

# MANCHESTER REGIONAL HIGH SCHOOL

Medical Science I

Adopted:

Revised:

**Manchester Regional High School Board of Education**

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# **Manchester Regional High School District Mission Statement**

*The mission of Manchester Regional High School is to produce respectful, responsible and well-rounded graduates who possess the knowledge and skills to become contributing members of society and life-long learners.*

*Highly qualified, collaborative and innovative staff address the needs of a diverse school community in a stimulating and nurturing environment.*

## MANCHESTER REGIONAL HIGH SCHOOL

### COURSE DESCRIPTION: Medical Science I

Medical Science 1 is a one-year course offered to students in grades 10-12. The objective of this course is to provide to the student a basic understanding of the fundamental practice of medicine and its various disciplines. The student receives a general background in the use of technology in medicine. Topics covered include: Health care terminology, introduction to anatomy and physiology, study of pathology, study of cancer, integumentary system, skeletal system, muscular system, nervous system and cardiovascular system. Student reports and projects will require technological components.

### COURSE DATA:

This guide is intended as a description of the Medical Science I course, which is to be offered as an elective course for 10<sup>th</sup> - 12<sup>th</sup> grade students at Manchester Regional High School. The course is designed for the student who has successfully completed a one-year course in Geophysical science. The individual attempting this course should be interested in furthering their knowledge of the health care industry and the human body and the impact of diseases.

Length of course: Full year

Credits: Five

Periods per week: Five

Classification: Grade 10-12

Prerequisite: Geophysical Science – Grade of “C” or better

### EVALUATION:

The purposes of evaluation are to provide information about student progress and to determine whether students have learned the subject matter, which has been taught. Teachers will evaluate student progress by utilizing teacher-made quizzes and tests, oral questioning, class participation. Other evaluative criteria will include homework, special projects, special exams and other school records.

**NOTE:** The following pacing guide was developed during the creation of these curriculum units. The actual implementation of each unit may take more or less time. Time should also be dedicated to preparation for benchmark assessments, and analysis of student results on the same. A separate document is included at the end of this curriculum guide with suggestions and resources related to State Assessments (if applicable). It is highly recommended that teachers meet throughout the school year to coordinate their efforts in implementing the curriculum and preparing students for benchmark assessments in consideration of both the School and District calendar.

## Standards:

**HS-LS1-1** - Explain the connection between the sequence and the subcomponents of a biomolecule and its properties.

**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-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.

**Manchester Regional High School Curriculum Guide**

**Content Area: Science**

**Course Title: Medical Science I**

**Grade Level: 10-12**

**All units require the use of the Promethean Board.**

**All research projects require the use of Chromebooks.**

**Unit 1: Introduction to Medical Terminology**

**4 Weeks**

**Unit 2: Organization of the Human Body**

**4 Weeks**

**Unit 3: Understanding Infectious Disease**

**6 Weeks**

**Unit 4: What is Cancer?**

**6 Weeks**

**Unit 5: Coverings, Support, and Movement**

**10 Weeks**

**Unit 6: Regulation of the Body**

**6 Weeks**

**Board Approved on:**

<b>Unit 1 Overview</b>	
<b>Content Area – Science</b>	
<b>Unit 1 Title – Introduction to Medical Terminology</b>	
<b>Target Course/Grade Level – Medical Science 1/ 10<sup>th</sup> -12<sup>th</sup> Grade</b>	
<b>Unit Summary and Rationale</b> – Students will be able to identify, define, and describe the use of medical terminology necessary to work in the health care industry. Examine the construction of common medical terms used in the medical environment by defining certain prefixes, suffixes, and roots. Understand the techniques used to combine terms and their meanings.	
<b>Interdisciplinary Connections</b> – Science and Language Arts: journal writing; open-ended extended response questions.	
<b>21<sup>st</sup> Century Themes</b> – Health Literacy; Media Literacy; Information Literacy	<b>21<sup>st</sup> Century Skills</b> – Creativity/Innovation Critical Thinking/Problem Solving Life & Career Skills
<b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>• How does anatomy relate to physiology?</li> <li>• Why is homeostasis so important?</li> <li>• What is medical terminology and why is it used?</li> <li>• How does structure of the body’s organs relate to their functions?</li> <li>• How is a disorder or disease defined?</li> <li>• What is normal as it relates to homeostasis?</li> </ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>• The human body has many structural and functional levels.</li> <li>• Medical terminology is essential to the field of health care because it is a universal language.</li> </ul>

