# Healthcare Science

**PROGRAM CONCENTRATION:  Healthcare Science**
**COURSE TITLE:  Middle School Healthcare Science, 7th Grade**

This course provides students with an introduction to several healthcare careers and the safety procedures and interpersonal communication skills required for them. The course will enable students to receive initial exposure to healthcare science skills; attitudes applicable to healthcare including the concepts of health, wellness, and preventative care; and responsibilities of today's healthcare provider. Mastery of skills through project-based learning, technical skills practice, and group activities will provide students with an opportunity to decide if they want to continue this course of study in high school and/or at a post-secondary institution. This course also introduces students to the concepts of teamwork and leadership in healthcare. This course is considered broad-based with high impact. Students will demonstrate mastery via completion of tasks on a performance checklist, role playing of scenarios involving patient-healthcare worker interactions, oral presentations, extemporaneous speaking, or responding to questions based on a medical reading passage.

## SAFETY PRACTICES AND INFECTION CONTROL

**MSHS7-HS-1:  Students will demonstrate the proper implementation of safe work practices to prevent injury or illness.**

   a) Demonstrate the proper use of PPE (personal protective equipment).
   b) Compare and contrast bacteria, viruses, and fungi.
   c) Distinguish the different symbols for biohazardous materials.

## ACADEMIC STANDARDS:

*S7CS2 – Students will use standard safety practices for all classroom laboratory and field investigations.*

*S7CS4 – Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities.*

*S7CS5 – Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.*

*S7CS6 – Students will communicate scientific ideas and activities clearly.*

*M7G3 – Students will use the properties of similarity and apply these concepts to geometric figures.*

*M7G4 – Students will further develop their understanding of three-dimensional figures.*

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## NATIONAL STANDARDS

*7 – 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.*

*7.11 – Apply infection control procedures including standard precautions.*

*7.12 – Compare the different methods of controlling the growth of microorganisms.*

*7.21 – Apply personal safety procedures based on Occupational Safety and Health Administration (OSHA) and Center for Disease Control (CDC) regulations.*

*7.22 – Apply proper use of personal protective equipment (PPE).*

*7.42 – Comply with safety signs, symbols, and labels.*

## HEALTHCARE COMMUNICATIONS

**MSHS7-HS-2:** **Students will effectively communicate orally and in writing, applying knowledge of healthcare science communications.**

   a) Differentiate between verbal and non-verbal communication and evaluate the components and barriers to effective communication.
   b) Interpret basic medical abbreviations selected from JCAHO's (Joint Commission on Accreditation of Healthcare Organizations) recommended abbreviations list.
   c) Analyze and define medical terms utilizing common medical prefixes, suffixes, and word roots.

## ACADEMIC STANDARDS:

*S7CS1 – Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.*

*S7CS6 – Students will communicate scientific ideas and activities clearly.*

*M7G3 – Students will use the properties of similarity and apply these concepts to geometric figures.*

*M7G4 – Students will further develop their understanding of three-dimensional figures.*

*M7P3 – Students will communicate mathematically.*

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## NATIONAL STANDARDS

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

*2.11 – Identify styles and types of verbal and nonverbal communication.*

*2.19 – Use medical terminology to communicate information including data and observations.*

## TEAMWORK AND LEADERSHIP

**MSHS7-HS-3:  The student will describe the attributes of effective teamwork and leadership.**

> a)  Define leadership and state the qualities of a leader.
> b)  Describe Career and Technical Student Organizations and their importance in leadership development, and identify benefits of belonging to Health Occupations Students of America (HOSA).

