nervous system (Cerebrospinal fluid, Cranial nerves, Effector, Motor neurons, Neuron, Reflex arc).
- Describe the basic structure and functions of the nervous system.
- Identify the components for each type of neuron, and describe the functions of each component.
- Discuss the main divisions of the nervous system.
- Compare and contrast the sympathetic nervous system and the parasympathetic nervous system.
- Identify and label the lobes of the brain and explain the functions associated with each lobe.
- Outline the structures and functions of the spinal cord.
- Discuss cerebrospinal fluid.
- Describe the functions of the cranial and spinal nerves.
- Explain the reflex arc.

Study diseases and disorders.

- Explain disorders and injuries of the nervous system (ALS, Alzheimer's, bacterial meningitis, cerebral palsy, epilepsy, multiple sclerosis, Parkinson's).
- Demonstrate technique for cranial nerve evaluation (reflexes), and identify abnormal responses.
- Differentiate between pediatric and adult reflexes.
- Research theories of pain, especially concerning the neuroanatomy of pain, the concept of pain threshold, and pain tolerance. Include information on the perception of pain in pediatric, the aged, males, and females.
- Research electrophysiological technologies such as the electroencephalogram (EEG), the electrocardiogram (ECG), transcutaneous electrical nerve stimulation (TENS), and cardioversion.
- Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease of the nervous system.
- Apply behaviors that promote health and wellness of the nervous system.
- Describe strategies for the prevention of diseases including health screenings and examinations of the nervous system.
- Investigate complementary (alternative) health practices as they relate to wellness and disease prevention of the nervous system.
- Investigate career possibilities in the field related to the nervous system.

Performance Assessments: (Districts to complete for each unit)

Example assessments for this unit include:

It is expected that students:

- Observe or construct microscopic slides of nervous tissue and differentiate the function of the nerve tissue structures.
- Microscope view of nerve and lab report.
- Identify the components of the central and peripheral nervous system and compare and contrast their functions.
- Investigate the physiology of electrochemical impulses and neural integration.
- Research and construct written and/or verbal presentation on disease or disorder of the nervous system.

- Analyze a case study of a neurological disorder to make a diagnosis or prognosis.
- Conduct lab reports: reflex physiology lab.
- Demonstrate biology lab skills: Dissection of sheep brain, Cranial nerve anatomy lab, and microscopic view of nerve.
- Manage a lab portfolio

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students access and evaluate information as they research medical texts and peer-reviewed journals to explain the pathophysiology and abnormal anatomy and/or physiology surrounding diseases, disorders, and/or syndromes of the nervous system.
- Students communicate clearly as they explain how these abnormalities can affect one's physical health.
- As part of their presentation, students outline signs and symptoms of these disorders, their underlying causes, clinical manifestations, diagnostic procedures, evaluation, and treatment.
- Students solve problems and make judgments and decisions as they differentiate between the diseases in a pediatric, adult, and elderly person.
- Students apply technology effectively, work effectively in diverse teams, and use and manage information as they develop a public service announcement, community awareness presentation, or health education presentation to inform a selected audience about one of these diseases or disorders using the National HOSA competitive events guidelines.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 1: Academic Foundation
Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization
- Chemical
- Cellular
- Tissue
- Organ
- System
- Organism

1.1.2 Identify basic structures and describe functions of human body systems.

g. Nervous
- Structures of the nervous system
  - Identify organs of the nervous system
  - Identify structures of the special sense organs
- Functions of the nervous system

- Sensation
- Movement
- Processing

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:

- ALS
- Alzheimer's
- Bacterial meningitis
- Cerebral palsy
- Epilepsy
- Multiple Sclerosis
- Parkinson
- Dementia

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy
- Cloning
- Stem cell research

1.3 Medical Mathematics

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results.

Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Model verbal and nonverbal therapeutic communication.

- Active listening
- Silence
- Summarizing
- Reflecting

2.1.3 Distinguish between subjective and objective information.

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.

2.2.2 Interpret common medical abbreviations to communicate information.

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).
2.3.2 Prepare examples of technical and informative writing.

Foundation Standard 4: Employability Skills
Use employability skills to enhance employment opportunities and job satisfaction.
4.3 Career Decision-Making
4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.
4.3.2 Distinguish differences among careers within the health science pathways
- Biotechnology research and development
- Diagnostic services
- Health informatics
- Support services
- Therapeutic services

Foundation Standard 7: Safety Practices
Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.
7.4 Common Safety Hazards
7.4.2 Comply with safety signs, symbols, and labels.

