

Content Area: Science

Course Title: Anatomy & Physiology

Grade Level: 11-12

Unit Plan 1

The Human Organism

Unit Plan 2

Homeostasis: the Endocrine & Reproductive Systems

Unit Plan 3

Histology

Unit Plan 4

Musculoskeletal System

Unit Plan 5

Cardiovascular & Respiratory Systems

Unit Plan 6

Gastrointestinal system

Unit Plan 7

Nervous System

Unit Plan 8

Exercise Physiology

Date Created: April,11, 2011

Board Approved: _____

Unit Overview

Content Area: Anatomy & Physiology

Unit Title: The Human Organism

Target Course/Grade Level: 11-12

Unit Summary

This unit is designed to gain introductory knowledge of the organization of anatomy and physiology that can be used to describe the body's responses to stimuli when healthy or diseased. Students will learn the terminology of medicine and the structural and functional organization of the body.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st Century Themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at www.njcccs.org.

Learning Targets

CPI

5.1.12.A.1-3	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The Four Science Practice Strands encompass the knowledge and reasoning skills that students must acquire to be proficient in service.
5.1.12.D.2	Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams.
5.3.12.A.3	Predict a cell's response in a given set of environmental conditions.
5.3.12.A.6	Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions (e.g., diabetes, cystic fibrosis, lactose intolerance).

Unit Essential Questions

- What is the importance of understanding the relationship between structure and function of the body?
- Why are anatomical positions and directional terms an important aspect of understanding the human body?

Unit Enduring Understandings

Students will understand that...

- Living systems, from the organism to the cellular level, demonstrate the complementary nature of structure and function.
- Anatomy describes the structure of the body; physiology describes the function of the body.
- The position of the body can affect the description of the body parts in relation to one another.

Unit Objectives

Students will know...

- Vocabulary and key terms
- Levels of organization in the body
- 11 systems of the body
- Laboratory safety procedures

Unit Objectives

Students will be able to...

- Label a diagram of the human body using directional terms
- Identify planes of the body using MRI's
- Describe the functions and major structures of each of the body systems
- Identify and describe the anatomy and physiology of the major structures of the body systems using a preserved rat

Formative Assessments

For additional ideas please refer to NJ State DOE classroom application documents:

<http://njcccs.org/CADDownload.aspx>

- Observation
- Homework
- Class participation
- Laboratory oral quizzes
- Whiteboards
- Laboratories/Lab Reports
- Graphing & diagrams
- Writing Assignments

Summative Assessments

For additional ideas please refer to NJ State DOE Professional Education Port (PEP):

<http://www.state.nj.us/education/njpep/index.html>

- Chapter/Unit Test
- Writing Assignments
- Laboratory Practical
- Unit Projects
- Quarterly Exams

Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction
- Native language texts and native language to English dictionary
- Follow all IEP modifications/504 plan

Curriculum development Resources/Instructional Materials/Equipment Needed Teacher Resources:

- *Textbook*
- *Laboratory manuals, equipment & specimens*
- *Class Website*
- *Science Websites*

<http://educatus.com//main/samples/default.asp?lid=801486&scid=8014860000>

<http://njcccs.org>

Unit Overview

Content Area: Anatomy & Physiology

Unit Title: Homeostasis: The Endocrine & Reproductive Systems

Target Course/Grade Level: 11-12

Unit Summary

This unit will provide students with a working knowledge of the importance and maintenance of homeostasis. Examples of homeostasis and negative and positive homeostatic feedback will be taught using the endocrine system. Students will investigate normal and abnormal insulin responses and using preserved specimens learn the positive feedback mechanisms driving human ovulation.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st Century Themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at www.njcccs.org.