## ACADEMIC STANDARDS:

*S7CS1 – Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.*

*S7CS7 – Students will communicate scientific ideas and activities clearly.*

## NATIONAL STANDARDS:

*8.12 – Recognize characteristics of effective teams.*

*8.21 – Recognize methods for building positive team relationships.*

*8.23 – Analyze the attributes and attitudes of an effective leader.*

## INTRODUCTION TO RESPIRATORY THERAPY:

**MSHS7-HS-4:  Students will differentiate careers available in the field of respiratory care.**

> a)  Compare and contrast the roles and responsibilities of pulmonologists, certified respiratory therapists, registered respiratory therapists, and pulmonary function technologists, along with their education and training requirements, salary ranges, job outlooks, and facilities in which they work.

b) Identify the parts of the respiratory system and the function of each.
c) Differentiate between respiration and ventilation.
d) Investigate medical conditions that affect the respiratory system.
e) Define the terms oxygen therapy, aerosol therapy (inhalers, nebulizers), hyperinflation (incentive spirometry), chest physical therapy, suctioning, and mechanical ventilation, and describe when each would be required.
f) Sample tasks: Demonstrate at least one of the following:
- Proper placement of an oxygen mask and a nasal cannula on a manikin (e.g., a CPR manikin).
- Proper placement of a stethoscope for the auscultation of the lungs.
- Proper use of an incentive spirometer.

## ACADEMIC STANDARDS:

*S7CS7 – Students will communicate scientific ideas and activities clearly.*

*S7CS4 – Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities.*

*S7CS5 – Students will use the ideas of a system, model, change, and scale in exploring scientific and technological matters.*

*S7CS6 – Students will communicate scientific ideas and activities clearly.*

*S7L2 – Students will describe the structure and function of cells, tissues, organs, and organ systems.*

*ML7P3 – Students will communicate mathematically.*

## NATIONAL STANDARDS:

*1.11 – Classify the basic structural and functional organization of the human body including chemical, cellular, tissue, organ, and system.*

*1.13 – Analyze the interdependence of the basic structures and functions of the human body as they relate to wellness, disease, disorders, therapies, and care/rehabilitation.*

*1.14 – Compare the structure and function of the human body across the lifespan.*

*1.21 – Compare diseases/disorders including respective classification(s), prevention, causes, pathogenesis, diagnoses, therapies, and care/rehabilitation.*

*1.22 – Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease.*

*3.11 – Select appropriate tools for information to be collected.*

*4.31 – Compare potential health science career pathways using a variety of health careers within the diagnostic services, therapeutic services, health informatics services, support services, or biotechnology research and development.*

*4.32 – Recognize levels of education, credentialing requirements, employment opportunities, workplace environments, and career growth potential for a service area.*

### INTRODUCTION TO EMERGENCY SERVICES:

**MSHS7-HS-5: Students will describe the field of pre-hospital emergency care while attaining skills for dealing with emergency situations.**

   a) Compare and contrast the roles and responsibilities of emergency medicine physicians, emergency medical technicians-paramedics (EMTs-paramedic), EMTs-intermediate, EMTs-basic, and first responders, along with their education, training requirements, salary ranges, job outlooks, and facilities in which they work.
   b) Discuss disaster preparedness and emergency management agencies.
   c) Analyze components of scene size-up.
   d) Complete the AHA (American Heart Association) Heartsaver CPR in Schools curriculum or equivalent American Red Cross curriculum.
   e) Complete the AHA Heartsaver First Aid curriculum or equivalent American Red Cross curriculum.

### ACADEMIC STANDARDS:

*S7CS6 – Students will communicate scientific ideas and activities clearly.*

*S7L2 – Students will describe the structure and function of cells, tissues, organs, and organ systems.*

*ML7P3 – Students will communicate mathematically.*

### NATIONAL STANDARDS:

*4.31 – Compare potential health science career pathways using a variety of health careers within the diagnostic services, therapeutic services, health informatics services, support services, or biotechnology research and development.*

*4.32 – Recognize levels of education, credentialing requirements, employment opportunities, workplace environments, and career growth potential for a service area.*

*5.12 – Analyze implications of actions.*

*10.12 – Apply skills to obtain training or certification in Cardiopulmonary Resuscitation (CPR)/Automated External Defibrillator (AED)/Foreign Body Airway Obstruction (FBAO)/First Aid.*