<b>Learning Targets</b>	
<b>Unit Proficiencies</b> After completing this unit of study, the student will be able to: <ul style="list-style-type: none"> <li>• The meanings of common medical terms, how to construct them, and how to deconstruct them.</li> <li>• Identify and define medical terms</li> <li>• Create and construct medical terms</li> <li>• Relate homeostasis to the overall health of the human body.</li> </ul>	<b>Next Generation Science Standards</b> HS-LS1-1 HS-LS1-2 HS-LS1-3

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**Labs and Projects**

**All labs require the use of the Chromebooks**

Name of lab/project. <ul style="list-style-type: none"><li>• Interactive computer software</li></ul>	<b>Practice Standards</b> HS-LS1-2 HS-LS1-3
	<b>Resources Required</b> computers
Name of lab/project. <ul style="list-style-type: none"><li>• Construct medical scenario paragraph using medical terminology</li></ul>	<b>Practice Standards</b> HS-LS1-2 HS-LS1-3
	<b>Resources Required</b> computers

<b>Unit 2 Overview</b>	
<b>Content Area – Science</b>	
<b>Unit 1 Title</b> – Organization of the Human Body	
<b>Target Course/Grade Level – Medical Science 1/ 10<sup>th</sup> -12<sup>th</sup> Grade</b>	
<b>Unit Summary and Rationale</b> – An introduction to human anatomy and physiology through which students will learn the basic structures and functions of the systems of the human body and the importance of maintaining homeostasis.	
<b>Interdisciplinary Connections</b> – Science and Language Arts: journal writing; open-ended extended response questions.	
<b>21<sup>st</sup> Century Themes</b> – Health Literacy; Media Literacy; Information Literacy	<b>21<sup>st</sup> Century Skills</b> – Creativity/Innovation Critical Thinking/Problem Solving Life & Career Skills
<b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>• How does anatomy relate to physiology?</li> <li>• Why is homeostasis so important?</li> <li>• What is the necessity of learning the language of anatomy?</li> <li>• What are the levels of organization?</li> <li>• What is the difference between active and passive transport?</li> <li>• What is homeostasis and how do all 11 systems in the human body work to maintain this?</li> </ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>• The human body has many structural and functional levels.</li> <li>• Each system within the human body interacts to maintain a balance.</li> </ul>

<b>Learning Targets</b>	
<b>Unit Proficiencies</b>  After completing this unit of study, the student will be able to: <ul style="list-style-type: none"> <li>• Identify and define structures and functions of each of the 11 body systems</li> <li>• Define homeostasis and relate its importance to the normal functions of the human body.</li> <li>• Describe the occurrence of disorders and diseases as they relate to the imbalance of homeostasis.</li> </ul>	<b>Next Generation Science Standards</b> HS-LS1-1 HS-LS1-2 HS-LS1-3

**Labs and Projects**

**All labs require the use of the Chromebooks**

Name of lab/project. <ul style="list-style-type: none"><li>• Interactive computer software</li></ul>	<b>Practice Standards</b> HS-LS1-2
	<b>Resources Required</b> computers
Name of lab/project. <ul style="list-style-type: none"><li>• Work in groups to prepare a Power point to define the structures and functions within a system. Share the information with the class through a presentation.</li></ul>	<b>Practice Standards</b> HS-LS1-2 HS-LS1-3
	<b>Resources Required</b> computers

<b>Unit 3 Overview</b>	
<b>Content Area – Science</b>	
<b>Unit 1 Title – Understanding Infectious Disease</b>	
<b>Target Course/Grade Level – Medical Science 1/ 10<sup>th</sup> -12<sup>th</sup> Grade</b>	
<b>Unit Summary and Rationale</b> – This unit will provide students with an understanding of the modes in which diseases are transmitted and the five common pathogens. The students will be aware of how the body defends against disease and different ways infection can be controlled. Understand steps followed by physicians to aid in the diagnosis of disease and common diagnostic and laboratory tests used.	
<b>Interdisciplinary Connections</b> – Science and Language Arts: journal writing; open-ended extended response questions.	
<b>21<sup>st</sup> Century Themes</b> – Health Literacy; Media Literacy; Information Literacy	<b>21<sup>st</sup> Century Skills</b> – Creativity/Innovation Critical Thinking/Problem Solving Life & Career Skills
<b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>• What is an infectious disease and how is it transmitted?</li> <li>• What prevention techniques are most effective?</li> <li>• How do doctors diagnose diseases?</li> <li>• What are the benefits of living in an industrialized nation in relation to health?</li> </ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>• The importance of living a healthy lifestyle.</li> <li>• The different types of pathogens which cause disease and the means by which they operate,</li> <li>• The mechanisms of immunity in response to a vaccine.</li> </ul>