Learning Targets

Content Standards

CPI #	Cumulative Progress Indicator (CPI)
5.1.12.A.1-3	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The Four Science Practice Strands encompass the knowledge and reasoning skills that students must acquire to be proficient in service.
5.1.12.D.2	Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams.
5.1.12.D.3	Demonstrate how to use scientific tools and instruments and knowledge of how to handle animals with respect for their safety and welfare.
5.3.12.A.3	Predict a cell's response in a given set of environmental conditions.
5.3.12.A.6	Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions (e.g., diabetes, cystic fibrosis, lactose intolerance).

Unit Essential Questions

- How is homeostasis maintained?
- How do negative and positive feedback mechanisms differ?

Unit Enduring Understandings

Students will understand that...

- Normal cell function depends on the maintenance of the cells' fluid environment.
- Normal homeostatic control of blood glucose requires multiple hormones.
- Ovulation is an example of positive feedback that is beneficial to the human organism

<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • Vocabulary and key terms • Laboratory safety procedures • Homeostasis and negative and positive feedback systems • Differences between lipid and protein hormones • Basics of hormonal regulation of the female reproductive system 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Describe the how the mechanisms for inducing responses in different target tissues differ between lipid and protein hormones • Explain how a single hormone can have opposite responses in different target tissues. • Be able to graph the normal blood glucose response throughout the day • Describe the anatomy and physiology of the human ovary • Explain why, using the hormonal cascade of the human ovary and the life cycle of the human sperm, there is no “safe” time to have unprotected sex

Formative Assessments

For additional ideas please refer to NJ State DOE classroom application documents:

<http://njcccs.org/CADDownload.aspx>

- Observation
- Homework
- Class participation
- Laboratory oral quizzes
- Whiteboards
- Laboratories/Lab Reports
- Graphing & diagrams
- Writing Assignments

Summative Assessments

For additional ideas please refer to NJ State DOE Professional Education Port (PEP):

<http://www.state.nj.us/education/njpep/index.html>

- Chapter/Unit Test
- Writing Assignments
- Laboratory Practical

Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction
- Native language texts and native language to English dictionary
- Follow all IEP modifications/504 plan

Curriculum development Resources/Instructional Materials/Equipment Needed Teacher Resources:

- *Textbook*
- *Laboratory manuals, equipment & specimens*
- *Class Website*
- *Science Websites*

<http://bodybrowser.googlelabs.com/>

<http://njcccs.org>

Unit Overview

Content Area: Anatomy & Physiology

Unit Title: Histology

Target Course/Grade Level: 11-12

Unit Summary

This unit is designed to learn the chemical and cellular structure and function of the body. An understanding of this will allow students to the various types of tissue and their functions. Normal anatomy and physiology and pathology will be investigated. Southern Ocean Medical Center’s physician lecture will help to answer the unit’s essential questions.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st Century Themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at www.njcccs.org.

Learning Targets

Content Standards

CPI #	Cumulative Progress Indicator (CPI)
5.1.12.A.1-3	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The Four Science Practice Strands encompass the knowledge and reasoning skills that students must acquire to be proficient in service.
5.1.12.D.2	Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams.
5.3.12.A.3	Predict a cell’s response in a given set of environmental conditions.
5.3.12.A.6	Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions (e.g., diabetes, cystic fibrosis, lactose intolerance).

Unit Essential Questions

- What are the main functions of the cell?
- What is the relationship between cellular structure and function in the human body?
- How are tissues classified?
- How do the changes that occur in

Unit Enduring Understandings

Students will understand that...

- Each cell is well adapted for the functions it performs.
- Tissues are a collection of cells with similar structure and function.
- Cancer is a disruption of the cell cycle.

