



Health Science 3 - 5552

Human Structure and Function

Course Description:

Health Science 3 acquaints students with basic anatomy and physiology of the human body. Students learn how the human body is structured and the function of each of the 12 body systems. Students will study the relationship that body systems have with disease from the healthcare point of view. This is a very “hands on” course and students will learn through projects and activities in the classroom. Skill procedures and foundation standards are reviewed and integrated throughout the program. Job shadowing is encouraged. This course does not count as a lab science.

General Requirements: This course is recommended for students in grades 11 or 12. Required pre-requisites are: Health Science 1 or Sports Medicine 1. Students are recommended to be First Aid and CPR certified prior to this course. Students should be familiar with general medical terminology as well as technical skills associated with vital signs. (Skills learned in HS2 or SM1). This is the third course in a 4 course sequence for Health Science.

Credit: 1 or 2 unit (s)

Foundation Standards:

Foundation 1: Academic Foundations:

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

1.1 Human Anatomy and Physiology

1.11 Identify basic levels of organization of the human body.

- a. Chemical
- b. Cellular
- c. Tissue
- d. Organs
- e. Systems
- f. Organism

1.12 Identify body planes, directional terms, cavities, and quadrants.

- a. Body planes (sagittal, mid-sagittal, coronal/frontal, transverse/horizontal).

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- b. Directional terms (superior, inferior, anterior/ventral, posterior/dorsal, medial, lateral, proximal, distal, superficial, and deep).
- c. Cavities (dorsal, cranial, spinal, thoracic, abdominal, and pelvic).
- d. Quadrants (upper right, lower right, upper left, and lower left).

1.13 Analyze basic structures and functions of human body systems (skeletal, muscular, integumentary, cardiovascular, lymphatic, respiratory, nervous, special senses, endocrine, digestive, urinary, and reproductive).

- a. Skeletal (bone anatomy, axial and appendicular skeletal bones, functions of bones, ligaments, types of joints)
- b. Muscular (microscopic anatomy of muscle tissue, types of muscle, locations of skeletal muscles, functions of muscles, tendons, directional movements)
- c. Integumentary (layers, structures and functions of skin)
- d. Cardiovascular (components of blood, structures and functions of blood components, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)
- e. Lymphatic (structures and functions of lymphatic system, movement of lymph fluid)
- f. Respiratory (structures and functions of respiratory system, physiology of respiration)
- g. Nervous (structures and functions of nervous tissue and system, organization of nervous system)
- h. Special senses (structures and functions of eye, ear, nose and tongue; identify senses for sight, hearing, smell, taste, touch)
- i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)
- j. Digestive (structures and functions of gastrointestinal tract, chemical and mechanical digestion, structures and functions of accessory organs)
- k. Urinary (structures and functions of urinary system, gross and microscopic anatomy, process of urine formation, urine composition, homeostatic balance)
- l. Reproductive (structures and functions of male and female reproductive systems, formation of gametes, hormone production and effects, menstrual cycle, and conception)

1.2 Diseases and Disorders

1.21 Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).

- a. Etiology
- b. Pathology
- c. Diagnosis
- d. Treatment
- e. Prevention

1.22 Discuss research related to emerging diseases and disorders (such as: autism, VRSA, PTSD, Listeria, seasonal flu).

1.23 Describe biomedical therapies as they relate to the prevention, pathology, and treatment of disease.

- a. Gene testing
- b. Gene therapy
- c. Human proteomics
- d. Cloning
- e. Stem cell research

1.3 Medical Mathematics

1.31 Demonstrate competency in basic math skills and mathematical conversions as they relate to healthcare.

- a. Metric system (such as: centi, milli, kilo)
- b. Mathematical (average, ratios, fractions, percentages, addition, subtraction, multiplication, division)
- c. Conversions (height, weight/mass, length, volume, temperature, household measurements)

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

1.33 Demonstrate use of the 24-hour clock/military time.

2: Foundation 2: Communications: Healthcare professionals will know the various methods of giving and obtaining information. They will communicate effectively, both orally and in writing.

1. Use medical terminology and medical math to communicate information. Oral and written.
2. **Apply** active speaking and listening skills

3: Foundation 3: Systems: Healthcare professionals will understand how their role fits into their department, their organization and the overall healthcare environment. They will identify how key systems affect services they perform and the quality of care.