<b>Learning Targets</b>	
<b>Unit Proficiencies</b> After completing this unit of study, the student will be able to: <ul style="list-style-type: none"> <li>• The human body has many defenses against disease</li> <li>• The importance of washing hands and receiving inoculations as it relates to the prevention of disease.</li> <li>• The diagnosis of disease is based on a step by step process with the additional use of advanced techniques if necessary.</li> <li>• Identify and define common infectious diseases and their portals of entry</li> <li>• Outline the steps of diagnosis and types of techniques used.</li> <li>• Describe how the body defends itself against a pathogen</li> </ul>	<b>Next Generation Science Standards</b> HS-LS1-1 HS-LS1-2 HS-LS1-3

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**Labs and Projects**

**All labs require the use of the Chromebooks**

Name of lab/project. "Most Wanted" : Create a poster to describe the characteristics of a bacteria and the disease it causes	<b>Practice Standards</b> HS-LS1-2
	<b>Resources Required</b> Poster paper Scissors Glue computers
Name of lab/project. Lab - The effects of hand washing on bacterial growth	<b>Practice Standards</b> HS-LS1-2 HS-LS1-3
	<b>Resources Required</b> Sterile plates Agar Q-tips
Name of lab/project. Create a concept map to organize the material concerning infectious diseases	<b>Practice Standards</b> HS-LS1-1
	<b>Resources Required</b> Computers
Name of Lab/Project: Relate knowledge to real world implications of diseases through a video	<b>Practice Standards</b> HS-LS1-1
	<b>Resources Required</b> Rx for Survival video

<b>Unit 4 Overview</b>	
<b>Content Area – Science</b>	
<b>Unit Title – What is Cancer?</b>	
<b>Target Course/Grade Level – Medical Science 1/ 10<sup>th</sup> -12<sup>th</sup> Grade</b>	
<b>Unit Summary and Rationale</b> – An introduction to understanding the steps in development of a malignant tumor and the regulatory control of cancer. This unit will enable the students to distinguish between types of cancers and the causes of cancer. Students will understand the symptoms, diagnosis techniques, and treatments of various cancer types.	
<b>Interdisciplinary Connections</b> – Science and Language Arts: journal writing; open-ended extended response questions.	
<b>21<sup>st</sup> Century Themes</b> – Health Literacy; Media Literacy; Information Literacy	<b>21<sup>st</sup> Century Skills</b> – Creativity/Innovation Critical Thinking/Problem Solving Life & Career Skills
<b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>• What is cancer and how is it preventable?</li> <li>• How does cancer develop and how is it treated?</li> <li>• What are the signs and symptoms of common types of cancers?</li> <li>• What is the importance of maintaining a healthy lifestyle?</li> <li>• What breakthrough was made by Dr. Judah Folkman which changed the way some cancers are treated?</li> <li>• What are some current technologies and treatments in the news today?</li> </ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>• Some cancers are preventable</li> <li>• Cancer can be genetic and take years to develop</li> <li>• Lifestyle choices play a major role in the development of cancer</li> </ul>

<b>Learning Targets</b>	
<b>Unit Proficiencies</b> After completing this unit of study, the student will be able to: <ul style="list-style-type: none"> <li>• Identify the importance of a healthy lifestyle to prevent cancer</li> <li>• Describe the steps involved in the development of a malignant tumor</li> <li>• Describe treatments available for cancer and how they work</li> <li>• Identify and define the different types of cancers</li> </ul>	<b>Next Generation Science Standards</b> HS-LS1-1 HS-LS1-2 HS-LS1-3

<ul style="list-style-type: none"> <li>• Define the steps involved in the development of cancer.</li> <li>• Describe the impact of the research performed by Judah Folkman and how it changed the treatment of some cancers.</li> </ul>	
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<b>Labs and Projects</b> <b>All labs require the use of the Chromebooks</b>	
Name of lab/project. Chemotherapy Drug Dosage	<b>Practice Standards</b> HS-LS1-2
	<b>Resources Required</b> Liver solution Peroxide Balloons Test tubes Stop watches
Name of lab/project. PSA: Cancer Poster	<b>Practice Standards</b> HS-LS1-2 HS-LS1-3
	<b>Resources Required</b> Poster Markers Computers
Name of lab/project. Cancer warriors	<b>Practice Standards</b> HS-LS1-1
	<b>Resources Required</b> Movie analysis Promethean Board

