

STRANDS AND STANDARDS

HEALTH SCIENCE, INTRODUCTION



Course Description

This semester course is designed to create an awareness of career possibilities in health care and inform students of the educational options available for health science and health technology programs. Instruction includes beginning anatomy and physiology, medical terminology, medical ethics, diseases, and disorders. The course prepares students for the Medical Anatomy/Physiology course and/or for a variety of health technology programs.

Intended Grade Level	9-12
Units of Credit	0.5
Core Code	36.01.00.00.090
Concurrent Enrollment Core Code	N/A
Prerequisite	N/A
Skill Certification Test Number	700
Skill Certification Cut Score	78%
Test Weight	1.0
License Area of Concentration	CTE and/or Secondary Education 6-12 or Elementary Education 1-8
Required Endorsement(s)	
Endorsement 1	Health Science Introduction
Endorsement 2	Emergency Medical Technician
Endorsement 3	Exercise Science, Sports Medicine
Endorsement 4	Medical Anatomy & Physiology
Endorsement 5	Medical Forensics
Endorsement 6	Nurse Assistant
Endorsement 7	Surgical Technician

STRAND 1

INTRODUCTION-Students will explore the fundamental aspects of Healthcare.

Standard 1

Identify how math is used in the medical field.

- Demonstrate use of the 24-hour clock/military time.
- Demonstrate competency in basic math skills as they relate to healthcare (averages, ratios, fractions, percentages, addition, subtraction, multiplication, division).
- Demonstrate the ability to convert units of height, weight, and temperature.
- Demonstrate the ability to use the metric system.

Standard 2

Describe anatomical position and the role it plays in human anatomy.

- Define anatomical position.

Standard 3

Describe body planes and directional terms and their relationship to anatomical position.

- Identify body planes.
 - Sagittal
 - Mid-sagittal
 - Coronal/frontal
 - Transverse/horizontal
- Identify directional terms.
 - Superior
 - Inferior
 - Anterior
 - Posterior
 - Medial
 - Lateral
 - Proximal
 - Distal
 - Superficial
 - Deep

STRAND 2

SUPPORT SYSTEMS-Students will explore aspects of the body systems related to support.

Standard 1

Identify the basic functions of the skeletal system.

- Describe how the skeletal system provides structure/support.
- Describe how the skeletal system provides means for muscle attachment and movement.
- Describe how the skeletal system store minerals (i.e., calcium).
- Describe hematopoiesis (blood cell production) and where it occurs.

Standard 2

Explore the basic structure of the skeleton.

- Identify the following bones:
 - Cranium
 - Frontal

- Parietal
- Occipital
- Temporal
- Maxillae
- Mandible
- Vertebrae
 - Cervical
 - Thoracic
 - Lumbar
 - Sacrum
 - Coccyx
- Ribs
- Sternum
- Humerus
- Radius
- Ulna
- Carpals
- Metacarpals
- Phalanges (fingers)
- Pelvis
- Femur
- Patella
- Tibia
- Fibula
- Tarsals
- Metatarsals
- Phalanges (toes)
- Describe articulation and identify examples of the following:
 - Immovable
 - Movable
- Describe the function of ligaments.

Standard 3

Describe the diseases and disorders associated with the skeletal system.

- Compare and contrast open and closed fractures.
- Describe the causes, signs, symptoms, and treatment of scoliosis.
- Describe the causes, signs, symptoms, and treatment of osteoarthritis.
- Describe the causes, signs, symptoms, and treatment of osteoporosis.
- Describe the causes, signs, symptoms, and treatment of sprain.

Standard 4

Describe the basic functions of the muscular system.

- Define thermogenesis.
- Identify how muscles produce movement (i.e., muscle contractions).
- Explain how muscles maintain posture.
- Explain how muscles protect internal organs.
- Explain how smooth muscle controls the volume of hollow body organs.

Standard 5

Explore the basic structure of the muscular system.

- Differentiate between cardiac, smooth, and skeletal muscles (appearance, location, control)
- Identify the location of the following muscles:
 - Biceps Brachii
 - Triceps Brachii
 - Trapezius
 - Deltoid
 - Diaphragm
 - Pectoralis major
 - Latissimus dorsi
 - Rectus abdominis
 - Gastrocnemius
 - Hamstrings
 - Quadriceps
 - Gluteus maximus
- Describe the function of tendons

Standard 6

Describe the disease and disorders associated with the muscular system.

- Describe the causes, signs, symptoms, and treatment of tendonitis.
- Describe the causes, signs, symptoms, and treatment of muscular dystrophy.
- Describe the causes, signs, symptoms, and treatment of strain.
- Describe the causes, signs, symptoms, and treatment of spasm (i.e., Charlie horse).

Standard 7

Describe the basic functions of the integumentary system.