Foundation Standard 9: Health Maintenance Practices
Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.
9.1 Healthy Behaviors
9.1.1 Promote behaviors of health and wellness
- Exercise
- Nutrition
- Relationships
- Sleep habits
- Stress management
- Weight control

9.1.3 Describe strategies for the prevention of diseases.
- Community health education outreach programs
- Immunizations
- Medical, dental, and mental health screenings
- Routine physical exams
- Stress management

Aligned Washington State Academic Standards	
Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

Unit 10: The Sensory System	**Total Learning Hours for Unit:** 12

Unit Summary:
Students will investigate the anatomy, physiology, and basic pathophysiology of the sensory system. Students will perform technical skills related to this system.

In this unit, students:

Analyze the basic structure and function of the sensory system.

- Define terminology related to the sensory system (Cochlea, Cornea, Iris, Perception, Pupil, Retina, Sclera, Sensation, Taste bud).
- Analyze the structure and functions of the sensory system (eye, ear, nose, tongue).
- Identify the five main senses.
- Discuss why stimulation of a sense organ results in sensation.
- Identify the parts of the eye and their functions.
- Outline the parts of the ear and their functions.
- Discuss the senses of smell, taste, and touch.
- Trace sound waves through the ear.
- Explain the physiology of vision.

Study diseases and disorders.

- Explore disorders of the sensory system (presbyopia, myopia, hyperopia, cataracts, conjunctivitis, deafness [conductive, sensorineural], glaucoma, macular degeneration, strabismus, middle ear infection, tinnitus, vertigo).
- Differentiate between the diseases in an infant, pediatric, adult, and elderly person.
- Demonstrate techniques for administering vision and hearing test, and identify abnormal results.
- Apply behaviors that promote health and wellness of the sensory system.
- Describe strategies for the prevention of diseases including health screenings and examinations of the sensory system.
- Investigate complementary (alternative) health practices as they relate to wellness and disease prevention of the sensory system.
- Investigate career possibilities in the field related to the sensory system.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
It is expected that students:

- Identify the structure and functions of the body's sensory organs.
- Experiment with testing the senses, including visual and auditory tests.
- Conduct lab reports: Sensory evaluation lab using Snellen eye chart, Ishihara's color blindness plates, tuning forks, scented oils, and foods.
- Demonstrate biology lab skills: dissection of cow eye (microscopy of retina and cochlea), identifying major structures.
- Manage a lab portfolio

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students collaborate with others to dissect an eye, identifying and labeling anatomical structures.
- Students work creatively with others to make a physical model of the ear, to explain how hearing aids work.
- Students reason effectively to create models that explain the disruption of sensory mechanisms when using a narcotic.
- Students communicate clearly as they role-play the role of a patient and a doctor performing a basic neurological assessment. Students should check sensory responses to sharp and dull objects, pupil response to light, eye movement and the ability to follow objects, reflexes, coordination, balance, and gait. Each pair should perform the assessment in front of the class for peer review, with classmates noting any missed or inaccurate protocol.

Industry Standards and/or Competencies:
National Health Science Standards

Foundation Standard 1: Academic Foundation
Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization
   - Chemical
   - Cellular
   - Tissue
   - Organ
   - System
   - Organism

1.1.2 Identify basic structures and describe functions of human body systems.

l. Sensory system
   - Structures of the sensory system
     - Identify organs of the sensory system

- Identify structures of the special sense organs
- Functions of the Sensory system
  - Identify functions of the eye, ear, nose, and tongue
  - Identify senses for sight, hearing, smell, taste, and touch

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:

- Presbyopia
- Myopia
- Hyperopia
- Cataracts
- Conjunctivitis
- Deafness [conductive, sensorineural]
- Glaucoma
- Macular degeneration
- Strabismus middle ear infection
- Tinnitus
- Vertigo

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy
- Cloning
- Stem cell research

1.3 Medical Mathematics

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results.

Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Model verbal and nonverbal therapeutic communication.

- Active listening
- Silence
- Summarizing
- Reflecting

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.

2.2.2 Interpret common medical abbreviations to communicate information.

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).

2.3.2 Prepare examples of technical and informative writing.

Foundation Standard 4: Employability Skills

Use employability skills to enhance employment opportunities and job satisfaction.

4.3 Career Decision-Making

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.

4.3.2 Distinguish differences among careers within the health science pathways

- Biotechnology research and development
- Diagnostic services
- Health Informatics
- Support services
- Therapeutic services

Foundation Standard 7: Safety Practices

Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

7.4 Common Safety Hazards

7.4.2 Comply with safety signs, symbols, and labels.

Foundation Standard 9: Health Maintenance Practices

Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.

9.1 Healthy Behaviors

9.1.1 Promote behaviors of health and wellness

- Exercise
- Nutrition
- Relationships
- Sleep habits
- Stress management
- Weight control

9.1.4 Investigate complementary and alternative health practices as they relate to wellness and disease prevention

- Acupuncture
- Eastern medicine
- Holistic medicine
- Homeopathy

- Manipulative therapies
- Natural therapies

Aligned Washington State Academic Standards	
Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

Unit 11: The Endocrine System	**Total Learning Hours for Unit:** 12

Unit Summary:
This unit asks students to analyze and investigate the anatomy, physiology, and basic pathophysiology of the endocrine system.