<b>Unit 5 Overview</b>	
<b>Content Area – Science</b>	
<b>Unit 5 – Coverings, Support, and Movement</b>	
<b>Target Course/Grade Level – Medical Science 1/ 10<sup>th</sup> -12<sup>th</sup></b>	
<p><b>Unit Summary and Rationale</b> – This unit will cover the basic structures and functions of the integumentary, skeletal, and muscular systems, the composition of skin, its tissues and structures.</p> <p>Students will learn the functions of skin and differentiate between types of fingerprints. Learn the bones of the axial and appendicular skeletons. Study the function of muscles and relate it to exercise. Integrate understanding of muscles and skeleton to explain movement.</p>	
<p><b>Interdisciplinary Connections</b> – Science and Language Arts: journal writing; open-ended extended response questions.</p>	
<p><b>21<sup>st</sup> Century Themes</b> – Health Literacy; Media Literacy; Information Literacy</p>	<p><b>21<sup>st</sup> Century Skills</b> – Creativity/Innovation Critical Thinking/Problem Solving Life &amp; Career Skills</p>
<p><b>Unit Essential Questions</b></p> <ul style="list-style-type: none"> <li>• What structures comprise the skin?</li> <li>• What are types of fingerprints?</li> <li>• What factors determine skin color and skin cancers?</li> <li>• How does the study of the structure and function of bones and muscles help us understand the complexity of the human’s ability to produce such precise movement?</li> <li>• What information can we learn by studying the dysfunction of the skeletal and muscular systems to help us in future choices to keep these systems healthy?</li> </ul>	<p><b>Unit Enduring Understandings</b></p> <ul style="list-style-type: none"> <li>• Skin functions include protection from many factors</li> <li>• The effect different factors have on the occurrence of aging and cancers.</li> <li>• Skeletal System provides a framework for all vital organs of the body. It serves as areas for muscle attachment, articulation of joints for movement, storage of substances for blood cell formation and enables continuity of life.</li> <li>• The structure and function of the skeletal and muscular system do not work independently of each other but have a relationship with other systems in the human body.</li> <li>• Our ability to move requires a complex interaction and is subject to different types of injuries.</li> </ul>

## Learning Targets

### Unit Proficiencies

After completing this unit of study, the student will be able to:

- The major structures and functions of the skin
- Factors that affect the health of skin
- How the structure of bone relates to its function
- How to describe how the bones provide a lever system and the various types of joints and movements that they can provide
- How different types of injuries occur and are treated in muscle and bone
- Identify the structures and functions of the integumentary system
- Understand the importance of maintaining the health of the integumentary system.
- Identify most of the bones of the skeletal system
- Describe the function(s) of the skeletal system.
- Compare the function of tendons, ligaments, and cartilage.
- Describe injuries of the bones and muscles.
- Identify types of fingerprints patterns and hair anatomy.

### Next Generation Science Standards

HS-LS1-1

HS-LS1-2

HS-LS1-3

## Labs and Projects

**All labs require the use of the Chromebooks**

Name of lab/project. <ul style="list-style-type: none"><li>Who's the Criminal? Fingerprint lab employing various techniques to develop and compare prints</li></ul>	<b>Practice Standards</b> HS-LS1-2
	<b>Resources Required</b> Microscope slides Dusting powders Fingerprint tape Cyanoacrylate Spoons Plastic containers Iodine crystals
Name of lab/project. <ul style="list-style-type: none"><li>Identification of Hair - to compare animal and human hair</li></ul>	<b>Practice Standards</b> HS-LS1-2 HS-LS1-3
	<b>Resources Required</b> Microscopes Microscope slides Mounting solution
Name of lab/project. <ul style="list-style-type: none"><li>Dem Bones</li></ul>	<b>Practice Standards</b> HS-LS1-1
	<b>Resources Required</b> Scissors Glue Print outs of skeletons
Name of lab/project. <ul style="list-style-type: none"><li>Chicken wing dissection lab</li></ul>	<b>Practice Standards</b> HS-LS1-3
	<b>Resources Required</b> Dissection tools Chicken wings