- Identify how skin protects against infection.
- Explain that the skin produces vitamin D.
- Explain how the skin functions as a sensory organ.
- Explain how skin regulates body temperature.
- Identify how the skin protects against UV light.

Standard 8

Identify the layers of the skin and appendages.

- Describe the layers of the skin.
 - Epidermis
 - Dermis
 - Hypodermis (Subcutaneous)
- Describe the appendages of the skin.
 - Nails
 - Sudoriferous (sweat) glands
 - Sebaceous (oil) glands
 - Hair

Standard 9

Describe the disease and disorders associated with the integumentary system.

- Describe the causes, signs, symptoms, and treatment of acne.
- Describe the causes, signs, symptoms, and treatment of mycoses (fungal infections) (i.e., athlete's foot,

ringworm).

- Describe the causes, signs, symptoms, treatment, prevention, and detection (ABCDE method) of skin cancer.
 - Basal cell carcinoma
 - Squamous cell carcinoma
 - Melanoma

STRAND 3

TRANSPORTATION SYSTEMS—Students will explore aspects of the body systems related to transportation.

Standard 1

Describe the basic functions of the cardiovascular system.

- Identify how the cardiovascular system transports nutrients and wastes.
- Identify how the cardiovascular system transports heat.
- Identify how the cardiovascular system transports oxygen to body cells and carbon dioxide away from body cells.
- Identify how the cardiovascular system transports hormones.
- Identify how the cardiovascular system transports antibodies.

Standard 2

Identify the basic structures and functions of the heart, blood vessels, and blood.

- Describe the basic structures and functions of the heart.
 - Right atrium
 - Right ventricle
 - Left atrium
 - Left ventricles
 - Valves
- Explain the flow of blood through the heart.
- Compare and contrast the difference between arteries, capillaries, and veins.
- Identify the components of blood and the function of each component.
 - Red blood cells
 - White blood cells
 - Platelets
 - Plasma

Standard 3

Describe the diseases and disorders associated with the circulatory system.

- Describe the causes, signs, symptoms, and treatment of atherosclerosis.
- Describe the causes, signs, symptoms, and treatment of hypertension.
- Describe the causes, signs, symptoms, and treatment of myocardial infarction.
- Describe the causes, signs, symptoms, and treatment of anemia.

Standard 4

Identify the basic functions of the respiratory system.

- Describe how the nose warms, moistens, and filters air.
- Describe how sound production is related to the respiratory system.
- Describe the process of carbon dioxide-oxygen gas exchange.

Standard 5

Describe the basic function and structures of the respiratory system.

- Nasal cavity
- Oral cavity
- Pharynx
- Epiglottis
- Larynx
- Trachea
- Bronchi
- Bronchioles
- Lungs
- Alveoli

Standard 6

Describe the diseases and disorders associated with the respiratory system.

- Describe the causes, signs, symptoms, and treatment of pneumonia.
- Describe the causes, signs, symptoms, and treatment of lung cancer.
- Describe the causes, signs, symptoms, and treatment of tuberculosis.
- Describe the causes, signs, symptoms, and treatment of influenza.
- Describe the causes, signs, symptoms, and treatment of Chronic Obstructive Pulmonary Disorders (COPD).
 - Asthma
 - Chronic bronchitis
 - Emphysema

Standard 7

Describe the basic function and structures of the immune system.

- Identify the basic function of the immune system (provides protection against diseases).
- Identify the basic structures of the immune system.
 - Tonsils
 - Lymph nodes
 - Spleen
 - White blood cells

Standard 8

Describe the diseases and disorders associated with the immune system.

- Describe the causes, signs, symptoms, and treatment of the human immunodeficiency virus (HIV).
- Describe the causes, signs, symptoms, and treatment of acquired immune deficiency syndrome (AIDS).
- Describe the causes, signs, symptoms, and treatment of lupus.
- Describe the causes, signs, symptoms, and treatment of mononucleosis.

STRAND 4

REGULATORY SYSTEMS-Students will explore aspects of the body systems related to regulation.

Standard 1

Identify the basic functions of the nervous system.

- Describe how the sensory nerves detect stimuli (pressure, temperature, taste, smell, light, etc.) and send the message in the form of an impulse to the central nervous system (spinal cord/brain).
- Describe how the nervous system receives and interprets incoming nerve impulses and determines

appropriate responses.

- Explain how the motor nerves carry out the response of the central nervous system (spinal cord/brain).

Standard 2

Identify the basic structures and their functions.

- Describe the structures of the brain and their functions.
 - Cerebrum
 - Cerebellum
 - Brain stem
- Describe the structure and function of the spinal cord.
- Describe the location and function of cerebrospinal fluid.
- Describe the location and function of meninges.
- Describe the structure (cell body, dendrites, axon) and function of sensory and motor nerves.