## INTRODUCTION TO MEDICAL LABORATORY TECHNOLOGY:

**MSHS7-HS-6:  Students will assess careers opportunities in the field of medical laboratory technology.**

   a) Compare and contrast the roles and responsibilities of pathologists, medical laboratory technologists, medical laboratory technicians, medical laboratory assistants, and phlebotomists, along with their education, training requirements, salary ranges, job outlooks, and facilities in which they work.
   b) Identify and operate the parts of a microscope.
   c) Distinguish between a red blood cell, white blood cell, and platelet.
   d) Differentiate between arterial, venous, and capillary blood and ways of obtaining each type of sample.
   e) Compare the different types of lab tests.
   f) Sample tasks: Demonstrate at least one of the following:
      - Cleansing the skin in preparation for a capillary puncture.
      - Placing a tourniquet in preparation for a venipuncture.
      - Testing simulated urine using a reagent strip.
      - Measuring specific gravity of simulated urine.
      - Measuring blood sugar (glucose) level using simulated blood and a glucose meter.

## ACADEMIC STANDARDS:

*S7CS2 – Students will use standard safety practices for all classroom laboratory and field investigations.*

*S7CS4 – Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities.*

*S7CS6 – Students will communicate scientific ideas and activities clearly.*

## NATIONAL STANDARDS:

*1.11 – Classify the basic structural and functional organization of the human body including chemical, cellular, tissue, organ, and system.*

*1.35 – Analyze diagrams, charts, graphs, and tables to interpret healthcare results.*

*3.11 – Select appropriate tools for information to be collected*

*4.31 – Compare potential health science career pathways using a variety of health careers within the diagnostic services, therapeutic services, health informatics services, support services, or biotechnology research and development.*

*4.32 – Recognize levels of education, credentialing requirements, employment opportunities, workplace environments, and career growth potential for a service area.*

*7.11 – Apply infection control procedures including standard precautions,*

*7.12 – Compare the different methods of controlling the growth of microorganisms.*

## INTRODUCTION TO BIOTECHNOLOGY SERVICES:

### MSHS7-HS-7:  Students will evaluate career choices in the biotechnology field.

a) Compare and contrast the roles and responsibilities of workers in the field of genetics, biomedical engineering, toxicology, microbiology, and forensics, along with their education, training requirements, salary ranges, job outlooks, and facilities in which they work.
b) Describe computer applications and biomedical devices in healthcare.
c) Explore the structure of DNA and its relationship to the cell.
d) Evaluate forensic techniques.
e) Analyze the benefits of biomedical research.
f) Differentiate the ABO and Rh blood types.
g) Sample tasks – Demonstrate at least one of the following:
  - Separating DNA.
  - Testing of simulated blood for ABO and Rh type.
  - Fingerprinting.
  - Identification of bacteria.
  - Researching and debating a selected bioethical issue.
  - Creation or interpretation of a pedigree chart showing the inheritance of a genetic disease.

## ACADEMIC STANDARDS:

*S7CS2 – Students will use standard safety practices for all classroom laboratory and field investigations.*

*S7CS4 – Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities.*

*S7CS6 – Students will communicate scientific ideas and activities clearly.*

*S7L3 – Students will recognize how biological traits are passed on to successive generations.*

*M7D1 – Students will pose questions, collect data, represent and analyze the data, and interpret results.*

*M7G3 – Students will use the properties of similarity and apply these concepts to geometric figures.*

## NATIONAL STANDARDS:

*1.22 – Investigate biomedical therapies as they relate to the prevention, pathology, and treatment of disease.*

*1.35 – Analyze diagrams, charts, graphs, and tables to interpret healthcare results.*

*4.31 – Compare potential health science career pathways using a variety of health careers within the diagnostic services, therapeutic services, health informatics services, support services, or biotechnology research and development.*