In this unit, students:

Analyze the basic structure and function of the endocrine system.

- Define terminology related to the endocrine system (Endocrine glands, Endocrine system, Exocrine system, Steroid, Stress).
- Analyze the structures of the endocrine system and their functions.
- Identify the hormones secreted by each organ of the endocrine system and their functions.
- Explain the role of the endocrine system in maintaining homeostasis.
- Outline the process of hormone regulation.
- Describe the role of the hypothalamus in linking the endocrine system and nervous system.

Study diseases and disorders.

- Describe the response of the endocrine system to stress.
- Examine the relationship between homeostasis and stress; define common diseases associated with homeostatic imbalances associated with the various cells of the body.
- Outline the uses of hormones as medical treatments.
- Explore disorders of the endocrine system (acromegaly, cretinism, diabetes mellitus, dwarfism, gigantism, hyperthyroidism, hypothyroidism, myxedema).
- Demonstrate the roles and responsibilities of patient education related to endocrine systems (i.e. diabetic patient education).
- Explain the pathophysiology and abnormal anatomy and/or physiology surrounding the hypo- and hyper-secretion of hormones of the endocrine
  system. Explain how these abnormalities can affect one's physical and mental health**.**

- Describe how diseases can manifest themselves in different ways in pediatric, adult, and elderly persons.
- Demonstrate techniques for utilizing simulated equipment and medical devices related to the endocrine system (e.g., simulated blood glucose monitor).
- Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease of the endocrine system.
- Apply behaviors that promote health and wellness of the endocrine system.
- Describe strategies for the prevention of diseases including health screenings and examinations of the endocrine system.
- Investigate complementary (alternative) health practices as they relate to wellness and disease prevention of the endocrine system.
- Investigate career possibilities in the field related to the endocrine system.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
It is expected that students:

- Differentiate among the major organs and tissues that comprise the endocrine system and how the hormones secreted by these tissues assist in the maintenance of homeostasis.
- Research and construct written and/or verbal presentation on a disease or disorder of the endocrine system.
- Label the major endocrine glands using visual aids.
- Conduct lab reports: hyperinsulinism in guppies.
- Demonstrate biology lab skills: microscopy of various endocrine glands: pancreas, thyroid, mixing solutions, care of living lab specimens.
- Manage a lab portfolio.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students use and manage information to explain the pathophysiology and abnormal anatomy and/or physiology surrounding the hypo- and hyper-secretion of hormones of the endocrine system. They will communicate clearly as they explain how these abnormalities can affect one's physical and mental health.
- Students use system thinking as they describe how these diseases manifest themselves in different ways in pediatric, adult, and elderly persons.
- Students create media products and apply technology effectively as they develop a public service announcement, community awareness presentation, or health education presentation to inform a selected audience about one of these diseases or disorders, following National HOSA competitive events guidelines.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 1: Academic Foundation
Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization

- Chemical
- Cellular
- Tissue
- Organ
- System
- Organism

1.1.2 Identify basic structures and describe functions of human body systems.

h. Endocrine

- Structures of the endocrine system
  - Identify endocrine glands
- Functions of the endocrine system
  - Production of hormones
  - Regulation of body processes
  - Controls metabolism
  - Regulates growth, development, and maturation

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:

- Diseases associated with homeostatic imbalances
- Acromegaly
- Cretinism
- Diabetes mellitus
- Dwarfism
- Gigantism
- Hyperthyroidism
- Hypothyroidism
- Myxedema

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy
- Cloning
- Stem cell research

1.3 Medical Mathematics

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results.

Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Model verbal and nonverbal therapeutic communication.

- Active listening
- Silence
- Summarizing
- Reflecting

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.

2.2.2 Interpret common medical abbreviations to communicate information.

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).

2.3.2 Prepare examples of technical and informative writing.

Foundation Standard 7: Safety Practices

Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

7.4 Common Safety Hazards

7.4.2 Comply with safety signs, symbols, and labels.

Foundation Standard 9: Health Maintenance Practices

Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.

9.1 Healthy Behaviors

9.1.3 Describe strategies for the prevention of diseases.

- Community health education outreach programs
- Immunizations
- Medical, dental, and mental health screenings
- Routine physical exams
- Stress management

9.1.4 Investigate complementary and alternative health practices as they relate to wellness and disease prevention

- Acupuncture
- Eastern medicine
- Holistic medicine
- Homeopathy
- Manipulative therapies
- Natural therapies

Aligned Washington State Academic Standards

Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

ABSORPTION AND EXCRETION IN THE HUMAN BODY: The Respiratory System, Digestive System and Urinary System **Unit 12:** The Respiratory System	**Total Learning Hours for Unit:** 12

Unit Summary:
Analyze and investigate the anatomy, physiology and basic pathophysiology of the respiratory system, and evaluate and monitor respirations.