Standard 3

Describe the diseases and disorders associated with the nervous system.

- Describe the causes, signs, symptoms, and treatment of meningitis.
- Describe the causes, signs, symptoms, and treatment of epilepsy.
- Describe the causes, signs, symptoms, and treatment of concussion.
- Describe the causes, signs, symptoms, and treatment of cerebrovascular accident (stroke).

Standard 4

Describe the receptors of the special senses.

- Identify the sense of smell (chemoreceptors).
- Identify the sense of taste (chemoreceptors).
- Identify the sense of hearing (mechanoreceptors).
- Identify the sense of vision (photoreceptors).
- Identify the sense of touch (mechanoreceptors).

Standard 5

Identify the basic structures of the special sense organs and their functions.

- Describe the structure and function of the ear.
 - Outer ear
 - Auricle/Pinna
 - External auditory canal
 - Middle ear
 - Tympanic membrane
 - Auditory/Eustachian tube
 - Auditory ossicles
 - Malleus
 - Incus
 - Stapes
 - Inner ear
 - Cochlea
- Describe the structure and function of the eye.
 - Eyelid
 - Conjunctiva
 - Sclera
 - Cornea

- Iris
- Pupil
- Lens
- Retina
- Describe the structure and function of the nose (olfactory receptors).
- Describe the structure and function of the mouth/tongue (taste buds).
- Describe the structure and function of the skin (nerve endings).

Standard 6

Describe the diseases and disorders of the special senses.

- Describe the causes, signs, symptoms, and treatment of pinkeye (conjunctivitis).
- Describe the causes, signs, symptoms, and treatment of middle ear infection (otitis media).
- Describe the causes, signs, symptoms, and treatment of deafness.
- Describe the causes, signs, symptoms, and treatment of near-sightedness (myopia).
- Describe the causes, signs, symptoms, and treatment of far-sightedness (hyperopia).
- Describe the causes, signs, symptoms, and treatment of aging eyes (presbyopia).

Standard 7

Identify the basic functions of the endocrine system.

- Describe how the endocrine system regulates body processes.
- Describe how the endocrine system regulates growth, development, and maturation.

Standard 8

Identify the location of the following glands and the function of the hormones they release.

- Pituitary gland-located in the brain, releases growth hormone (GH), thyroid stimulating hormone (TSH), and adrenocorticotrophic hormone (ACTH).
- Thyroid gland-located in the neck, releases thyroxine.
- Pancreas-located behind the stomach, releases insulin and glucagon.
- Adrenal glands-located on top of the kidneys, releases cortisol, adrenaline, and noradrenaline.

Standard 9

Describe the disease and disorders of the endocrine system.

- Describe the causes, signs, symptoms, and treatment of Type 1 diabetes (Insulin Dependent Diabetes Mellitus).
- Describe the causes, signs, symptoms, and treatment of Type 2 diabetes (Non-insulin Dependent Diabetes Mellitus).
- Describe the causes, signs, symptoms, and treatment of gigantism.
- Describe the causes, signs, symptoms, and treatment of dwarfism.
- Describe the causes, signs, symptoms, and treatment of hypothyroidism.
- Describe the causes, signs, symptoms, and treatment of hyperthyroidism.

STRAND 5

MAINTENANCE SYSTEMS-Students will explore aspects of the body systems related to maintenance.

Standard 1

Describe the basic functions of the digestive system.

- Define ingestion.
- Define digestion (chemical and mechanical).
- Define absorption.

- Define excretion.

Standard 2

Describe the location and basic functions of the digestive organs.

- Mouth, chemical and mechanical digestion
- Pharynx, passageway
- Esophagus, passageway
- Stomach-storage, absorption, chemical and mechanical digestion
- Small intestine, chemical digestion and absorption
- Large intestine, absorption of water and formation of feces
- Rectum, temporary storage for solid waste (feces)
- Anus, excretion of feces

Standard 3

Describe the diseases and disorders of the digestive system.

- Describe the causes, signs, symptoms, and treatment of Crohn's disease.
- Describe the causes, signs, symptoms, and treatment of celiac disease.
- Describe the causes, signs, symptoms, and treatment of appendicitis.
- Describe the causes, signs, symptoms, and treatment of colon cancer.

Standard 4

Describe the basic functions of the urinary system.

- Explain how the urinary system regulates the volume and composition of blood.
- Explain how the urinary system excretes body wastes.

Standard 5

Identify the basic organs, and functions of the urinary system.

- Kidneys, filter blood and produce urine
- Ureters, transport urine from the kidney to the bladder
- Bladder, storage of urine
- Urethra, transport urine from bladder to the exterior of the body

Standard 6

Describe the diseases and disorders of the urinary system

- Describe the causes, signs, symptoms, and treatment of kidney stones.
- Describe the causes, signs, symptoms, and treatment of kidney failure.
- Describe the causes, signs, symptoms, and treatment of urinary tract infections (UTI).