*4.32 – Recognize levels of education, credentialing requirements, employment opportunities, workplace environments, and career growth potential for a service area.*

*6.14 – Recognize ethical issues and their implications related to healthcare.*

## READING STANDARD COMMENT:

After the elementary years, students are seriously engaged in reading for learning. This process sweeps across all disciplinary domains, extending even to the area of personal learning. Students encounter a variety of informational as well as fictional texts, and they experience text in all genres and modes of discourse. In the study of various disciplines of learning (language arts, mathematics, science, social studies), students must learn through reading the communities of discourse of each of those disciplines. Each subject has its own specific vocabulary, and for students to excel in all subjects, they must learn the specific vocabulary of those subject areas *in context.*

Beginning with the middle grade years, students begin to self-select reading materials based on personal interests established through classroom learning. Students become curious about science, mathematics, history, and literature as they form contexts for those subjects related to their personal and classroom experiences. As students explore academic areas through reading, they develop favorite subjects and become confident in their verbal discourse about those subjects.

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Reading across curriculum content develops both academic and personal interests in students. As students read, they develop both content and contextual vocabulary. They also build good habits for reading, researching, and learning. The Reading Across the Curriculum standard focuses on the academic and personal skills students acquire as they read in all areas of learning.

**CTAEMRC-1:  Students will enhance reading in all curriculum areas by:**

a. Reading in all curriculum areas.
   - Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.
   - Read both informational and fictional texts in a variety of genres and modes of discourse.
   - Read technical texts related to various subject areas.

b. Discussing books.
   - Discuss messages and themes from books in all subject areas.
   - Respond to a variety of texts in multiple modes of discourse.
   - Relate messages and themes from one subject area to messages and themes in another area.
   - Evaluate the merit of texts in every subject discipline.
   - Examine author's purpose in writing.
   - Recognize the features of disciplinary texts.

c. Building vocabulary knowledge.
   - Demonstrate an understanding of contextual vocabulary in various subjects.
   - Use content vocabulary in writing and speaking.
   - Explore understanding of new words found in subject area texts.

d. Establishing context.
   - Explore life experiences related to subject area content.
   - Discuss in both writing and speaking how certain words are subject area related.
   - Determine strategies for finding content and contextual meaning for unknown words.

## WRITING:

The student writes clear, coherent text. The writing shows consideration of the audience and purpose. The student progresses through the stages of the writing process (e.g., prewriting, drafting, revising, and editing successive versions).

**CTAEW-1:  The student demonstrates competence in a variety of genres.**

The student produces technical writing (business correspondence: memoranda, emails, letters of inquiry, letters of complaint, instructions and procedures, lab reports, slide presentations) that:

a) Creates or follows an organizing structure appropriate to purpose, audience, and context.
b) Excludes extraneous and inappropriate information.

c) Follows an organizational pattern appropriate to the type of composition.
d) Applies rules of Standard English.

## CTAEW-2:  The student uses research and technology to support writing.

The student:

a) Identifies topics, asks and evaluates questions, and develops ideas leading to inquiry, investigation, and research.
b) Uses organizational features of electronic text (e.g., bulletin boards, databases, keyword searches, e-mail addresses) to locate relevant information.
c) Includes researched information in different types of products (e.g., compositions, multimedia presentations, graphic organizers, projects, etc.).
d) Uses appropriate structures to ensure coherence (e.g., transition elements).
e) Supports statements and claims with anecdotes, descriptions, facts and statistics, and specific examples.
f) Gives credit for both quoted and paraphrased information in a bibliography by using a consistent and sanctioned format and methodology for citations.

## CTAEW-3:  The student consistently uses the writing process to develop, revise, and evaluate writing.

The student:

a) Plans and drafts independently and resourcefully.
b) Uses strategies of note taking, outlining, and summarizing to impose structure on composition drafts.
c) Edits writing to improve word choice after checking the precision of the vocabulary.