In this unit, students:

Analyze the basic structure and function of the respiratory system.

- Define terminology related to the respiratory system (Alveolus, Breathing, Bronchus, Homeostasis, Larynx, Pharynx, Respiration, Trachea).
- Analyze the structures of the respiratory system and their functions.
- Discuss the process of breathing and respiration.
- Differentiate between the upper and lower respiratory tract while tracing the pathway of air into and out of the respiratory system.
- Explain the physiology of breathing to include the process of gas exchange.
- Analyze the interdependence of the cardiovascular and respiratory systems as they relate to gas exchange, circulation, and the support of the vital organs of the human body.
- Demonstrate measuring and recording respirations, and identify abnormal results.

Study diseases and disorders.

- Outline abnormal breathing conditions.
- Explore common disorders of the respiratory system (emphysema, influenza, lung cancer, pneumonia, SIDS, tuberculosis).
- Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease of the respiratory system.
- Apply behaviors that promote health and wellness of the respiratory system.
- Describe strategies for the prevention of diseases including health screenings and examinations of the respiratory system.
- Investigate complementary (alternative) health practices as they relate to wellness and disease prevention of the respiratory system.
- Investigate career possibilities in the field related to the respiratory system.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
It is expected that students:

- Draw and label the structures and function of the respiratory system and describe the exchange of gases at the cellular level.
- Write a research paper or construct an electronic slide presentation on a respiratory system dysfunction and present it to the class. Include an interview with a health professional as a resource for this assignment.
- Conduct lab reports: lung capacity using water spirometer.
- Demonstrate biology lab skills: Dissection of a pig pluck, comparing healthy lung to smoker's lung.
- Manage a lab portfolio.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students use and manage information, communicate clearly, and reason effectively as they research the effects of second-hand smoke and smokeless tobacco to create and present posters on these subjects.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 1: Academic Foundation
Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization
   - Chemical
   - Cellular
   - Tissue
   - Organ
   - System
   - Organism

1.1.2 Identify basic structures and describe functions of human body systems.

f. Respiratory
   - Structures of the respiratory system
     - Identify respiratory organs
   - Functions of the respiratory system
     - Gas exchange
     - Physiology of respiration

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:

- Emphysema
- Influenza
- Lung cancer
- Pneumonia
- SIDS
- Tuberculosis

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy
- Cloning
- Stem cell research

1.3 Medical Mathematics

1.3.1 Demonstrate competency using basic math skills and mathematical conversions as they relate to healthcare.

a. Metric system
- Centi
- Milli
- Kilo

b. Mathematical
- Average
- Ratios
- Fractions
- Percentages
- Addition/Subtraction
- Multiplication/Division

c. Conversions
- Height (inches/meters)
- Weight/mass (pounds/grams)
- Length (inches/meters)
- Volume (ml/cc)
- Temperature (F/C)
- Household measurements (Tbsp/tsp/cup/oz)

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results

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Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Model verbal and nonverbal therapeutic communication.

- Active listening
- Silence
- Summarizing
- Reflecting

2.1.3 Distinguish between subjective and objective information.

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.

2.2.2 Interpret common medical abbreviations to communicate information.

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).

2.3.2 Prepare examples of technical and informative writing.

Foundation Standard 4: Employability Skills

Use employability skills to enhance employment opportunities and job satisfaction.

4.3 Career Decision-Making

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.

4.3.2 Distinguish differences among careers within the health science pathways

- Biotechnology research and development
- Diagnostic services
- Health informatics
- Support services
- Therapeutic services

Foundation Standard 7: Safety Practices

Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness.

7.4 Common Safety Hazards

7.4.2 Comply with safety signs, symbols, and labels.

Foundation Standard 9: Health Maintenance Practices

Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.

9.1 Healthy Behaviors

9.1.1 Promote behaviors of health and wellness

- Exercise
- Nutrition
- Relationships
- Sleep habits
- Stress management
- Weight control

9.1.3 Describe strategies for the prevention of diseases.

- Community health education outreach programs
- Immunizations
- Medical, dental, and mental health screenings
- Routine physical exams
- Stress management

9.1.4 Investigate complementary and alternative health practices as they relate to wellness and disease prevention

- Acupuncture
- Eastern medicine
- Holistic medicine
- Homeopathy
- Manipulative therapies
- Natural therapies

Foundation Standard 10: Technical Skills

Apply and demonstrate technical skills and knowledge common to health career specialties.