4: Foundation 4: Employability Skills: Healthcare professionals will understand how employability skills enhance their employment opportunities and job satisfaction. They will demonstrate key employability skills and will maintain and upgrade skills, as needed.

1. **Demonstrate** employability skills (as they apply to hygiene, dress, language, confidentiality, behavior and work ethic)
2. Expand components of a personal **portfolio** (letter of introduction, resume, healthcare project, writing sample, work-based learning, oral presentation, service learning, credentials, technology, and leadership experience).
3. **Participate** in healthcare **work-based learning** experiences (guest speakers, virtual tours, job shadowing, blood drives, community service projects, etc.).

5. Foundation Standard 5: Legal Responsibilities: Healthcare professionals will understand the legal responsibilities, limitations, and implications of their actions within the healthcare delivery setting. They will perform their duties according to regulations, policies, laws, and legislated rights of clients.

1. **Apply** procedures for accurate documentation and record keeping.
2. **Apply** standards for Health Insurance Portability and Accountability Act (**HIPAA**).

6. Foundation Standard 6: Ethics: Healthcare professionals will understand accepted ethical practices with respect to cultural, social, and ethnic differences within the healthcare environment. They will perform quality healthcare delivery.

1. Discuss **bioethical issues** related to disease.
2. **Apply ethical behaviors** in healthcare including personal, professional, and organizational ethics.

3. Apply **procedures for reporting** activities and behaviors that affect health, safety, and welfare of others.

7. Foundation Standard 7: Safety Practices: Healthcare professionals will understand the existing and potential hazards to clients, co-workers, and self. They will prevent injury or illness through safe work practices and follow health and safety policies and procedures.

1. **Demonstrate** principles of infection control using standard precautions in relation to the disease process and prevention.
2. Comply with safety signs, symbols and labels.

8. Foundation Standard 8: Teamwork: Healthcare professionals will understand the roles and responsibilities of individual members as part of the healthcare team, including their ability to promote the delivery of quality healthcare. They will interact effectively and sensitively with all members of the healthcare team.

1. Act responsibly as a team member.

9. Foundation Standard 9: Health Maintenance Practices: Healthcare professionals will understand the fundamentals of wellness and the prevention of disease processes. They will practice preventive health behaviors among the clients.

1. Describe strategies for **prevention of diseases** including health screenings and examinations.
2. **Apply** practices that promote prevention of disease and injury.

10. Foundation Standard 10: Technical Skills: Healthcare professionals will apply technical skills required for all career specialties. They will demonstrate skills and knowledge as appropriate.

1. **Revisit** procedures for **measuring and recording vital signs as you approach the appropriate body system.** (including recognition of normal ranges and understanding what the data means in relation to body systems and disease.)

11. Foundation Standard 11: Information Technology Applications: Healthcare professionals will use information technology applications required within all career specialties. They will demonstrate use as appropriate to healthcare application.

Sample Course Outline

- Instructor/Student expectations - Standards: 2 & 4
- HOSA/Leadership - Standard: 4
- School Safety /Infection control - Standard: 7
- Job Shadowing – Standard: 4
- **Anatomy & Physiology** - Standards: 1, 2, 3, 5, 6, 8, 9, 10, & 11
- Basic Organization (1.1)
- Body Planes/Directions/Cavities (1.12)

- **Basic Structures (1.13)**
- Integumentary System
- Skeletal System
- Muscular System
- Nervous System
- Special Senses
- Circulatory System (integrate pulse and blood pressure skills and parameters Standard 10.1)
- Lymphatic System
- Respiratory System (integrate respiratory skills and parameters Standard 10.1)
- Digestive System
- Urinary System
- Endocrine System
- Reproductive System
- Disease and Disorders (1.2)
 - Emerging Diseases (1.22)
 - Biomedical Therapies (1.23)

4. Medical Math - Standard: 1.3

5. Medical Terminology – Standard 2.2

Resources:

Browse catalog at www.mysctextbooks.com for latest instructional materials available to South Carolina public schools for health science technology courses.

Simmers, Louise. Diversified Health Occupations. Albany, New York: Delmar, latest edition. -----, -----, ---
----: Teacher’s Resource Kit, latest edition.