## ENTREPRENEURSHIP:

## MKT-EN-1: Understands concepts and processes associated with successful entrepreneurial performance.

a) Define entrepreneurship.
b) Identify and analyze characteristics of a successful entrepreneur.
c) Identify the reasons for planning in entrepreneurial businesses.
d) Discuss the entrepreneurial discovery processes.
e) Assess global trends and opportunities.
f) Determine opportunities for business creation.
g) Generate ideas for business.
h) Determine feasibility of ideas.
i) Determine the major reasons for business failure.

## ACADEMIC STANDARDS:

*ELA8W1 – The student produces writing that establishes an appropriate organizational structure, sets a context and engages the reader, maintains a coherent focus throughout, and signals a satisfying closure.*

*ELA8W3 – The student uses research and technology to support writing.*

*SSEF6 – The student will explain how productivity, economic growth and future standards of living are influenced by investment in factories, machinery, new technology and the health, education and training of people.*

*SSEIN1 – The student will explain why individuals, businesses and governments trade goods and services.*

## MKT-EN-2: Explain the fundamental concepts of business ownership.

a) Determine the relationship of competition to our private, free enterprise system.
b) Explain the effects of competition on buyers and sellers.
c) Identify the common types of business ownership.
d) Compare and contrast the advantages and disadvantages of each type of ownership.
e) Explain relevant government regulations relating to the operation of a business.
f) Discuss the types of risks that businesses encounter.
g) Explain how businesses deal with the various types of risks.
h) Identify the market segment for the business.
i) Formulate a marketing mix designed to reach a specific market segment.
j) Utilize the marketing functions to determine the competitive advantage of the proposed business.

## ACADEMIC STANDARDS:

*ELA8W1 – The student produces writing that establishes an appropriate organizational structure, sets a context and engages the reader, maintains a coherent focus throughout, and signals a satisfying closure.*

*ELA8W3 – The student uses research and technology to support writing.*

*SSEF5 – The student will describe the roles of government in a market economy.*

## CTAE FOUNDATION SKILLS:

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that students pursuing any career pathway should exhibit to be successful. As core

standards for all career pathways in all program concentrations, these skills link career, technical and agricultural education to the state's academic performance standards.

The CTAE Foundation Skills are aligned to the foundation of the U.S. Department of Education's 16 Career Clusters. Endorsed by the National Career Technical Education Foundation (NCTEF) and the National Association of State Directors of Career Technical Education Consortium (NASDCTEc), the foundation skills were developed from an analysis of all pathways in the sixteen occupational areas. These standards were identified and validated by a national advisory group of employers, secondary and postsecondary educators, labor associations, and other stakeholders. The Knowledge and Skills provide learners a broad foundation for managing lifelong learning and career transitions in a rapidly changing economy.

**CTAE-FS-1 Technical Skills:** Learners achieve technical content skills necessary to pursue the full range of careers for all pathways in the program concentration.

**CTAE-FS-2 Academic Foundations:** Learners achieve state academic standards at or above grade level.

**CTAE-FS-3 Communications:** Learners use various communication skills in expressing and interpreting information.

**CTAE-FS-4 Problem Solving and Critical Thinking:** Learners define and solve problems, and use problem-solving and improvement methods and tools.

**CTAE-FS-5 Information Technology Applications:** Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

**CTAE-FS-6 Systems:** Learners understand a variety of organizational structures and functions.

**CTAE-FS-7 Safety, Health and Environment:** Learners employ safety, health and environmental management systems in corporations and comprehend their importance to organizational performance and regulatory compliance.

**CTAE-FS-8 Leadership and Teamwork:** Learners apply leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.

**CTAE-FS-9 Ethics and Legal Responsibilities:** Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

**CTAE-FS-10 Career Development:** Learners plan and manage academic-career plans and employment relations.

**CTAE-FS-11 Entrepreneurship:** Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.