<b>Unit 6 Overview</b>	
<b>Content Area – Science</b>	
<b>Unit 6 Title</b> – Regulation of the Body	
<b>Target Course/Grade Level</b> –Medical Science/10 <sup>th</sup> -12 <sup>th</sup>	
<p><b>Unit Summary and Rationale</b> – This unit will provide students with an understanding of the integration and interrelation of the nervous system with all other body systems. They will become aware of how the nervous system is an integral part of comprehending how the body functions as a whole and how these control mechanisms provide necessary adjustments to meet the changing internal and external environmental conditions of the body. Each component of blood and its function will be examined. An examination of the structures and functions of the heart will be discussed. The organs of the digestive system will be outlined and nutrition and metabolism will be discussed.</p>	
<p><b>Interdisciplinary Connections</b> – Science and Language Arts: journal writing; open-ended extended response questions.</p>	
<p><b>21<sup>st</sup> Century Themes</b> – Health Literacy; Media Literacy; Information Literacy</p>	<p><b>21<sup>st</sup> Century Skills</b> – Creativity/Innovation Critical Thinking/Problem Solving Life &amp; Career Skills</p>
<p><b>Unit Essential Questions</b></p> <ul style="list-style-type: none"> <li>• How does the nervous system control all systems of the human body?</li> <li>• Why is blood essential to the body?</li> <li>• How is blood circulated throughout the body?</li> <li>• How does the digestive system provide the body with the organic molecules necessary to fuel the body’s cells and provide the building blocks for cell growth and repair?</li> <li>• Why is eating healthy important?</li> </ul>	<p><b>Unit Enduring Understandings</b></p> <ul style="list-style-type: none"> <li>• Blood supplies all cells in the body with nutrients and removes waste.</li> <li>• The heart is the pump that cycles the blood through the body and to the lungs .</li> <li>• Circulatory physiology including blood pressure and the effect of exercise on circulatory function.</li> <li>• All living organisms must obtain nutrients from their environment to sustain life. These substances are used as raw materials for synthesizing essential compounds or are decomposed to provide the energy that cells need to continue functioning.</li> <li>• The importance of eating healthy.</li> </ul>

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**Learning Targets**

**Unit Proficiencies**

After completing this unit of study, the student will be able to:

- Describe the major structures and functions of the brain.
- Identify the parts of a neuron.
- Describe the structure and function of blood, including the cell types comprising the formed elements and its importance in the body.
- Identify how to differentiate between the ABO and Rh blood groups.
- Describe the location of the heart in the body and identify its major anatomical structures and functions.
- Trace the pathway of blood through the heart.
- Factors that affect the health of the essential needs of the body
- Discuss the interrelationships among the nervous system and other organ systems.
- Describe the digestion and absorption of carbohydrates, lipids and proteins.
- Analyze the factors that affect the health and the essential needs of the body

**Next Generation Science Standards**

HS-LS1-1  
HS-LS1-2  
HS-LS1-3

## Labs and Projects

**All labs require the use of the Chromebooks**

Name of lab/project. <ul style="list-style-type: none"><li>• Create a neuron and a brain model</li></ul>	<b>Practice Standards</b> HS-LS1-2
	<b>Resources Required</b> Clay Pipe cleaners beads
Name of lab/project. <ul style="list-style-type: none"><li>• “A Day in the Life Of...” – Research journal reflecting living with a psychiatric or neurological disorder</li></ul>	<b>Practice Standards</b> HS-LS1-2 HS-LS1-3
	<b>Resources Required</b> Computers
Name of lab/project. <ul style="list-style-type: none"><li>• Blood Pressure and pulse rate measurements</li></ul>	<b>Practice Standards</b> HS-LS1-1
	<b>Resources Required</b> Stethoscopes Blood pressure cuffs Stopwatches
Name of lab/project. <ul style="list-style-type: none"><li>• “Murder and the Meal” Lab</li></ul>	<b>Practice Standards</b> HS-LS1-3
	<b>Resources Required</b> Benedict’s solution Biuret solution Food slurry prep Blender Test tubes Water bath Scales

**Diverse Learners (ELL, Special Ed, Gifted & Talented)**- Differentiation strategies may include, but are not limited to, learning centers and cooperative learning activities in either heterogeneous or homogeneous groups, depending on the learning objectives and the number of students that need further support and scaffolding, versus those that need more challenge and enrichment. Modifications may also be made as they relate to the special needs of students in accordance with their Individualized Education Programs (IEPs) or 504 plans, or English Language Learners (ELL). These may include, but are not limited to, extended time, copies of class notes, refocusing strategies, preferred seating, study guides, and/or suggestions from special education or ELL teachers.