10.1 Technical Skills

10.1.1 Demonstrate procedures for measuring and recording vital signs including the normal ranges

- Blood pressure
- Temperature
- Oxygen saturation
- Pain
- Pulse
- Respirations

Aligned Washington State Academic Standards	
Science	**Washington Science Standards (Next Generation Science Standards):**

	HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

Unit 13: Digestive System	**Total Learning Hours for Unit:** 12

Unit Summary:
In this unit, students analyze and investigate the anatomy, physiology, and basic pathophysiology of the digestive system.

In this unit, students:

Analyze the basic structure and function of the digestive system.

- Define terminology related to the digestive system (Bile, Carbohydrate, Chyme, Digestion, Enzymes, Fat, Hormone, Hydrochloric acid, Mucus, Nutrient, Peristaltic waves, Protein).
- Analyze the structures of the digestive system and their functions.
- Name the accessory organs of digestion.
- Outline the process of digestion.
- Compare and contrast chemical and mechanical digestion.
- Trace the path of food throughout the digestive pathway.
- Identify gastric secretions and describe the function of each secretion.
- Explain the process of absorption.

Study diseases and disorders.

- Explore the disorders of the digestive system (appendicitis, cirrhosis, colorectal cancer, gallstones, hepatitis, obesity, ulcers).
- Differentiate between diseases in a pediatric, adult, and elderly person.
- Demonstrate measuring height, weight, and Body Mass Index (BMI), and document in electronic medical record.
- Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease of the digestive system.
- Apply behaviors that promote health and wellness of the digestive system.
- Describe strategies for the prevention of diseases including health screenings and examinations of the digestive system.
- Investigate complementary (alternative) health practices as they relate to wellness and disease prevention of the digestive system.
- Investigate career possibilities in the field related to the digestive system.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
It is expected that students:

- Draw a label model of each organ within the digestive system, listing functions of each organ.
- Summarize research and disorders related to digestive system and present to class.
- Conduct lab reports: chemical and physical processes of digestion.
- Demonstrate biology lab skills: microscopy of villus, duodenum, salivary gland, and liver, mixing and measuring of solutions.
- Manage a lab portfolio.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students access and evaluate information as they research medical texts and peer-reviewed journals to explain the pathophysiology and abnormal anatomy and/or physiology surrounding diseases, disorders, and/or syndromes of the digestive system.
- Students communicate clearly as they explain how these abnormalities can affect one's physical health, outlining signs and symptoms, underlying causes, clinical manifestations, diagnostic procedures, evaluation, and treatment.
- Students solve problems and make judgments and decisions as they differentiate between the diseases in a pediatric, adult, and elderly person.
- Students apply technology effectively, work effectively in diverse teams, and use and manage information as they develop a public service announcement, community awareness presentation, or health education presentation to inform a selected audience about one of these diseases or disorders using the National HOSA competitive events guidelines.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 1: Academic Foundation
Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization
   - Chemical
   - Cellular
   - Tissue
   - Organ
   - System
   - Organism

1.1.2 Identify basic structures and describe functions of human body systems.

i. Digestive

- Structures of the digestive system
    - Identify digestive organs in sequence
    - Differentiate between alimentary and accessory organs
- Functions of the digestive system
    - Chemical and mechanical digestion
    - Absorption of nutrients
    - Excretion of wastes

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:

- Appendicitis
- Cirrhosis
- Colorectal cancer
- Gallstones
- Hepatitis
- Obesity
- Ulcers

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy
- Cloning
- Stem cell research

1.3 Medical Mathematics

1.3.1 Demonstrate competency using basic math skills and mathematical conversions as they relate to healthcare.

a. Metric system
- Centi
- Milli
- Kilo

b. Mathematical
- Average
- Ratios
- Fractions
- Percentages
- Addition/Subtraction
- Multiplication/Division

c. Conversions

- Height (inches/meters)
- Weight/mass (pounds/grams)
- Length (inches/meters)
- Volume (ml/cc)
- Temperature (F/C)
- Household measurements (Tbsp/tsp/cup/oz)

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results

Foundation Standard 2: Communications
Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Model verbal and nonverbal therapeutic communication.

- Active listening
- Silence
- Summarizing
- Reflecting

2.1.3 Distinguish between subjective and objective information.

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.
2.2.2 Interpret common medical abbreviations to communicate information.

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).
2.3.2 Prepare examples of technical and informative writing.

Foundation Standard 4: Employability Skills
Use employability skills to enhance employment opportunities and job satisfaction.

4.3 Career Decision-Making

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.
4.3.2 Distinguish differences among careers within the health science pathways

- Biotechnology research and development
- Diagnostic services
- Health informatics
- Support services
- Therapeutic services

Foundation Standard 9: Health Maintenance Practices

Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.