<p>tissues explain development, growth, aging and disease?</p>	<ul style="list-style-type: none"> • In general, cells divide more slowly and have decreased functional ability with age.
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • Vocabulary and key terms • Laboratory safety • The main functions of the cell • How osmotic pressure affects the movement of water into and out of a cell • The primary tissue types' structure and function • Skin cancer is a type of cancer frequently seen in oncology • Lung cancer can be difficult to treat because of the stage at which it is often discovered 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Describe the fluid mosaic model of the cell • List four ways that substances move across the plasma membrane • Define <i>isotonic</i>, <i>hypertonic</i> and <i>hypotonic</i> solutions and their effect on a human cell. • List the features and function of epithelial, connective, muscle and nervous tissue. • Identify the different types of tissue using slides. • Discuss types of frequently occurring cancers, their causes & prognoses

Formative Assessments

For additional ideas please refer to NJ State DOE classroom application documents:

<http://njcccs.org/CADDownload.aspx>

- Observation
- Homework
- Class participation
- Laboratory oral quizzes
- Whiteboards
- Laboratories/Lab Reports
- Graphing & diagrams
- Writing Assignments

Summative Assessments

For additional ideas please refer to NJ State DOE Professional Education Port (PEP):

<http://www.state.nj.us/education/njpep/index.html>

- Chapter/Unit Test
- Writing Assignments
- Laboratory Practical

Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction
- Native language texts and native language to English dictionary
- Follow all IEP modifications/504 plan

Curriculum development Resources/Instructional Materials/Equipment Needed Teacher Resources:

- *Textbook*
- *Laboratory manuals, equipment & specimens*
- *SOMC Physician Lecture*
- *Class Website*
- *Science Websites*

<http://bodybrowser.googlelabs.com/>

<http://www.uoguelph.ca/zoology/devobio/210labs/histo1.html>

<http://njcccs.org>

Unit Overview

Content Area: Anatomy & Physiology

Unit Title: Musculoskeletal System

Target Course/Grade Level: 11-12

Unit Summary

This unit presents an overview of both the muscular and skeletal systems. Students will, using models and real human bones, identify the general anatomical terms for bone features and explain the functional significance of each. Muscular contractions and muscle types will be studied. Types of articulations and injuries specific to each joint will be learned. Southern Ocean Medical Center's physician lecture will help to answer the unit's essential questions.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st Century Themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at www.njcccs.org.

Learning Targets

Content Standards

CPI #	Cumulative Progress Indicator (CPI)
5.1.12.A.1-3	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The Four Science Practice Strands encompass the knowledge and reasoning skills that students must acquire to be proficient in service.
5.1.12.D.2	Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams.
5.3.12.A.3	Predict a cell's response in a given set of environmental conditions.
5.3.12.A.6	Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions (e.g., diabetes, cystic fibrosis, lactose intolerance).

Unit Essential Questions

- How does bone growth occur and what are the hormonal factors influencing it?
- What forces are involved in joint injuries and what are predispositions?
- How do muscle contractions occur?

Unit Enduring Understandings

Students will understand that...

- Hormones play a vital role in bone growth
- The more movement an articulation allows the greater chance for injury exists.
- The three different muscle types are unique in structure and in function
- Skeletal muscle fibers exist in different forms depending on the glycolytic pathway it is uses.

<ul style="list-style-type: none"> • How does the structure of each of the three different muscle types affect its physiology? • What are the differences between Type I and Type II muscle fibers and should testing be done at an early age to determine athletic skill? 	
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • Vocabulary and key terms • Laboratory safety • The functions of the skeletal system • How bone remodeling occurs • Bones and landmarks of the skeletal system • Description and examples of selected joints, movements and related injuries • Age related changes that occur in the skeletal system • Functions of the muscular system • How muscular contractions occur • Anatomy and physiology of the three different muscle types • The differences between Type I and Type II muscle fibers 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Discuss the functions of the skeletal system • Identify bones and bony landmarks • Classify bone fractures • Explain the structure and injuries of the knee • Explain the structures and injuries of the ankle • Explain the structures and injuries of the shoulder • Discuss the age related changes that occur • Demonstrate types of joint movements • Discuss functions of the skeletal system • Identify the muscles of the body • Identify the structure and functions of the three types of muscle • Describe muscular contractions • Contrast slow-twitch and fast-twitch fibers

Formative Assessments

For additional ideas please refer to NJ State DOE classroom application documents:

<http://njcccs.org/CADDownload.aspx>

- Observation
- Homework
- Class participation
- Laboratory oral quizzes
- Whiteboards
- Laboratories/Lab Reports
- Graphing & diagrams
- Writing Assignments

Summative Assessments

For additional ideas please refer to NJ State DOE Professional Education Port (PEP):

<http://www.state.nj.us/education/njpep/index.html>

- Chapter/Unit Test
- Writing Assignments
- Laboratory Practical

Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction
- Native language texts and native language to English dictionary
- Follow all IEP modifications/504 plan

Curriculum development Resources/Instructional Materials/Equipment Needed Teacher Resources:

- *Textbook*
- *Laboratory manuals, equipment & specimens*
- *SOMC Physician Lecture*
- *Class Website*
- *Science Websites*

<http://bodybrowser.googlelabs.com/>

<http://www.edheads.org/activities/knee/>

<http://njcccs.org>

Unit Overview

Content Area: Anatomy & Physiology

Unit Title: Cardiovascular & Respiratory Systems

Target Course/Grade Level: 11-12

Unit Summary

This unit will provide the students with an understanding of the vessels of the cardiovascular system, normal and abnormal anatomy of the heart and blood flow, electrophysiology, and disease. Students will demonstrate their knowledge of normal anatomy and blood flow by explaining the implications of a congenital heart anomaly. Southern Ocean Medical Center's physician lecture will help to answer the essential questions of the unit.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st Century Themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at www.njcccs.org.

Learning Targets

Content Standards

CPI #	Cumulative Progress Indicator (CPI)
5.1.12.A.1-3	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The Four Science Practice Strands encompass the knowledge and reasoning skills that students must acquire to be proficient in service.
5.1.12.D.2	Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams.
5.1.12.D.3	Demonstrate how to use scientific tools and instruments and knowledge of how to handle animals with respect for their safety and welfare.
5.3.12.A.3	Predict a cell's response in a given set of environmental conditions.
5.3.12.A.6	Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions (e.g., diabetes, cystic fibrosis, lactose intolerance).

Unit Essential Questions

- How does the structure of the blood vessels affect their function?
- How does a congenital heart defect affect the physiology of blood flow?
- What factors contribute to cardiovascular disease?

Unit Enduring Understandings

Students will understand that...

- Arteries and veins differ in structure and function
- The structure of a capillary facilitates gas exchange
- The physiology of blood flow can be changed dramatically when structures are altered
- Cardiovascular disease is a leading cause of death and is multifactorial

Unit Objectives*Students will know...*

- Vocabulary and key terms
- Laboratory safety
- The functions of the pulmonary and systemic circulation
- The major structures of the pulmonary and systemic circulation
- Blood pressure is the measurement of pressure detected in the arteries
- That gas exchange occurs due to diffusion
- Structure and function of cardiac muscle
- Normal and abnormal structure and function in the heart
- Normal and abnormal electrical conduction in the heart
- Factors contributing to age-related cardiovascular disease

Unit Objectives*Students will be able to...*

- Explain the functions of the systemic circulation
- Explain the functions and structures of the pulmonary circulation
- Identify the general features of blood vessels
- Describe the clinical measurement of blood pressure
- Describe how carbon dioxide is transported in the blood, the chloride shift and how respiration can affect pH
- Compare cardiac and skeletal muscle
- Identify the structure and functions of the the external and internal anatomy of the heart
- Compare normal heart anatomy and physiology with that of a congenital heart anomaly
- Describe the conduction system in the heart
- Explain the various feature of an electrocardiogram and the events that those features reflect
- Discuss age-related changes that occur in the heart

Formative Assessments

For additional ideas please refer to NJ State DOE classroom application documents:

<http://njcccs.org/CADDownload.aspx>

- Observation
- Homework
- Class participation
- Laboratory oral quizzes
- Whiteboards
- Laboratories/Lab Reports
- Graphing & diagrams
- Writing Assignments

Summative Assessments

For additional ideas please refer to NJ State DOE

Professional Education Port (PEP):