-----, -----, -----: Workbook, latest edition.

CreativEd Services

<http://www.creativeservices.com/>

“Hands on Body Systems”

<http://www.starlasteachtips.com/bodysystems.html>

Thibodeau, Gary A., and Kevin T. Patton, Structure & Function of the Body. Student Edition, Elsevier, Inc. Mosby and WB Saunders, latest edition.

WEB SITES:

South Carolina Department of Education www.ed.sc.gov

South Carolina Health Science Education Teacher Resource Guide

www.cateresources.net/HSTETeacherResourceGuide/index.html

Health Science Educator Resources www.HealthScienceTeacher.com

National HOSA www.hosa.org

SC HOSA www.schosa.org

National Consortium for Health Science Education

www.healthscienceconsortium.org

American Heart Association

<http://www.americanheart.org/presenter.jhtml?identifier=1200000>

American Journal of Nursing

<http://www.ajn.org/>

American Red Cross

<http://www.redcross.org/>

Annals of Internal Medicine

<http://www.annals.org/>

Anatomy in Clay

<http://www.anatomyinclay.com/>

Be Something Amazing

<http://besomethingamazing.com/>

Body Works: A toolkit for healthy teens and strong families

<http://www.womenshealth.gov/bodyworks/>

Cancer.Net

<http://www.cancer.net/portal/site/patient>

CreativEd Services

<http://www.creativedservices.com/>

“Hands on Body Systems”

<http://www.starlasteachtips.com/bodysystems.html>

JAMA: The Journal of the American Medical Association
Medical Reserve Corps

<http://www.medicalreservecorps.gov/HomePage>

MedicineNet: We Bring Doctors' Knowledge to You (Medical Dictionary)

<http://www.medterms.com/script/main/hp.asp>

MedlinePlus: Trusted Health Information for You

<http://medlineplus.gov/>

Merck: A Global Research-Driven Pharmaceutical Company

<http://www.merck.com/home.html>

JAMA: The Journal of the American Medical Association

<http://jama.ama-assn.org/>

MedicineNet: We Bring Doctors' Knowledge to You (Medical Dictionary)

<http://www.medterms.com/script/main/hp.asp>

Medscape from WebMD

<http://www.medscape.com/>

Medical Math Lesson Plans

<http://cehd.umn.edu/NRCCTE/Math-In/MathHealth.html>

Medical Mysteries on the Web

<http://medmyst.rice.edu/>

Merck: A Global Research-Driven Pharmaceutical Company

<http://www.merck.com/home.html>

National Institutes of Health, Office of Science Education

<http://science.education.nih.gov/lifeworks>

New England Journal of Medicine

<http://content.nejm.org/>

NORD: National Organization for Rare Disorders

<http://www.rarediseases.org/>

North Carolina Association for Biomedical Research

http://www.ncabr.org/biomed/bio_resources/rx.html

OncoLink: Abramson Cancer Center of the University of Pennsylvania
<http://www.oncolink.upenn.edu/>

Physicians' Desk Reference
<http://www.pdr.net/login/Login.aspx>

Pregnancy and Parenting for Today's Mom
<http://parenting.ivillage.com/>

PubMed: A service of the US National Library of Medicine and the National Institutes of Health
<http://www.ncbi.nlm.nih.gov/PubMed>

Reuters Health: The premier supplier of health and medical news
<http://www.reutershealth.com/en/index.html>

RxList: The Internet Drug Index
<http://www.rxlist.com/script/main/hp.asp>

Starla's Creative Teaching Tips
<http://www.starlasteachtips.com/>

States' Career Clusters
www.careerclusters.org

Stay Healthy
<http://www.stayhealthy.com/page/view.sh?id=home>

Texas Health Science
<http://www.texashste.com/>

U.S. Public Health Service
<http://www.usphs.gov/>

Us TOO International Prostate Cancer Education and Support Network
<http://www.ustoo.com/>

Web MD
<http://www.webmd.com/>

Weil (Andrew Weil, MD) Your Trusted Health Advisor
<http://www.drweil.com/>

Wellness Web

<http://www.wellweb.com/>

World Health Online

<http://www.healthy.net/>

Yahoo Health

http://dir.yahoo.com/Health_ADD_~_www.healthscienceconsortium.org