STRAND 6

REPRODUCTIVE SYSTEM-Students will explore aspects of the human reproductive system.

Standard 1

Describe the functions of the reproductive system.

- Explain the production of gametes (egg and sperm) by the gonads.
- Explain the production of hormones to help in the maturation process.

Standard 2

Describe the structures, location and function of the female reproductive system.

- Ovaries, produces and releases the egg (ovulation) and releases estrogen and progesterone.

- Uterine tubes, tube for the eggs to travel to the uterus, most common site for fertilization of the egg
- Uterus, consists of the fundus, body, and cervix, site for menstruation (endometrium), development of the embryo, and expulsion of the fetus
- Vagina, passageway for menstruation, female copulatory organ, birth canal

Standard 3

Describe the structures, location and function of the male reproductive system.

- Testes, produces sperm and testosterone
- Scrotum, encloses and protects the testes and maintains an optimal temperature for sperm production
- Epididymis, storage and maturation of sperm
- Vas Deferens, transportation of sperm
- Prostate gland, secretes alkaline fluid
- Urethra, passageway for sperm and urine

Standard 4

Describe the diseases and disorders of the reproductive system.

- Describe the causes, signs, symptoms, and treatment of endometriosis.
- Describe the causes, signs, symptoms, and treatment of cervical cancer.
- Describe the causes, signs, symptoms, and treatment of benign prostatic hypertrophy.
- Describe the causes, signs, symptoms, and treatment of testicular cancer.
- Describe the causes, signs, symptoms, and treatment of sexually transmitted infections (STI/STD).

STRAND 7

INTRODUCTION-Students will explore the organizational aspects of Healthcare.

Standard 1

Compare and contrast the history of medicine with current trends.

- Describe the contribution(s) to healthcare that the following groups or individuals have made.
 - Egyptians
 - Hippocrates
 - Clara Barton
 - Florence Nightingale
 - William Harvey
 - Joseph Lister
 - Ignas Semmelweis
- Identify current trends in healthcare.

Standard 2

Investigate the various aspects of health insurance.

- Describe health insurance.
 - Premium
 - Copay
 - Deductible
- Compare and contrast government funded healthcare programs and private health insurance.
 - Medicaid
 - Medicare

Standard 3

Summarize basic professional standards and characteristics of healthcare workers.

- Describe proper hygiene of a healthcare worker.

- Handwashing
- Describe proper dress of a healthcare worker.
- Discuss proper behavior in a healthcare setting (honesty, empathy, dependable, life- long learner, and teamwork).

Standard 4

Discuss desirable attitudes and behaviors when providing healthcare to diverse patients.

- Describe how cultural differences impart the delivery of healthcare.
- Describe the importance of treating patients as individuals.

Standard 5

Compare and contrast the health science career pathways.

- Explore careers associated with the Diagnostic Services Pathway. Careers associated with the technology used to aid in the diagnosing of patients.
- Explore careers associated with the Therapeutic Services Pathway. Careers that are associated with direct patient care.
- Explore careers associated with the Health Informatics Pathway. Careers associated with the business side of healthcare.
- Explore careers associated with the Support Services Pathway. Careers that create an environment suitable for patient care.
- Explore careers associated with the Biotechnology Research and Development Pathway. Careers that use science and technology that make improvements in the therapeutic and diagnostic arenas.

Standard 6

Demonstrate knowledge of medical law and medical ethics.

- Differentiate between medical law and medical ethics.
- Describe scope of practice for healthcare workers.
- Explain the importance of expressed consent and implied consent.
- Define legal implications and how they relate to healthcare (battery, invasion of privacy, malpractice/negligence).
- Describe HIPAA with particular emphasis on patient confidentiality and patient records.

Performance Skills

Choose one health science career and create a presentation to explain:

- Education/Training required
- Job description
- Job outlook
- Salary
- Skills
- Working environment
- Certification/licensure

Presentation examples may include, but are not limited to: PowerPoint, poster, oral brochure, HOSA career health display, and video

Performance Skills

Choose one disease/disorder and prepare an oral and/or written report/presentation including the following:

- Signs and symptoms
- Prevalence
- Treatment

- Prevention/Risk reduction

Presentation examples may include, but are not limited to: PowerPoint, poster, oral brochure, display, and video

Workplace Skills

- Communication
- Problem Solving
- Teamwork
- Critical Thinking
- Dependability
- Accountability
- Legal Requirements/expectations

Skill Certification Test Points by Strand

Test Name	Test #	Number of Test Points by Strand										Total Points	Total Questions
		1	2	3	4	5	6	7	8	9	10		