<http://www.state.nj.us/education/njpep/index.html>

- Chapter/Unit Test
- Writing Assignments
- Congenital Heart Anomaly Project
- Laboratory Practical

Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction
- Native language texts and native language to English dictionary
- Follow all IEP modifications/504 plan

Curriculum development Resources/Instructional Materials/Equipment Needed Teacher Resources:

- *Textbook*
- *Laboratory manuals, equipment & specimens*
- *SOMC Physician Lecture*
- *Class Website*
- *Science Websites*

<http://childrensheartinstitute.org/index.htm>

http://www.rnceus.com/course_frame.asp?exam_id=16&directory=ekg

<http://www.heart.org/HEARTORG/>

<http://njcccs.org>

Unit Overview

Content Area: Anatomy & Physiology

Unit Title: Gastrointestinal System

Target Course/Grade Level: 11-12

Unit Summary

This unit will provide students with an understanding of how the digestive system provides the body with water, electrolytes and other nutrients. The structure of the organs of this system will be examined to infer their function. Southern Ocean Medical Center’s physician lecture will help to answer the unit’s essential questions.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st Century Themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at www.njcccs.org.

Learning Targets

Content Standards

CPI #	Cumulative Progress Indicator (CPI)
5.1.12.A.1-3	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The Four Science Practice Strands encompass the knowledge and reasoning skills that students must acquire to be proficient in service.
5.1.12.D.2	Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams.
5.3.12.A.3	Predict a cell’s response in a given set of environmental conditions.
5.3.12.A.6	Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions (e.g., diabetes, cystic fibrosis, lactose intolerance).
5.1.12.A.1-3	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The Four Science Practice Strands encompass the knowledge and reasoning skills that students must acquire to be proficient in service.
5.1.12.D.2	Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams.
5.3.12.A.3	Predict a cell’s response in a given set of environmental conditions.

Unit Essential Questions

- How is movement in the gastrointestinal system regulated?

Unit Enduring Understandings

Students will understand that...

- Structures of the digestive system are specialized and under hormonal, mechanical and neurological control

<ul style="list-style-type: none"> • How do injury and disease affect digestion? 	<ul style="list-style-type: none"> • Diseases affective structure or control of the digestive system affect the other systems
<p>Unit Objectives <i>Students will know...</i></p> <ul style="list-style-type: none"> • Vocabulary and key terms • Laboratory safety • Structure, function and control of the digestive system • Pathways for digestion of carbohydrates, lipids and proteins • Diseased states of the digestive system and affect on other body systems 	<p>Unit Objectives <i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Describe the functions of the digestive system • Identify the structure and functions of the organs of the digestive system • Starting with the mouth, describe the process of swallowing • Describe the movements of the stomach and their regulation • Explain the digestion of carbohydrates, lipids, proteins and the list the products of digestion for each • Discuss diseases of the gastrointestinal system

Formative Assessments

For additional ideas please refer to NJ State DOE classroom application documents:

<http://njcccs.org/CADDownload.aspx>

- Observation
- Homework
- Class participation
- Laboratory oral quizzes
- Whiteboards
- Laboratories/Lab Reports
- Graphing & diagrams
- Writing Assignments

Summative Assessments

For additional ideas please refer to NJ State DOE Professional Education Port (PEP):

<http://www.state.nj.us/education/njpep/index.html>

- Chapter/Unit Test
- Writing Assignments
- Laboratory Practical

Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction
- Native language texts and native language to English dictionary
- Follow all IEP modifications/504 plan

Curriculum development Resources/Instructional Materials/Equipment Needed Teacher Resources:

- *Textbook*
- *Laboratory manuals, equipment & specimens*
- *SOMC Physician Lecture*
- *Class Website*
- *Science Websites*

<http://bodybrowser.googlelabs.com/>

<http://njcccs.org>

Unit Overview

Content Area: Anatomy & Physiology

Unit Title: Nervous System

Target Course/Grade Level: 11-12

Unit Summary

This unit provides the students with an intense investigation of the nervous system at each of the seven levels of organization of the body presented in the first unit. Students will rely on their knowledge of their prerequisite chemistry course to learn the resting state of a neuron and learn propagation of the action potential. Neurotransmitters and addiction, disease and medication will be examined. Students will learn through case studies how we learn what parts of the nervous system do when we examine the repercussions for a patient lacking specific structures or function.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st Century Themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at www.njcccs.org.