9.1 Healthy Behaviors

9.1.1 Promote behaviors of health and wellness.

- Exercise
- Nutrition
- Relationships
- Sleep habits
- Stress management
- Weight control

9.1.3 Describe strategies for the prevention of diseases.

- Community health education outreach programs
- Immunizations
- Medical, dental, and mental health screenings
- Routine physical exams
- Stress management

9.1.4 Investigate complementary and alternative health practices as they relate to wellness and disease prevention

- Acupuncture
- Eastern medicine
- Holistic medicine
- Homeopathy
- Manipulative therapies
- Natural therapies

Aligned Washington State Academic Standards

Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

Unit 14: Urinary System	**Total Learning Hours for Unit:** 12

Unit Summary:
The topic of this unit is the anatomy, physiology, and basic pathophysiology of the urinary system.

In this unit, students:

Analyze the basic structure and function of the urinary system.

- Define terminology related to the urinary system (Acidosis, Aldosterones, Alkalosis, Antidiuretic hormone (ADH), Micturition, Nephron, Renin-angiotensin system, Urine).
- Outline the functions of the urinary system.
- Identify the structures of the urinary system and their functions.
- Identify the internal and external anatomy of the kidney.
- Analyze the blood supply that is required for functioning, the physiology of the nephrons, the process by which urine is formed, the pathways for excretion in males and females, and the chemical and nervous system control of urinary secretion.
- Describe the structure and functions of the nephron, and explain the processes of secretion, filtration and reabsorption including where the processes occur.
- Compare and contrast the urinary system of the female with the urinary system of a male.
- Explain the process of micturition.
- Demonstrate measuring intake and output, and identify abnormal results (collection of specimen) and document in an electronic medical record.

Study diseases and disorders.

- Explore disorders of the urinary system (cystitis, diabetes insipidus, glomerulonephritis, incontinence, kidney stones, renal failure, urinary tract infections).
- Differentiate between the diseases in a pediatric, adult, and elderly person.
- Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease of the urinary system.
- Apply behaviors that promote health and wellness of urinary system.
- Describe strategies for the prevention of diseases including health screenings and examinations of the urinary system.
- Investigate complementary (alternative) health practices as they relate to wellness and disease prevention of the urinary system.
- Investigate career possibilities in the field related to the urinary system.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
It is expected that students:

- Draw and label models of each organ within the urinary system, listing functions of each organ and comparing male and female systems.
- Summarize research about disorders related to the urinary system, presenting to the class.
- Construct a model of the kidney to include all parts.

- Conduct lab reports: urinalysis (simulated).
- Demonstrate biology lab skills: dissection of sheep kidney, microscopy of nephron.
- Manage a lab portfolio

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students access and evaluate information, make judgments and decisions, and reason effectively as they research medical texts and peer-reviewed journals to explain the diseases and disorders of the urinary system.
- Students think creatively as they explain how these abnormalities can affect one's physical health, outlining signs and symptoms, underlying causes, clinical manifestations, diagnostic procedures, evaluation, and treatment.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 1: Academic Foundation
Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization
- Chemical
- Cellular
- Tissue
- Organ
- System
- Organism

1.1.2 Identify basic structures and describe functions of human body systems.

j. Urinary
- Structures of the urinary system
  - Identify urinary organs
  - Identify gross and microscopic anatomy of the kidney
- Functions of the urinary system
  - Process of urine formation
  - Urine composition
  - Homeostatic balance

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:

- Cystitis
- Diabetes insipidus
- Glomerulonephritis
- Incontinence
- Kidney stones
- Renal failure
- Urinary tract infections

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy
- Cloning
- Stem cell research

1.3 Medical Mathematics

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results

Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Interpret verbal and nonverbal therapeutic communication.

- Active listening
- Silence
- Summarizing
- Reflecting

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.

2.2.2 Interpret common medical abbreviations to communicate information.

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).

2.3.2 Prepare examples of technical and informative writing.

Foundation Standard 4: Employability Skills

Use employability skills to enhance employment opportunities and job satisfaction.

4.3 Career Decision-Making

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.

4.3.2 Distinguish differences among careers within the health science career pathways

- Biotechnology research and development

- Diagnostic services
- Health informatics
- Support services
- Therapeutic services

Foundation Standard 7: Safety Practices
Identify existing and potential hazards to clients, co-workers, and self. Employ safe work practices and follow health and safety policies and procedures to prevent injury and illness

7.4 Common Safety Hazards

7.4.2 Comply with safety signs, symbols, and labels.

Foundation Standard 9: Health Maintenance Practices
Differentiate between wellness and disease. Promote disease prevention and model healthy behaviors.

9.1 Healthy Behaviors

9.1.3 Describe strategies for the prevention of diseases

- Community health education outreach programs
- Immunizations
- Medical, dental, and mental health screenings
- Routine physical exams
- Stress management

9.1.4 Investigate complementary (alternative) health practices as they relate to wellness and disease prevention.

- Acupuncture
- Eastern medicine
- Holistic medicine
- Homeopathy
- Manipulative therapies
- Natural therapies

Aligned Washington State Academic Standards	
Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Science and Engineering Practice	**Disciplinary Core Idea**	**Crosscutting Concept**

LIFE CYCLE IN THE HUMAN BODY: REPRODUCTION, GROWTH AND DEVELOPMENT **Unit 15:** The Reproductive System	**Total Learning Hours for Unit:** 7

Unit Summary:
The subject of this unit is the anatomy, physiology, and basic pathophysiology of the reproductive system.

In this unit, students:

- Define terminology related to the reproductive system (Blastocyte, Fertility, Fertilization, Fraternal twins, Hormone replacement therapy, Infertility, Libido, Menstrual cycle, Ovarian follicle, Ovary, Pituitary gland, Reproduction, Sperm, STC, Testes, Uterus, Vagina).
- Identify the structures of the male reproductive system and their functions.
- Identify the structures of the female reproductive system and their functions.
- Explain the phases of the menstrual cycle.
- Discuss the physiology of reproduction.
- Outline the changes that occur during menopause.
- Explain the relationship of the endocrine system to the function of the reproductive system.
- Describe how structure and function are related in terms of cell and tissue types.

Study diseases and disorders.

- Discuss sexually transmitted diseases: gonorrhea, syphilis, genital herpes, chlamydia, trichomoniasis, genital warts, and Human papillomavirus (HPV).
- Explore disorders of the reproductive system (reproductive cancers [breast, testicular, cervical, ovarian, prostate], endometriosis, and impotence).
- Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease of the reproductive system.
- Learn about behaviors that promote health and wellness of reproductive system.
- Describe strategies for the prevention of diseases including health screenings and examinations of the reproductive system.
- Investigate complementary (alternative) health practices as they relate to wellness and disease prevention of the reproductive system.
- Investigate career possibilities in the field related to the reproductive system.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
It is expected that students:

- Demonstrate their understanding of the process of fertilization, mitosis, and meiosis, then outline the timeline and phases of development of a fetus from fertilization until birth.
- Be able to describe the abnormalities that can occur at each phase of a fetus' growth, including genetic disorders and other congenital complications.
- Demonstrate biology lab skills: microscopy of human ovary, ovum & sperm.
- Manage a lab portfolio.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students demonstrate that they can solve problems, manage and use information, and create media products as they research and develop a public service announcement or public health presentation to inform high school students and young adults of the various types of sexually transmitted diseases.
- Students communicate clearly as they provide informative and factual details concerning complications, signs and symptoms, preventive measures, and treatments available for the diseases they discuss.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 1: Academic Foundation
Understand human anatomy, physiology, common diseases and disorders, and medical math principles.

1.1 Human Anatomy and Physiology

1.1.1 Describe the organization of the human body and directional terms.

a. Identify Levels of Organization
   - Chemical
   - Cellular
   - Tissue
   - Organ
   - System
   - Organism

1.1.2 Identify basic structures and describe functions of human body systems.

k. Reproductive system
   - Structures of the reproductive system
     - Identify female reproductive organs
     - Identify male reproductive organs
   - Functions of the reproductive system
     - Function of gametes
     - Production of hormones

1.2 Diseases and Disorders

1.2.1 Describe etiology, pathology, diagnosis, treatment, and prevention of common diseases and disorders, including, but not limited to the following:

- Sexually transmitted diseases: gonorrhea, syphilis, genital herpes, chlamydia, trichomoniasis, genital warts, and Human papillomavirus (HPV).
- Reproductive cancers [breast, testicular, cervical, ovarian, prostate]

- Endometriosis
- Impotence

1.2.2 Discuss biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- Gene testing
- Gene therapy
- Cloning
- Stem cell research

1.3 Medical Mathematics

1.3.2 Demonstrate the ability to analyze diagrams, charts, graphs, and tables to interpret healthcare results

Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Model verbal and nonverbal therapeutic communication

- Active listening
- Silence
- Summarizing
- Reflecting

2.2 Medical Terminology

2.2.1 Use common roots, prefixes, and suffixes to communicate information.

Aligned Washington State Academic Standards

Science	**Washington Science Standards (Next Generation Science Standards):** HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. HS-LS3-2. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept

Unit 16: Capstone/Culminating Project	**Total Learning Hours for Unit:** 10

Unit Summary:
Students will evaluate a solution to a complex real-world problem. When formulating their solution, students will prioritize criteria and trade-offs that account for a range of constraints including cost, safety, reliability, and cultural and social impact.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
Sample projects:

- Given a case study, which includes two or more body systems, students in a group will research the diagnose or problem, discuss the ethical dilemma presented, positive and negative implications related to the decision, clarify myths and facts regarding the decision, develop treatment recommendations for a patient.
- Select a topic and defend a position on a current medical ethical dilemma.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

- Students will demonstrate the ability to communicate clearly through their group project presentation.