Learning Targets

Content Standards

CPI #	Cumulative Progress Indicator (CPI)
5.1.12.A.1-3	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The Four Science Practice Strands encompass the knowledge and reasoning skills that students must acquire to be proficient in service.
5.1.12.D.2	Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams.
5.1.12.D.3	Demonstrate how to use scientific tools and instruments and knowledge of how to handle animals with respect for their safety and welfare.
5.3.12.A.3	Predict a cell's response in a given set of environmental conditions.
5.3.12.A.6	Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions (e.g., diabetes, cystic fibrosis, lactose intolerance).
5.1.12.A.1-3	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The Four Science Practice Strands encompass the knowledge and reasoning skills that students must acquire to be proficient in service.
5.1.12.D.2	Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams.

5.3.12.A.3	Predict a cell's response in a given set of environmental conditions.	
<p>Unit Essential Questions</p> <ul style="list-style-type: none"> • How do the central and peripheral nervous system's structure and function differ? • How do diseases of myelination affect the human body? • What is synesthesia? • How do we learn what structures in the nervous system do? 	<p>Unit Enduring Understandings</p> <p><i>Students will understand that...</i></p> <ul style="list-style-type: none"> • The central and peripheral nervous system are distinct divisions in the nervous system • Diseases of myelination decrease the velocity of conduction of the action potential in the neuron • Studying synesthesia allows for insights into cognitive and perceptual processes • Diseased states of the nervous system allow us to learn the function of the parts of the nervous system and addiction 	
<p>Unit Objectives</p> <p><i>Students will know...</i></p> <ul style="list-style-type: none"> • Vocabulary and key terms • Laboratory safety • The distinction between the peripheral and central nervous system • Structure and function of neurons • How myelination of axons allows for faster, saltatory conduction • Resting state of the neuron and propagation of the action potential at the chemical and electrical levels • Synapses and neurotransmitters • The primary motor cortex • The inverse relationship between two point discrimination and area devoted to a body part in the primary somatosensory cortex • Pathways of the special senses 	<p>Unit Objectives</p> <p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> • List the major functions of the nervous system • Describe the structure and function of a neuron • Describe myelinated and unmyelinated axons • Describe the concentrations between the intercellular and extracellular fluids • Define the term <i>resting membrane potential</i> and explain how it is produced and changed • Describe the events occurring during an action potential • Discuss the effect of stimulus strength on action potential frequency • Explain the propagation of action potentials • Describe synapses • Name and describe the major parts of the brain • Starting with the stimulation of a sensory receptor, describe the events resulting in conscious awareness and interpretation of the stimulus • Describe the motor areas of the cerebral cortex • Describe the sensory areas of the cerebral cortex • Describe and explain pathways for pain, speech and vision 	

Formative Assessments

For additional ideas please refer to NJ State DOE classroom application documents:

<http://njcccs.org/CADDownload.aspx>

- Observation
- Homework
- Class participation
- Laboratory oral quizzes
- Whiteboards
- Laboratories/Lab Reports
- Graphing & diagrams
- Writing Assignments

Summative Assessments

For additional ideas please refer to NJ State DOE

Professional Education Port (PEP):

<http://www.state.nj.us/education/njpep/index.html>

- Chapter/Unit Test
- Writing Assignments
- Laboratory Practical

Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction
- Native language texts and native language to English dictionary
- Follow all IEP modifications/504 plan

Curriculum development Resources/Instructional Materials/Equipment Needed Teacher Resources:

- *Textbook*
- *Laboratory manuals, equipment & specimens*
- *Class Website*
- *Science Websites*

<http://bodybrowser.googlelabs.com/>

<http://learn.genetics.utah.edu/content/addiction/drugs/mouse.html>

<http://learn.genetics.utah.edu/content/addiction/reward/madneuron.html>

<http://njcccs.org>

Unit Overview

Content Area: Anatomy & Physiology

Unit Title: Exercise Physiology

Target Course/Grade Level: 11-12

Unit Summary

Exercise physiology is an application of physiology that studies the acute and chronic responses of all body systems to exercise. Using their knowledge of each system and of diseases, students will study the affects of exercise, utilizing the school's cardio lab. While all systems will be discussed, special attention will be paid to the cardiovascular response.

Primary interdisciplinary connections:

Infused within the unit are connection to the 2009 NJCCCS for Mathematics, Language Arts Literacy and Technology.

21st Century Themes:

The unit will integrate the 21st Century Life and Career stand 9.1 strands A-D. These strands include: Critical thinking and problem solving, creativity and innovation, collaboration, teamwork and leadership, and cross cultural understanding and interpersonal communication.

Technology connections:

For further clarification refer to NJ Class Standard Introductions at www.njcccs.org.

Learning Targets

Content Standards

CPI #	Cumulative Progress Indicator (CPI)
5.1.12.A.1-3	All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The Four Science Practice Strands encompass the knowledge and reasoning skills that students must acquire to be proficient in service.
5.1.12.D.2	Represent ideas using literal representations, such as graphs, tables, journals, concept maps, and diagrams.
5.1.12.D.3	Demonstrate how to use scientific tools and instruments and knowledge of how to handle animals with respect for their safety and welfare.
5.3.12.A.3	Predict a cell's response in a given set of environmental conditions.
5.3.12.A.6	Describe how a disease is the result of a malfunctioning system, organ, and cell, and relate this to possible treatment interventions (e.g., diabetes, cystic fibrosis, lactose intolerance).

Unit Essential Questions

- How can knowledge of exercise physiology help to condition athletes?
- How can knowledge of exercise physiology help in the treatment of disease?

Unit Enduring Understandings

Students will understand that...

- All systems must be considered in conditioning of athletes
- While exercise can be beneficial in the treatment of disease, modifications and monitoring is essential

Unit Objectives

Students will know...

- Vocabulary and key terms
- Laboratory safety
- The factors involved in cardiac output
- Local control of blood flow in an exercising muscle
- How total peripheral resistance changes and its implication on blood pressure and performance
- How blood glucose levels change and its implication on performance

Unit Objectives

Students will be able to...

- Explain how the circulatory system responds to exercise
- List the major factors involved in intrinsic and extrinsic regulation of the heart
- Demonstrate graphically how exercise affects the body in the diseased state, for example diabetes mellitus and heart disease

Formative Assessments

For additional ideas please refer to NJ State DOE classroom application documents:

<http://njcccs.org/CADDownload.aspx>

- Observation
- Homework
- Class participation
- Laboratory oral quizzes
- Whiteboards
- Laboratories/Lab Reports
- Graphing & diagrams
- Writing Assignments

Summative Assessments

For additional ideas please refer to NJ State DOE Professional Education Port (PEP):

<http://www.state.nj.us/education/njpep/index.html>

- Chapter/Unit Test
- Writing Assignments
- Laboratory Practical

Modifications (ELLs, Special Education, Gifted and Talented)

- Teacher tutoring
- Peer tutoring
- Cooperative learning groups
- Modified assignments
- Differentiated instruction
- Native language texts and native language to English dictionary
- Follow all IEP modifications/504 plan

Curriculum development Resources/Instructional Materials/Equipment Needed Teacher Resources:

- *Textbook*
- *Laboratory manuals & equipment*
- *Class Website*
- *Science Websites*

<http://www.gssiweb.com/Default.aspx>

<http://njcccs.org>