Industry Standards and/or Competencies:
National Health Science Standards:

Foundation Standard 6: Ethics
Understand accepted ethical practices with respect to cultural, social, and ethnic differences within the healthcare environment.

6.1 Ethical Practice

6.1.1 Differentiate between ethical and legal issues impacting healthcare.
6.1.2 Identify ethical issues and their implications related to healthcare.

- Ethics committee
- Euthanasia
- In vitro fertilization
- Organ donation
- Scope of practice

6.2 Cultural, Social, and Ethnic Diversity

6.2.1 Discuss religious and cultural values as they impact healthcare

- Ethnicity
- Gender
- Race

- Religion

6.2.2 Demonstrate respectful and empathetic treatment of ALL patients/clients

- Civility
- Customer Service
- Patient Satisfaction

Aligned Washington State Academic Standards	
Science	**Washington Science Standards (Next Generation Science Standards):** HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Science and Engineering Practice	**Disciplinary Core Idea**	**Crosscutting Concept**

Unit 17: Employability and Career Development	**Total Learning Hours for Unit:** 15

Unit Summary:
Health care workers will understand how employability skills enhance their employment opportunities and job satisfaction. They will demonstrate skills that support and maintain job functions and will upgrade these skills, as needed.

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:

In lab/clinical settings, students will demonstrate professionalism, flexibility, problem solving, critical thinking and job related skills, as evaluated by the instructor in accordance with industry standards.
Possible scoring guides:

- The same tool used for professionals in this lab/clinical setting adapted appropriately for use with students.
- A scoring guide based on the employability skills in the employability skills column of this framework.

Students will research the requirements for a career interest:

1. Using current technology, create a Personal Pathway plan.

2. Participate in a job shadow/internship in a healthcare setting.
3. Present a career interest project (WCTSMA or HOSA career health display is an example).
4. Interview a health care professional in their career of choice and write a reflection essay.

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

- Students work creatively with others, guide and lead others, and manage goals and time as they participate in work-based learning leadership activities that enhance skill development in the areas of speaking, self-confidence, marketing oneself, and on the job experiences.
- Students manage projects and demonstrate flexibility as they participate in portfolio leadership activities that enhance skill development in the areas of writing, organization, presentation and speaking.
- Students interact effectively with others as they seek counselors, mentors, and other experts to assist in the planning and execution of education and career plans.

Industry Standards and/or Competencies:

National Health Science Standards:

Foundation Standard 2: Communications

Demonstrate methods of delivering and obtaining information, while communicating effectively.

2.1 Concepts of Effective Communication

2.1.1 Model verbal and nonverbal therapeutic communication

- Active listening
- Silence
- Summarizing
- Reflecting

2.2 Medical Terminology

2.21 Use common roots, prefixes, and suffixes to communicate information.

2.3 Written Communication Skills

2.3.1 Use proper elements of written and electronic communication (spelling, grammar, and formatting).

2.3.2 Prepare examples of technical and informative writing.

Foundation Standard 4: Employability Skills

Use employability skills to enhance employment opportunities and job satisfaction.

4.1 Personal Traits of the Health Professional

4.1.1 Identify personal traits and attitudes desirable in a career ready member of a health team.

- Acceptance of criticism
- Competence
- Dependability
- Discretion

- Empathy
- Enthusiasm
- Honesty
- Initiative
- Integrity
- Patience
- Positive Attitude
- Responsibility
- Self-motivation
- Tact
- Team play
- Willingness to learn

4.1.2. Summarize professional standards as they apply to hygiene, dress, language, confidentiality and behavior.

4.2. Employability Skills

4.2.1 Apply employability skills in healthcare.

- Chain of command
- Communication Skills
- Decision making
- Flexible
- Organization
- Problem solving
- Scope of practice
- Time Management
- Work Ethic

4.3 Career Decision-Making

4.3.1 Research levels of education, credentialing requirements, and employment trends in health professions.

4.3.2 Distinguish differences among careers within the health science pathways

- Biotechnology research and development
- Diagnostic services
- Health Informatics
- Support services
- Therapeutic services

4.4 Employability Preparation

4.4.1 Develop components of a personal portfolio.

- Letter of introduction
- Resume

- Sample Projects
- Writing Sample
- Work-based Learning Documentation
- Oral Report
- Community Service/Service Learning
- Credentials
- Technology Skills
- Leadership Examples

Aligned Washington State Academic Standards

Science	**Washington Science Standards (Next Generation Science Standards):** HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept