



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Curriculum Development Timeline

School: Ocean Township High School

Course: Anatomy and Physiology

Department: Science

| Board Approval | Supervisor | Notes |
|-----------------------|-------------------|------------------|
| July 2011 | Patrick Sullivan | Born Date |
| December 2017 | Patrick Sullivan | Update Standards |
| August 2018 | Patrick Sullivan | Revisions |
| August 2019 | Patrick Sullivan | Review |

Home of the Spartans!
#spartanlegacy





Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Pacing Guide

| Week | Marking Period 1 | Week | Marking Period 3 |
|------|---------------------------------|------|---------------------------------|
| 1 | Introduction & anatomical terms | 11 | Nervous system |
| 2 | Anatomical terms | 12 | Nervous system |
| 3 | Cell structure & homeostasis | 13 | Cardiovascular system |
| 4 | Homeostasis/Drug dosage | 14 | Respiratory system |
| 5 | Homeostasis/Drug dosage | 15 | Respiratory system |
| Week | Marking Period 2 | Week | Marking Period 4 |
| 6 | Integumentary system | 16 | Digestive system |
| 7 | Skeletal system | 17 | Reproductive system & fertility |
| 8 | Skeletal system | 18 | Global health |
| 9 | Muscular system & biomechanics | 19 | Pathology & autopsy |
| 10 | Muscular system & biomechanics | 20 | Body System Project |

Core Instructional & Supplemental Materials including various levels of Texts

Health and Science Pipeline Initiative (HASPI) curriculum labs:

<http://www.haspi.org/anatomy-and-physiology.html>

Anatomy Text Shier, Butler, and Lewis. (2016) Hole's Human Anatomy & Physiology. New York, NY: McGraw Hill Education.

Digital Resources Across All Levels: (D=differentiated)

BioDigital Human (D)

Edpuzzle (D)

Gizmo (D)

Live Surgery Program

New York Times Articles

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

PhET Interactive Simulations (D)
Science News (D)
Tedx Talks

| | |
|---|-----------|
| Time Frame | Weeks 1-2 |
| Topic | |
| Introduction and Anatomical Terminology | |
| Essential Questions | |
| <ol style="list-style-type: none">1. What is anatomy and physiology?2. How do professionals study and communicate about the body?3. How are medical terms created?4. How do professionals communicate about the body with patients and families?5. What are the major body systems, and what is their function?6. How can the body's systems malfunction? | |
| Enduring Understandings | |
| <ol style="list-style-type: none">1. Anatomy is the study of the body's structure, and physiology is the study of the body's function.2. Professionals use a standard set of terms to identify regions of the body and communicate about its structure and function.3. Medical terms are often based on a limited set of prefixes, roots, and suffixes; and definitions of unfamiliar words can often be inferred from these.4. It is possible, and sometimes necessary, to move between medical terms and everyday terms, when communicating with patients and families.5. There are 11 major body systems, each with their own function, which all interact with and depend on each other.6. There are many disorders that affect the human body, caused by genetics, environment, injury, lifestyle, or a combination of these. | |
| Alignment to Standards | |

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

- HS-LS1-2
- CCC-1 Patterns
- CCC-2 Cause and Effect
- CCC-3 Scale, Proportion, and Quantity
- CCC-4 Systems and System Models
- CCC-6 Structure and Function
- SEP-3 Planning and Carrying Out Investigations
- SEP-8 Obtaining, Evaluating, and Communicating Information

Learning Activities & Key Concepts and Skills

Using anatomical language - Students will use an interactive internet resource from Wisc-Online, a digital library of web-based learning resources. Students will have the opportunity to learn and review anatomical terminology including relative positions, body sections, divisions of the abdominal pelvic cavity, and regional body parts. The analysis requires students to apply what they have learned by choosing and defining terminology used in the medical field

Anatomical language review - Students will review the regional body parts and anatomical positions through an interactive activity that involves placing labels on a “student model”. The analysis will require students to further label diagrams with the body regions and identify the organs in abdominal quadrants and regions. Students will also apply this knowledge to patient treatment directions.

Medical terminology basics - Students will familiarize themselves with the basics of using medical terminology including common medical prefixes, root words, and suffixes. Students will practice combining and breaking down medical terms using pre-made cards. Students can also choose to play a review game with the cards. The analysis will allow students to apply the medical terminology deciphering techniques they have learned by creating a medical story, translating a medical description, and translating an emergency room report.

Body systems poster - Students will create a life-size poster of a chosen or assigned body system. Following the poster creation, students will have the opportunity to collect basic information (function, organs, organ function, and medical conditions) for each body system from posters created by classmates.

Assessments

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Formative:

Review questions in online interactive, translated paragraphs, labels on student models, terminology game participation

Summative:

Analysis questions at the end of each lab assess understanding of term parts and how they are put together, body system posters assessed with a rubric to check for understanding of body systems integration and diseases, quiz on terminology and basic anatomy concepts (multiple choice and essay)

Benchmark:

Content (multiple choice) assessing knowledge of body systems, anatomy terms, and physiology of disease; and skills (essay) assessing ability to synthesize information from multiple units.

Alternative:

Anatomical position labels on student models, terminology game participation, body system posters creation

Career Education

CRP4. Communicate clearly and effectively and with reason. The first three activities teach students how to communicate in a medical setting.

CRP11. Use technology to enhance productivity. Students use online review tools to learn terms and positions.

CRP12. Work productively in teams while using cultural global competence. Students must work in groups to produce an effective educational body systems poster.

CRP2. Apply appropriate academic and technical skills. Students must use computer, research, and critical thinking skills to learn and interpret medical terms.

CRP1. Act as a responsible and contributing citizen and employee. Students must be productive group members to create the body systems poster, and work together to label a living anatomy model (partner).

CRP6. Demonstrate creativity and innovation. Students must find creative and attractive ways of communicating body systems information on their group posters.

CRP7. Employ valid and reliable research strategies. Students must research the structure, function, parts, and diseases for their assigned body system.

21st Century Skills

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

9.3.HL.2 - Explain the healthcare workers' role within their department, their organization and the overall healthcare system. Students experience the role of a doctor as communicator between other healthcare teams, patients, and patients' families.

9.3.HL-THR.2 - Communicate patient/client information among healthcare team members to facilitate a team approach to patient care. Students practice communicating using anatomical language.

9.3.HL-THR.3 - Utilize processes for assessing, monitoring, and reporting patient's/client's health status to the treatment team within protocol and scope of practice. Students practice translating medical terminology and communicating it to various roles.

9.3.ST.6 - Demonstrate technical skills needed in a chosen STEM field. Students must be able to understand and use medical terminology to have a career in the medical field.

Interdisciplinary Connections

VPA.1.1.12.D.CS2 - Stimuli for the creation of artworks can come from many places, including other arts disciplines. Students use artistic skills to summarize and communicate information effectively.

Technology Integration

TECH.8.1.12.E - Organize, analyze, evaluate, and synthesize information from a variety of sources and media. Students use online learning tools to learn terms, and use the internet to research a body system.

TECH.8.1.12.D.5 - Demonstrate personal responsibility for life-long learning by searching the internet to apply skills and content to their own lives.

| | |
|--|-------------|
| Time Frame | Weeks 3-4-5 |
| Topic | |
| Cellular function and homeostasis | |
| Essential Questions | |
| <ol style="list-style-type: none">1. What is osmosis?2. How does osmosis affect cell structure and function?3. Why is homeostasis important to organisms, specifically in terms of water tonicity, | |

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

- temperature, and pH?
4. How do organisms maintain homeostasis?

Enduring Understandings

Osmosis is the movement of water across a membrane from an area of high concentration to low concentration.

Osmosis is important to cells because different concentrations of solutes can cause crenation (shrinkage) or lysis (breaking) of cells.

Homeostasis is important for organisms to maintain ideal conditions for metabolic reactions.

Some examples of homeostasis are tonicity (water balance, 0.9%), temperature (37C), pH (7.4) and elimination of drugs from the body.

Alignment to Standards

- HS-LS1-3
- HS-ETS1-4
- CCC-2 Cause and Effect
- CCC-3 Scale, Proportion, and Quantity
- CCC-4 Systems and System Models
- CCC-7 Stability and Change
- SEP-2 Developing and Using Models
- SEP-3 Planning and Carrying Out Investigations
- SEP-8 Obtaining, Evaluating, and Communicating Information

Learning Activities & Key Concepts and Skills

Cell tonicity - Students take the roll of a patient educator. A dehydrated patient is refusing the 0.9% saline IV solution, and it is the student's job to explain with a visual example why it must be 0.9% saline. The students will be required to create an experiment with limited supplies. This activity focuses on osmosis as well as experimental design

Red blood cell tonicity - Students will use animal blood purchased from a butcher source to observe the effects of tonicity on red blood cells. Red blood cells will be exposed to hypertonic, hypotonic, and isotonic saline solutions. Following exposure, the red blood cell solutions will be observed with a microscope.

Homeostasis Gizmo – Students use an online simulation to adjust the levels of

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

clothing, perspiration, and exercise to maintain a stable internal temperature as the external temperature changes. Water and blood sugar levels need to be replenished regularly, and fatigue occurs with heavy exercise. Severe hypothermia, heat stroke, or dehydration can result if internal stability is not maintained.

pH of the body - Students will test their own salivary pH over a 24-hour period. Following the 24-hour period, data will be collected for the class and a histogram created for data analysis. The importance of maintaining a healthy body pH for normal bodily functions will be discussed.

Drug dosage Gizmo – Students use an online simulation to explore how a drug prescription must be carefully planned to maximize benefit while avoiding an overdose. Students give a patient one or more pills and monitor the levels of medication in the body through time. Based on the reaction of the patient, they determine the ideal levels of medication. They then create a dosage schedule so these levels are maintained through time. Four types of pills, each with a different release pattern and target organ, are available for use.

Assessments

Formative:

Experimental design when using potatoes to demonstrate tonicity, results explanation paragraph after experiment, osmosis predictions for blood cells, pH histogram evaluates graphing skills, analysis questions at the end of each lab assess student understanding of homeostasis in the body (open ended).

Summative:

Written quiz (MC and open ended) assesses student understanding of tonicity, cell function, and homeostasis, and the relationship between all three.

Benchmark:

Alternative:

Experimental design when using potatoes to demonstrate tonicity, results explanation paragraph after experiment, osmosis predictions for blood cells, pH histogram evaluates graphing skills, analysis questions at the end of each lab assess student understanding of homeostasis in the body (open ended)

Career Education

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

CRP1. Act as a responsible and contributing citizen and employee. Students must work together to design and interpret an experiment.

CRP4. Communicate clearly and effectively and with reason. Students practice communicating the results of their experiment with a patient.

CRP6. Demonstrate creativity and innovation. Students must be creative and innovative to use limited supplies to design an experiment to demonstrate cell tonicity.

CRP2. Apply appropriate academic and technical skills. Students use the scientific method to design an experiment, and they use analysis skills to interpret results of simulations.

CRP3. Attend to personal health and financial well-being. Students measure their own body pH and analyze how their lifestyle may affect that.

CRP11. Use technology to enhance productivity. Students use online simulations to explore homeostasis topics.

21st Century Skills

9.3.HL.3 - Identify existing and potential hazards to clients, coworkers, visitors, and self in the healthcare workplace. Students practice wearing PPE and isolating themselves from biological substances while handling blood and pH paper.

9.3.HL-BRD.4 - Demonstrate the principles of... sterile techniques, contamination control... used in biotechnology research. Students use sterile practices to transfer blood samples; and practice not contaminating pH paper before use.

9.3.ST.3 - Describe and follow safety, health, and environmental standards related to STEM workplaces. Students follow safe protocols when handling blood samples and measuring saliva pH.

9.3 HL-THR.3 - Utilize processes for assessing, monitoring, and reporting patient's/client's health status to the treatment team within protocol and scope of practice. Students practice analyzing and communicating about patient health.

9.3.ST.2 - Use technology to acquire, manipulate, analyze, and report data. Students use online simulations to gather data about human homeostasis.

Interdisciplinary Connections

LA.11-12.RST.11-12.3 - Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. Students must read and carefully follow directions on how to handle and observe blood, and they must write clear instructions explaining their own experimental design.

MA.K-12.4 - Model with mathematics. Students must use math to determine the rate of drug metabolism and the optimal drug dosage in the Gizmo simulation.

Technology Integration

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

TECH.8.1.12.F-1 - Students use an online simulation (Gizmo) to further understanding of human homeostasis.
TECH.8.1.12.D.5 - Demonstrate personal responsibility for life-long learning by searching the internet to apply skills and new content to their lives.

| | |
|---|--------|
| Time Frame | Week 6 |
| Topic | |
| Integumentary system | |
| Essential Questions | |
| <ol style="list-style-type: none">1. What is histology?2. What is the structure and function of epithelial tissue?3. What are the major organs and function of the integumentary system?4. What are the causes and symptoms of skin cancer?5. How can people lower their risk for skin cancer?6. How does the skin help maintain homeostasis? | |
| Enduring Understandings | |
| <ol style="list-style-type: none">1. Histology is the microscopic study of tissues, specifically their structure and function.2. There are many different types of epithelial tissue, but they all are found in the linings or protective layers of tissues.3. The skin, hair, nails, and glands make up the integumentary system, which protects the body from the outside environment and helps maintain homeostasis.4. Skin cancer risk factors include UV exposure and heredity; symptoms are moles that are ABCDE: Asymmetrical, irregular Borders, different Colors, a Diameter greater than a pencil, and Evolving.5. Wearing broad spectrum sunscreen and avoiding the sun are the best ways to lower skin cancer risk.6. The skin plays an essential role in monitoring the outside temperature, sending signals to | |

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

the brain, triggering goosebumps and shivering, and sweating, which helps maintain temperature and/or water balance.

Alignment to Standards

- HS-LS1-2
- HS-LS1-3
- HS-LS1-4
- CCC-1 Patterns
- CCC-2 Cause and Effect
- CCC-3 Scale, Proportion, and Quantity
- CCC-6 Structure and Function
- CCC-7 Stability and Change
- SEP-2 Developing and Using Models
- SEP-3 Planning and Carrying Out Investigations

Learning Activities & Key Concepts and Skills

Epithelial tissue histology – Students learn to identify basic epithelial tissues including simple, stratified, squamous, cuboidal, columnar, pseudostratified, transitional, and keratinized. The activity is separated into three parts. Part A introduces students to the function, location, and structure of epithelial tissues. Part B is a practice activity to identify various slide images of epithelial tissues. Part C has students look at actual organ and tissue slides to find and identify epithelial tissues.

Integumentary system – Station lab activity that has students investigate the organs, histology, diseases, and characteristics of the integumentary system. Students investigate the inflammatory response, observe the microscopic parts of their own integumentary system, and learn how the skin is able to maintain an internal temperature when the external temperature fluctuates.

Sunscreen & skin cancer – Students learn about UV radiation and its impact on the occurrence of skin cancer. Different SPF sunscreens are tested on UV sensitive paper to compare their ability to screen or block UV radiation. Students follow up by performing a patient analysis for three patients, and determining whether the patients' moles may be indicative of melanoma.

Investigating the skin – Students learn about thermoregulation, glands, and dermal nerves. Four activities have students investigate special characteristics of their own

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

skin. In the first activity students use iodine and cornstarch-soaked sheets to locate sweat glands in the palm. The second activity has students observe the cooling sensation caused by evaporative cooling produced by sweat. The third activity has students map the location of mechanoreceptors, thermoreceptors, and nociceptors in a small area of the forearm. The fourth activity has students determine the two-point touch distance on several locations of their bodies

Skin cancer interactive – An introductory section walks students through the basic biology of healthy skin and then explores the types of skin cancer, the causes of skin cancer, and how to lower skin cancer risk. An interactive assessment allows students to gauge understanding. There are then two practical portions, where students screen skin samples for cancer and then field “calls” from patients concerned about skin cancer risks.

Assessments

Formative:

Each lab activity has open-ended analysis and review questions assessing knowledge of that topic, including:

- Identifying microscopic images of different types of epithelial tissues
- Diagnosing potentially cancerous moles and writing treatment plans

Summative:

Written quiz (multiple choice and open ended) assessing student understanding of the integumentary system’s structure and function.

Benchmark:

Alternative:

Identifying microscopic images of different types of epithelial tissues, diagnosing potentially cancerous moles and writing treatment plans

Career Education

CRP3.Attend to personal health and financial well-being. Students investigate the function of their own skin, and evaluate their own risk of skin cancer.

21st Century Skills

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

9.3.ST.6 - Demonstrate technical skills needed in a chosen STEM field. Students identify histological slides, diagnose possible cancers, and communicate with patients.
9.3.HL.2 - Explain the healthcare workers' role within their department, their organization and the overall healthcare system. Students act as health care providers in diagnosing, creating treatment plans, and communicating with patients.
9.3.HL-BRD.4 - Demonstrate the principles of... sterile techniques, contamination control... used in biotechnology research. Students must be careful not to contaminate the UV sensitive paper or the sunscreen.
9.3 HL-THR.3 - Utilize processes for assessing, monitoring, and reporting patient's/client's health status to the treatment team within protocol and scope of practice. Students practice written communications of diagnoses and treatment plans.

Interdisciplinary Connections

SOC.9-12.1.1.1 Compare present and past events to evaluate the consequences of past decisions and to apply lessons learned. Students use patient behavior to inform their risk of skin cancer.
VPA.1.1.12.D.CS2 Stimuli for the creation of artworks can come from many places, including other arts disciplines. Students use observational skills to observe color, shape, position, etc. of cells in tissues, then draw them accurately.

Technology Integration

TECH.8.1.12.C - Additional resources and extension activities on Google Classroom in order to reflect on their learning and expand on knowledge.

| | |
|---|----------|
| Time Frame | Week 7-8 |
| Topic | |
| Skeletal System | |
| Essential Questions | |
| <ol style="list-style-type: none">1. What is the structure and function of the skeletal system?2. What is the importance of minerals like calcium to the skeletal system?3. How do doctors diagnose and treat bone fractures? | |

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

4. What is the proper way to immobilize a bone injury for transport to a medical facility?

Enduring Understandings

1. The skeletal system aids in support, movement, blood production, and mineral homeostasis of the body.
2. Calcium is an essential component of bone density, which changes as we age, and can lead to fractures.
3. Doctors use radiography (x-rays) to evaluate bone injuries, and determine what kind of treatment (reduction, immobilization, etc.) is required.
4. Bones should be immobilized above and below the injury in order to reduce further harm to the patient.

Alignment to Standards

- HS-LS1-2
- HS-LS1-3
- HS-LS1-4
- HS-PS4-4
- CCC-1 Patterns
- CCC-2 Cause and Effect
- CCC-3 Scale, Proportion, and Quantity
- CCC-4 Systems and System Models
- CCC-7 Stability and Change
- SEP-2 Developing and Using Models
- SEP-3 Planning and Carrying Out Investigations

Learning Activities & Key Concepts and Skills

Connective tissue histology lab – Students learn to identify basic connective tissues including loose areolar, adipose, reticular, dense regular, dense irregular, hyaline cartilage, elastic cartilage, fibrocartilage, bone, and blood. The activity is separated into three parts. Part A introduces students to the function, location, and structure of connective tissues. Part B is a practice activity to identify various slide images of

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

connective tissues. Part C has students look at actual organ and tissue slides to find and identify connective tissues.

Skeletal system lab – Station lab activity that has students investigate the organs, histology, diseases, and characteristics of the skeletal system. Students investigate the construction and strength of long bones, determine height from long bone length, and calculate skeletal proportions.

Calcium & osteoporosis lab – Students learn about the different bone minerals and the importance of calcium to normal body functions. Students also learn about bone mineral homeostasis and how an imbalance can lead to osteoporosis. Students use chicken bones to observe the mineral salts and collagen components of bone tissue.

Identifying x-rays lab – Students learn about radiography techniques and their uses in the medical field. Students also learn about common fractures. The students then work as a radiologist to diagnose the location and type of fracture for 14 patients using printed x-ray images.

Long bone immobilization lab - Activity that allows students to practice splinting and immobilization of the forearm in case of fracture. The skills test is the same test for “Long Bone Immobilization” as that of the National EMT Registry exam.

Assessments

Formative:

Analysis questions after each lab have students assess their understanding of the structure and function of the skeletal system, including reading x-rays and classifying the type of fracture or injury.

Summative:

Written quiz (multiple choice and open ended sections) assesses student knowledge of skeletal topics, such as functions, bone types, fracture types, and fracture treatments.

Benchmark:

Alternative:

Students assess each other’s performance on the National EMT Registry exam Long Bone Immobilization station; students are assessed on real clinical skills in both reading x-rays and immobilizing injuries.

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Career Education

CRP1. Act as a responsible and contributing citizen and employee. Students must work productively in a group to examine each other's characteristics, design & carry out an experiment, and simulate an EMT situation.

CRP3. Attend to personal health and financial well-being. Students evaluate their own diets and how they may impact their bone health.

CRP4. Communicate clearly and effectively and with reason. Students must interpret the results of an experiment and communicate them to a "patient;" students must communicate each step of the EMT station with each other.

CRP11. Use technology to enhance productivity. Students use Chromebooks to view x-rays, instead of printouts.

CRP12. Work productively in teams while using cultural global competence. Students must work productively in a group to examine each other's characteristics, design & carry out an experiment, and simulate an EMT situation.

21st Century Skills

9.3.ST.6 - Demonstrate technical skills needed in a chosen STEM field. Students practice communicating with patients about bone health; identifying real x-rays; and immobilizing long bones like EMTs.

9.3.HL.2 - Explain the healthcare workers' role within their department, their organization and the overall healthcare system. Students role play various healthcare workers, including family physician, radiologist, and EMT.

9.3.HL.3 - Identify existing and potential hazards to clients, coworkers, visitors, and self in the healthcare workplace. Students learn about protecting themselves and patients from x-rays and body fluids.

9.3.HL-THR.3 - Utilize processes for assessing, monitoring, and reporting patient's/client's health status to the treatment team within protocol and scope of practice. Students monitor, assess, and communicate about the "health" of a "patient's" bones in an experiment they conduct, in x-rays they read, and while treating a mock fracture.

9.3.ST.3 - Describe and follow safety, health, and environmental standards related to STEM workplaces. Students learn about protecting themselves and patients from x-rays and body fluids.

9.3.HL.1 - Determine academic subject matter, in addition to high school graduation requirements, necessary for pursuing a health science career. Students learn about and practice one part of the EMT license exam (National EMT Registry).

9.3.HL.4 - Evaluate the roles and responsibilities of individual members as part of the healthcare team and explain their role in promoting the delivery of quality health care. Students role play various healthcare workers, including family physician, radiologist, and EMT.

9.3.HL-BRD.4 - Demonstrate the principles of... sterile techniques, contamination control... used

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

in biotechnology research. Students practice protecting themselves from biological substances by wearing gloves when treating a patient.

9.3.HL-THR.2 - Communicate patient/client information among healthcare team members to facilitate a team approach to patient care. Students practice writing diagnoses of fractures, as well as communicating with each other about a long bone fracture patient.

Interdisciplinary Connections

LA.11-12.RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. Students must read and precisely follow directions on how to read x-rays and how to immobilize a long bone without causing further damage.

SOC.9-12.1.1.1 Compare present and past events to evaluate the consequences of past decisions and to apply lessons learned. Students evaluate a patient's life choices and explain how they contributed to her osteoporosis risk.

VPA.1.1.12.D.CS2 Stimuli for the creation of artworks can come from many places, including other arts disciplines. Students use observational skills to observe color, shape, position, etc. of cells in connective tissues, then draw them accurately.

Technology Integration

TECH.8.1.12.E - Organize, analyze, evaluate, and synthesize information from a variety of sources and media

TECH.8.1.12.A - Students will use Google Slides as additional information and will use Google Sheets to create a data table of loss or gain in mass of bones

TECH.8.1.12.C - Additional resources and extension activities on Google Classroom in order to reflect on their learning and expand on knowledge.

TECH.8.1.12.D - Demonstrate personal responsibility for life-long learning by researching the internet, watching a YouTube video to learn and practice a new skill

| | |
|--------------------------------|-----------|
| Time Frame | Week 9-10 |
| Topic | |
| Muscular system & biomechanics | |

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Essential Questions

1. What is the structure and function of muscle and nervous tissue?
2. What is the structure and function of the muscular system?
3. What are the different types of muscle tissue, and what are their functions?
4. How do healthcare professionals diagnose and evaluate muscle weakness or paralysis?
5. How do bones, joints, and muscles work together?
6. How can we use physics concepts like speed, acceleration, and force to optimize the human body?

Enduring Understandings

1. Muscle tissue and nervous tissue have specific structures that help them accomplish their functions.
2. The muscular system consists of many organs (muscles) that help with movement and temperature homeostasis of the body.
3. Skeletal muscle is found attached to the skeleton throughout the body and helps generate movement and heat; cardiac muscle is the heart, which pumps blood around the body; and smooth muscle is found lining most hollow organs and helps move substances through other systems.
4. Healthcare professionals diagnose muscular problems using a variety of tools and tests, including the manual muscle test.
5. Joints of the body often form levers, and we can use the concepts of physics to study them.
6. The rules of force and motion studied in physics can be applied to the human body to find ways of optimizing performance or daily life.

Alignment to Standards

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

- HS-LS1-2
- HS-LS1-4
- CCC-1 Patterns
- CCC-2 Cause and Effect
- CCC-3 Scale, Proportion, and Quantity
- CCC-5 Energy and Matter
- CCC-6 Structure and Function

Learning Activities & Key Concepts and Skills

Muscle & nervous tissue histology - Students learn to identify basic muscle and nervous tissues including skeletal muscle, smooth muscle, cardiac muscle, neurons, and neuroglia. The activity is separated into three parts. Part A introduces students to the function, location, and structure of muscle and nervous tissues. Part B is a practice activity to identify various slide images of muscle and nervous tissues. Part C has students look at actual organ and tissue slides to find and identify muscle and nervous tissues.

Muscular system - Station lab activity that has students investigate the organs, histology, diseases, and characteristics of the muscular system. Students have the opportunity to measure muscle fatigue. Students perform a manual muscle test on a patient (partner). Students also have the opportunity to determine the relationship between muscle contraction and muscle size.

Biomechanics - This is a station activity that has students explore a variety of biomechanical characteristics of their own bodies. At Station A students will determine their rate of speed and acceleration. At Station B students will determine the range of motion of the elbow and knee joints. At Station C students will measure the amount of force generated by the triceps, biceps, quadriceps, and hamstrings. At Station D students will perform the Forestry Step Test to examine the link between muscle use and the increase in oxygen consumption by the body. Finally, at Station E students will determine the cadence, velocity, and stride length of their gait.

Assessments

Formative:

Open-ended questions with each lab assess student understanding of muscular and biomechanics concepts.

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Summative:

Written quiz, with both multiple choice and open-ended sections, assesses understanding of topics such as structure of muscles, clinical muscle tests, and types of levers in the body.

Benchmark:

Alternative:

Students perform several real clinical tests on their partners, including functional evaluations (gait analysis, range of motion) and manual muscle tests.

Career Education

CRP3. Attend to personal health and financial well-being. Students analyze their own gait, muscle strength, and range of motion, which can alert them to any health abnormalities.

CRP12. Work productively in teams while using cultural global competence. Students must work together to perform all the clinical tests, while also being mindful of their partner's personal space and comfort.

21st Century Skills

9.3.ST.6 - Demonstrate technical skills needed in a chosen STEM field. Students perform real clinical tests on their partners, including functional evaluations (gait analysis, range of motion) and manual muscle tests.

9.3.HL.2 - Explain the healthcare workers' role within their department, their organization and the overall healthcare system. Students discuss lesser-known members of the healthcare system, such as biomechanical engineers and physical therapists.

9.3.HL.4 - Evaluate the roles and responsibilities of individual members as part of the healthcare team and explain their role in promoting the delivery of quality health care. Students roleplay as lesser-known members of the healthcare system, therefore gaining a better understanding of their roles and responsibilities.

Interdisciplinary Connections

MA.K-12.4 Model with mathematics. Students use math to analyze the mechanics and physics of the human body.

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

VPA.1.1.12.D.CS2 Stimuli for the creation of artworks can come from many places, including other arts disciplines. Students use observational skills to observe color, shape, position, etc. of cells in muscle and nervous tissues, then draw them accurately.

Technology Integration

TECH.8.1.12.C - Additional resources and extension activities on Google Classroom in order to reflect on their learning and expand on knowledge.

| | |
|---|-------------|
| Time Frame | Weeks 11-12 |
| Topic | |
| Nervous system | |
| Essential Questions | |
| <ol style="list-style-type: none">1. What is the general structure and function of the nervous system?2. What is the difference between cranial nerves and spinal nerves?3. How do nerve cells communicate with each other and with muscle cells?4. How do the senses (taste, smell, touch, vision, hearing) work?5. How are smell and taste linked?6. How do addictive drugs affect the brain and create addiction? | |
| Enduring Understandings | |
| <ol style="list-style-type: none">1. The structure of individual nerve cells and the nervous system as a whole are responsible for its function of carrying messages quickly and accurately around the body.2. The twelve pairs of cranial nerves are responsible for movement and sensation in the head and neck, while the 31 spinal nerves are responsible for the body.3. Electrical signals, created by ion gradients, cause impulses to move through nerve cells, while neurotransmitters such as dopamine and serotonin carry the impulse from one cell to the next. | |

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

4. Special receptor cells and processing areas in the brain work together to perceive and interpret sensory input.
5. Smell and taste work together to create the sensation of flavor, and warn us of danger.
6. Addictive drugs mimic or alter neurotransmitters and receptors in the brain, leading to altered perception and creating physiological cravings which lead to addiction.

Alignment to Standards

- HS-LS1-2
- HS-ETS1-4
- CCC-1 Patterns
- CCC-2 Cause and Effect
- CCC-3.1 Scale, Proportion, and Quantity,
- CCC-4 Systems and System Models
- SEP-2 Developing and Using Models

Learning Activities & Key Concepts and Skills

Nervous system - Station lab activity that has students investigate the organs, histology, diseases, and characteristics of the nervous system. Students investigate whether they have any nerve damage in their forearms, visual acuity, and determine their reaction time.

Cranial nerves - Lab activity that has students test the function of their cranial nerves. This activity is setup to be conducted with a partner, and each cranial nerve test is followed by a short description of disorders that may affect the function of that cranial nerve.

Smell & taste - Lab activity that has students investigate characteristics of smell and taste. Station activities will allow students to determine their olfactory acuity, observe sense accommodation, learn how taste and smell are linked, and compare taste sensations.

Drug addiction & the brain - Internet activity using animations and activities by the

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Genetics Science Learning Center, on “Drug Abuse and Addiction”. Students use the site to explore the symptoms and negative effects of several categories of drugs, on neurotransmitters and/or receptors of the brain. The causes of addiction and tolerance are also explored.

Assessments

Formative:

After each lab, students will answer analysis questions assessing their understanding of each topic, including structure and function of neurons, name and function of cranial nerves, and the mechanisms of addiction.

Summative:

A written quiz will include multiple choice and open-ended questions on topics such as identifying parts of a neuron, connecting structure to function in the system as a whole, and explaining various functions of the system and senses.

Benchmark:

Alternative:

Students conduct tests on their own senses (smell, vision, perception, hearing) and reaction times, then assess the results to determine if they have any nerve malfunctions.

Career Education

CRP3. Attend to personal health and financial well-being. Students assess and analyze their own sensory and nervous function.

CRP7. Employ valid and reliable research strategies. Students must research how drugs affect the brain and how addiction happens.

CRP11. Use technology to enhance productivity. Students use their Chromebooks and interactive simulations to understand drugs and addiction.

21st Century Skills

9.3.ST.2 - Use technology to acquire, manipulate, analyze, and report data. Students use their Chromebooks and interactive simulations to understand drugs and addiction.

Interdisciplinary Connections

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

LA.11-12.RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. Students research and summarize various processes, including how a nerve impulse travels through the body and how drugs of addiction work.

SOC.9-12.1.1.1 Compare present and past events to evaluate the consequences of past decisions and to apply lessons learned. While researching drug addiction, students evaluate how choices impact future consequences with regard to addiction.

Technology Integration

TECH.8.1.12.D.5 - Demonstrate personal responsibility for life-long learning by using the internet and interactive simulations to understand drugs and addiction.

TECH.8.1.12.E - Organize, analyze, evaluate, and synthesize information from a variety of sources and media.

| | |
|--|---------|
| Time Frame | Week 13 |
| Topic | |
| Cardiovascular system | |
| Essential Questions | |
| <ol style="list-style-type: none">1. What are the structural features and functions of the organs of the cardiovascular system?2. How do medical professionals measure and assess heart rate and blood pressure?3. How can the blood be analyzed, and what information can be gleaned from this analysis?4. What is an electrocardiogram, and what does it measure? | |
| Enduring Understandings | |
| <ol style="list-style-type: none">1. The heart, arteries, veins, and blood cells all have specific structures that help them accomplish the function of circulation oxygen and nutrients to all tissues in the body.2. The stethoscope and sphygmomanometer are essential tools for assessing the health of the | |

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

cardiovascular system, which varies based on factors such as age, sex, and fitness level.\

3. Hematocrit values and complete blood cell counts can give information about the health of the cardiovascular system as well as overall health issues.
4. Electrocardiograms are recordings of electrical patterns in the heart, and are the main tool to determine heart rate, rhythm, and intervals.

Alignment to Standards

- HS-LS1-2
- HS-LS1-3
- HS-PS4-4
- CCC-1 Patterns
- CCC-3 Scale, Proportion, and Quantity,
- CCC-6 Structure and Function

Learning Activities & Key Concepts and Skills

Cardiovascular system - Station lab activity that has students investigate the organs, histology, diseases, and characteristics of the cardiovascular system. Students have the opportunity to use a stethoscope to listen to specific valves of the heart and locate the pulse at several pulse points. Students practice taking blood pressure measurements using a manual sphygmomanometer. Students measure and determine whether the hematocrit of their patients is within the normal range.

Complete blood cell count - Students learn about the contents of blood, and what can be diagnosed through a complete blood cell count. A simulated complete blood cell count for four patients to determine whether each patient's RBC, WBC, and platelet levels are high, low, or normal is done. Students will follow-up by looking at the patient's test results to formulate a diagnosis.

ECG activity - Students learn how to interpret electrocardiograms. Part A has students go through an internet activity that teaches ECG reading and shows how to interpret electrocardiograms. Part B allows students to put the internet lesson to practice by interpreting electrocardiograms.

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Assessments

Formative:

Written analysis questions after each lab assess understanding of topics such as organs, histology, and diseases of the cardiovascular system; components of blood and how they change with disease; and how to read an ECG.

Summative:

A quiz at the end of the unit assesses understanding of cardiovascular topics with multiple choice and open-ended questions; topics include structure and function of the cardiovascular system; blood cell structure and function; and how to identify a normal sinus rhythm of the heart.

Benchmark:

Alternative:

Students practice real clinical assessments, including taking pulse, listening to heart rate and rhythm, evaluating a complete blood cell count, and analyzing an ECG for rate, rhythm, and various intervals.

Career Education

CRP3. Attend to personal health and financial well-being. Students evaluate their own, as well as a partner's, cardiovascular health, in terms of heart rate and rhythm and blood pressure.

CRP7. Employ valid and reliable research strategies. Students use their evaluation of a complete blood cell count to research possible diagnoses and treatments.

CRP2. Apply appropriate academic and technical skills. Students practice skills that will assist them in the healthcare workplace, including research, taking vital signs, and assessing tests like hematocrit and complete blood cell count.

CRP11. Use technology to enhance productivity. Students use an interactive review tool for nursing students to learn how to read an ECG.

21st Century Skills

9.3 HL-THR.3 - Utilize processes for assessing, monitoring, and reporting patient's/client's health status to the treatment team within protocol and scope of practice. Students assess a partner's vital signs, record them, and communicate whether they are normal or not.

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

9.3.ST.6 - Demonstrate technical skills needed in a chosen STEM field. Students practice skills that will assist them in the healthcare workplace, including research, taking vital signs, and assessing tests like hematocrit and complete blood cell count.

9.3.HL.1 - Determine academic subject matter, in addition to high school graduation requirements, necessary for pursuing a health science career. Students use an interactive review designed for nursing students, and discuss what other information is necessary for nursing school.

9.3.HL.2 - Explain the healthcare workers' role within their department, their organization and the overall healthcare system. Students act as various healthcare workers, including nurse, researcher, and cytotechnologist.

9.3.HL.4 - Evaluate the roles and responsibilities of individual members as part of the healthcare team and explain their role in promoting the delivery of quality health care. Students act as various healthcare workers, including nurse, researcher, and cytotechnologist, and practice communicating information as these professionals would do.

Interdisciplinary Connections

LA.11-12.RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. Students must read and follow a complex set of steps to use the sphygmomanometer

Technology Integration

TECH.8.1.12.D.5 - Demonstrate personal responsibility for life-long learning by using the internet to research disease symptoms and to learn new skills.

TECH.8.1.12.E - Organize, analyze, evaluate, and synthesize information from a variety of sources and media, including medical websites and online interactive study aids.

| | |
|------------|------------|
| Time Frame | Week 14-15 |
| Topic | |

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Respiratory system

Essential Questions

1. How does the process of inhalation and exhalation work?
2. What symptoms can indicate problems with the respiratory system?
3. How do healthcare workers measure lung function and capacity?
4. What can cause respiratory distress, and how does respiratory distress affect the patient physically and mentally?
5. How can air quality of a patient's environment affect their health?

Enduring Understandings

1. Inhalation is initiated by the diaphragm, which contracts to pull air into the lungs; exhalation occurs when the diaphragm relaxes and air is pushed out of the lungs.
2. Many diseases can affect the respiratory system, most of which will cause shortness of breath, labored breathing, rapid breathing, and/or slow breathing.
3. A spirometer can be used to measure lung capacity and volume, which can indicate issues regarding respiratory health and overall fitness.
4. Respiratory distress can be caused by many respiratory disorders, such as asthma, and causes changes in the patient's heart rate, respiratory rate, and mental distress level.
5. Air quality can be affected by natural and human-caused factors, and it can contribute to respiratory distress and illnesses.

Alignment to Standards

- HS-LS1-2
- CCC-1 Patterns
- CCC-2 Cause and Effect
- CCC-3 Scale, Proportion, and Quantity
- CCC-7 Stability and Change
- SEP-3 Planning and Carrying Out Investigations

Learning Activities & Key Concepts and Skills

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Respiratory system - Station lab activity that has students investigate the organs, histology, diseases, and characteristics of the respiratory system. Students have the opportunity to perform a spirometry test to measure tidal volume, expiratory reserve volume, inspiratory reserve volume, vital capacity, and total lung capacity. Students practice auscultating lung sounds and taking respiratory rates. Students also have the opportunity to perform a simulated analysis of a patient to determine what is causing respiratory distress

Respiratory distress - Students learn how to recognize respiratory distress and the most common causes including asthma and COPD (chronic bronchitis and emphysema). The lab activity involves students using different diameter straws to simulate constriction of airways. The students will assess the respiratory rate and pulse of test subjects breathing through the straws at rest and during exercise.

Air quality & health - Students identify the amount of particulate matter pollution in outdoor or indoor locations of their choice. Assessment of environmental factors and using an air quality index to determine respiratory safety is used throughout the lab. The impact of air pollution on respiratory health is also reviewed.

Assessments

Formative:

Each lab activity ends with analysis questions, assessing topics such as how to measure and evaluate lung function, causes and symptoms of respiratory disorders, and the connection between environment and health.

Summative:

A written quiz with both multiple choice and open-ended parts assesses understanding of the structure and function of the respiratory system, respiratory disorders, and causes of respiratory distress.

Benchmark:

Alternative:

Students are assessed on their performance of real clinical skills, including measuring lung volume and capacity, auscultating lung sounds, taking respiratory rates, and diagnosing respiratory distress.

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Career Education

CRP3. Attend to personal health and financial well-being. Students assess their own lung function and compare it to average values for their age group and sex.

CRP12. Work productively in teams while using cultural global competence. Students must work as teams to simulate respiratory distress, and to carry out an air pollution study.

21st Century Skills

9.3 HL-THR.3 - Utilize processes for assessing, monitoring, and reporting patient's/client's health status to the treatment team within protocol and scope of practice. Students practice taking respiratory vital signs, evaluating patient data, diagnosing an illness, and communicating all this information in writing.

Interdisciplinary Connections

LA.11-12.RST.11-12.3 - Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. Students must carefully read and follow directions when performing a mock surgery and a dissection.

Technology Integration

TECH.8.1.12.C - Additional resources and extension activities on Google Classroom in order to reflect on their learning and expand on knowledge.

TECH.8.1.12.F - Students will use various websites to research and record temperature, weather, wind speed, and air quality data over 7 days.

| | |
|------------------|---------|
| Time Frame | Week 16 |
| Topic | |
| Digestive system | |

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Essential Questions

1. How are the structure and function of the digestive system linked?
2. What are the common diagnostic tests to check for illnesses of the digestive system?
3. What are the causes, symptoms, and preventative measures for foodborne illness?
4. What constitutes a healthy diet?

Enduring Understandings

1. The structure of the digestive system allows it to break down food and absorb nutrients very efficiently.
2. Tests including imaging (eg x-rays), viewing (eg endoscopes), and checking for blood (eg fecal occult blood test) can help diagnose disorders such as strictures, blockages, ulcers, cancers, and irritation of the digestive system.
3. Foodborne illness is caused by pathogens or chemicals in food; often cause flu-like symptoms, diarrhea, and vomiting; and can be prevented by proper handling, refrigeration, and heating of food.
4. A healthy diet consists of balanced nutrients including carbohydrates, proteins, fats, sodium, and sugars, and must include a healthy number of calories based on the person's BMR (basal metabolic rate).

Alignment to Standards

- HS-LS1-2
- CCC-1 Patterns
- CCC-2 Cause and Effect
- CCC-3 Scale, Proportion, and Quantity
- CCC-5 Energy and Matter
- SEP-3 Planning and Carrying Out Investigations

Learning Activities & Key Concepts and Skills

Digestive system - Station lab activity that has students investigate the organs, histology, diseases, and characteristics of the digestive system. The length of the digestive system will be simulated with string, the time from swallowing until it

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

reaches the stomach will be measured, and a simulated fecal occult blood test will be performed. Charts/information are provided for each station.

Bacteria in food - Lab activity in which students observe the amount of bacteria that develops in yogurt or milk left out for different periods of time. Students act as a family physician educating a patient on the importance of refrigeration to deter bacterial growth in milk products

What's in your food? - Lab activity that has students investigate nutritional facts, choose a favorite meal, and measure out the amount of fat, salt, and sugar in their favorite meal. Meals are then compared among the class.

Assessments

Formative:

End-of-lab analysis questions cover concepts like structure, function, histology, and diseases of the digestive system; causes, symptoms, and prevention of foodborne illness; and nutritional needs of the average person.

Summative:

A written quiz at the end of the unit uses multiple choice and open-ended questions to assess understanding of structure, function, histology, and diseases of the digestive system; causes, symptoms, and prevention of foodborne illness; and nutritional needs of the average person

Benchmark:

Alternative:

Students make a model of the digestive system to illustrate the relationship between sizes of organs, and plan a whole day of meals that falls within the FDA recommended guidelines.

Career Education

CRP3. Attend to personal health and financial well-being. Students analyze their own diets to assess their nutrition.

CRP4. Communicate clearly and effectively and with reason. Students practice communicating the importance of refrigeration to a patient with foodborne illness.

CRP7. Employ valid and reliable research strategies. Students must use patient information and

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

other resources to diagnose a specific foodborne illness.

CRP12. Work productively in teams while using cultural global competence. Students must work together to plan a whole day of meals that falls within the FDA recommended guidelines.

21st Century Skills

9.3.HL.2 - Explain the healthcare workers' role within their department, their organization and the overall healthcare system. Students practice the patient communication side of healthcare work, as well as acting as a nutritionist.

9.3.HL-BRD.4 - Demonstrate the principles of... sterile techniques, contamination control... used in biotechnology research. Students must take cultures of different milk samples using sterile techniques in order to assess the amount of bacteria in each one.

9.3 HL-THR.3 - Utilize processes for assessing, monitoring, and reporting patient's/client's health status to the treatment team within protocol and scope of practice. Students practice monitoring and reporting the condition of a patient with foodborne illness symptoms.

9.3.ST.6 - Demonstrate technical skills needed in a chosen STEM field. Students must take cultures of different milk samples using sterile techniques in order to assess the amount of bacteria in each one.

Interdisciplinary Connections

SOC.9-12.1.1.1 - Compare present and past events to evaluate the consequences of past decisions and to apply lessons learned. Students discuss the health consequences of good and bad nutrition choices.

MA.K-12.4 - Model with mathematics. Students use math skills to ensure their meal plan is within FDA-recommended values.

Technology Integration

TECH.8.1.12.C - Students use the internet to look up the nutritional value of various foods in their diets, as well as symptoms and causes of specific foodborne illnesses.

Time Frame

Week 17

Topic

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Reproductive system & fertility

Essential Questions

1. What is infertility, and what are its common causes?
2. What fertility treatments are available?
3. How do human babies develop?
4. What are the risks to mother and baby associated with babies that are either too large or too small for their gestational age?

Enduring Understandings

1. Infertility is diagnosed when a couple hasn't conceived after 12 months, and it can be caused by a variety of factors, from gamete formation to implantation of the embryo, in either the male or female.
2. Fertility treatments work by increasing ovulation or ejaculation, stabilizing hormones, and/or using in vitro or in vivo techniques for fertilization and/or development.
3. Babies develop over the course of 38-40 weeks, following a predictable set of stages.
4. Babies that are too large can cause injury to the mother during birth; babies that are too small often have health problems of their own.

Alignment to Standards

- HS-LS1-4
- CCC-3 Scale, Proportion, and Quantity
- CCC-6 Structure and Function
- CCC-7 Stability and Change
- SEP-3 Planning and Carrying Out Investigations

Learning Activities & Key Concepts and Skills

Fertility - Students will act as fertility specialists for four couples seeking fertility assistance. They will compare medical backgrounds and hormone test results to normal values to determine what may be causing the couples' infertility. Students follow up with research to create a treatment plan for each couple.

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Fetal development - Students continue as the fertility specialist for the three couples that were able to conceive from Lab 16b. Data on fetal size and development is compared to normal values to determine whether the fetus is developing at a normal rate.

Assessments

Formative:

Each lab activity is followed by analysis questions assessing understanding of fetal development and fertility.

Summative:

A quiz at the end of the unit assesses knowledge of fertility, fetal development, and pregnancy risks.

Benchmark:

Alternative:

Students use patient history and medical tests to diagnose causes of infertility, then write case treatment plans for each couple, and use a graph to analyze and display fetal development data.

Career Education

CRP2. Apply appropriate academic and technical skills. Students research causes of infertility and generate a treatment plan.

CRP4. Communicate clearly and effectively and with reason. Students must write a treatment plan for a patient.

CRP7. Employ valid and reliable research strategies. Students research causes of infertility and generate a treatment plan.

CRP11. Use technology to enhance productivity. Students use the internet and medical websites to research causes and treatments of infertility.

21st Century Skills

9.3.HL.2 - Explain the healthcare workers' role within their department, their organization and the overall healthcare system. Students play the role of a fertility specialist.

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

9.3.ST.2 - Use technology to acquire, manipulate, analyze, and report data. Students research causes and treatments of infertility on the internet.
9.3.HL.4 - Evaluate the roles and responsibilities of individual members as part of the healthcare team and explain their role in promoting the delivery of quality health care. Students act as fertility specialists and patient liaisons in researching and communication about fertility and fetal development.

Interdisciplinary Connections

LA.11-12.RST.11-12.2 - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. Students must identify the key points in the patient histories, then read and summarize information about fertility treatments for specific issues.
MA.K-12.4 - Model with mathematics. Students use graphing skills to represent average fetal growth rates and patient data.

Technology Integration

TECH.8.1.12.E - Organize, analyze, evaluate, and synthesize information from a variety of sources and media when diagnosing and creating treatment plans for infertility.
TECH.8.1.12.D - Demonstrate personal responsibility for life-long learning by using the internet to find reliable information and solve problems.

| | |
|---|---------|
| Time Frame | Week 18 |
| Topic | |
| Global health | |
| Essential Questions | |
| <ol style="list-style-type: none">1. What are the major infectious disease threats in the world today?2. How do education and poverty impact health and life expectancy?3. How are patient history and symptoms important when diagnosing disease?4. What is an epidemic and how are then identified and controlled? | |

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Enduring Understandings

1. There are many infectious diseases that cause problems worldwide, including AIDS, diarrheal diseases, and malaria.
2. Countries with low education and high poverty often have higher infectious disease burdens and lower life expectancies.
3. Patient history and symptoms work together to suggest differential diagnoses, or rule out possible diagnoses.
4. An epidemic is a widespread outbreak of a contagious disease, often first identified by general practitioners and emergency department workers.
5. Epidemics are controlled by a combination of diagnosing and derating patients, and public outreach to control the spread.

Alignment to Standards

- CCC-1 Patterns
- CCC-3 Scale, Proportion, and Quantity
- SEP-2 Developing and Using Models
- SEP-3 Planning and Carrying Out Investigations

Learning Activities & Key Concepts and Skills

Global health investigation - Students will have the opportunity to investigate the status of medicine, disease, and health access on a global scale. Interactive maps of life expectancy, annual income, and literacy compare the occurrence and mortality rates of several infectious diseases. Students also have the opportunity to research current investigators of global health issues. PBS videos can be purchased to supplement.

Epidemiology - Students role-play as healthcare workers and/or patients. The healthcare worker performs a patient exam and records pertinent history and symptoms in order to discover the infectious agent the patient may have contracted.

Assessments

Formative:

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Analysis questions have students interpret global health data and determine the proper treatment for an infectious disease.

Summative:

On the final exam, students are asked to state the relationship between education (literacy), poverty (GDP), and life expectancy. Then they suggest non-medical ways to increase life expectancy in developing countries.

Benchmark:

Alternative:

Students analyze global health data and draw conclusions, and students use symptoms and history to diagnose a patient with an infectious disease.

Career Education

CRP2. Apply appropriate academic and technical skills. Students research global health data and perform diagnoses.

CRP7. Employ valid and reliable research strategies. Students use an interactive map to determine the relationship among education, income, and health.

CRP11. Use technology to enhance productivity. Students use an online interactive tool to determine the relationship among education, income, and health; and research infectious disease treatment online.

CRP12. Work productively in teams while using cultural global competence. Students work in groups to act as patients and healthcare workers.

21st Century Skills

9.3.HL.1 - Determine academic subject matter, in addition to high school graduation requirements, necessary for pursuing a health science career. Students discuss what it takes to become an epidemiologist, and research the background of various people on the front lines of infectious disease research, prevention, and treatment.

9.3.HL.2 - Explain the healthcare workers' role within their department, their organization and the overall healthcare system. Students practice being on the front lines of epidemic detection, by differentiating between everyday illnesses and potential epidemics.

9.3.HL.4 - Evaluate the roles and responsibilities of individual members as part of the healthcare team and explain their role in promoting the delivery of quality health care. Students discuss the roles of various people in diagnosing, researching, preventing, and treating various infectious diseases.

9.3.ST.2 - Use technology to acquire, manipulate, analyze, and report data. Students use online

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

tools to research global health data.

Interdisciplinary Connections

LA.11-12.RST.11-12.2 Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. Students pull pertinent information from readings about patient symptoms and history, and from data about global health information.

Technology Integration

TECH.8.1.12.F -1 - Students use an online interactive map to gather global health data.
TECH.8.1.12.C - Additional resources and extension activities on Google Classroom to further their knowledge and skills in online researching.

| | |
|--|------------|
| Time Frame | Week 19-20 |
| Topic | |
| Pathology & autopsy/Body System Project | |
| Essential Questions | |
| <ol style="list-style-type: none">1. What is surgery, and when is it used?2. What are sutures and why are they used?3. What is an autopsy and when is one performed?4. How are all the systems we studied linked together? | |
| Enduring Understandings | |
| <ol style="list-style-type: none">1. Surgery is the treatment of a medical condition through an incision in the body.2. Sutures are stitches that close a wound to reduce infection risk and blood loss, while improving healing and function.3. An autopsy is a thorough investigation of a body after death to determine cause of death. | |

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

4. Autopsies are generally performed for medical reasons (eg sudden unexpected death) or legal reasons (suspicious death).
5. The systems studied this semester all work together to sustain life.

Alignment to Standards

- HS-LS1-2
- CCC-1 Patterns
- CCC-2 Cause and Effect
- CCC-4 Systems and System Models
- CCC-6 Structure and Function
- CCC-7 Stability and Change
- SEP-2 Developing and Using Models
- SEP-3 Planning and Carrying Out Investigations

Learning Activities & Key Concepts and Skills

Surgery & suturing - Students will learn about common surgical procedures and suturing techniques. The students are part of a surgical team that conducts an appendectomy, removal of the kneecap, a cesarean section, and open heart surgery on a model patient.

Pathology & autopsy - A video-based activity using “The Autopsy Files” by the renowned medical examiner Dr. Baden. Students learn about how forensic pathology and autopsy can be used in criminal investigations to identify a victim and solve crimes.

Fetal pig autopsy - Students will act as part of a medical examiner’s team to conduct an autopsy on a fetal pig. The team will follow autopsy procedure, which will include removing and weighing each organ, followed by completing an autopsy report on the victim.

Assessments

Formative:

Analysis questions review definitions and applications of surgery, suturing, and pathology

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

concepts and terms.

Summative:

Students generate an autopsy report at the end of the fetal pig “autopsy” (dissection).

Benchmark:

Content (multiple choice) assessing knowledge of body systems, anatomy terms, and physiology of disease; and skills (essay) assessing ability to synthesize information from multiple units.

Alternative:

Career Education

CRP1. Act as a responsible and contributing citizen and employee. Each student must take a role in both the surgery and autopsy labs.

CRP2. Apply appropriate academic and technical skills. Students must glean information from a documentary about autopsy; they also practice clinical skills like dissection and suturing.

CRP4. Communicate clearly and effectively and with reason. Students generate an autopsy report which must concisely and accurately summarize their findings.

CRP12. Work productively in teams while using cultural global competence. Each student must take a role in both the surgery and autopsy labs.

21st Century Skills

9.3.HL.1 - Determine academic subject matter, in addition to high school graduation requirements, necessary for pursuing a health science career. Students learn about the requirements to become a medical examiner.

9.3.HL.2 - Explain the healthcare workers’ role within their department, their organization and the overall healthcare system. Students evaluate the role of the medical examiner in both medicine and law.

9.3.HL.3 - Identify existing and potential hazards to clients, coworkers, visitors, and self in the healthcare workplace. Students learn about and practice wearing personal protective equipment (PPE), similar to practices in many medical and lab settings.

9.3.HL.4 - Evaluate the roles and responsibilities of individual members as part of the healthcare team and explain their role in promoting the delivery of quality health care. Students rotate roles during a simulated surgery, taking turns being a variety of doctors and nurses.

9.3.HL-BRD.4 - Demonstrate the principles of... sterile techniques, contamination control... used in biotechnology research. Students learn about and practice wearing personal protective

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

equipment (PPE), similar to practices in many medical and lab settings.

9.3.HL-THR.2 - Communicate patient/client information among healthcare team members to facilitate a team approach to patient care. Students must communicate among their team to provide the simulated patient with the best care during the simulated surgery.

9.3.HL-THR.3 - Utilize processes for assessing, monitoring, and reporting patient's/client's health status to the treatment team within protocol and scope of practice. Students must communicate among their team to provide the simulated patient with the best care during the simulated surgery.

9.3.ST.3 - Describe and follow safety, health, and environmental standards related to STEM workplaces. Students learn about and practice wearing personal protective equipment (PPE), similar to practices in many medical and lab settings.

9.3.ST.6 - Demonstrate technical skills needed in a chosen STEM field. Students learn about and practice wearing personal protective equipment (PPE), similar to practices in many medical and lab settings; they also learn how to use a scalpel, make an incision, and suture a wound.

Interdisciplinary Connections

LA.11-12.RST.11-12.3 - Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. Students must carefully read and follow directions when performing a mock surgery and a dissection.

SOC.9-12.1.1.1 - Compare present and past events to evaluate the consequences of past decisions and to apply lessons learned. Students learn about the history of forensic science and autopsy, and see how information and events from the past influence the science today.

Technology Integration

TECH.8.1.12.C - Students use an online interactive tool to do a virtual autopsy, expanding their knowledge about these procedures and practicing determining cause of death.

TECH.8.1.12.E - Organize, analyze, evaluate, and synthesize information from a variety of sources and media.

TECH.8.1.12.F-1 - Students view a documentary video to explore the history of autopsy in forensics and the use of autopsy to identify and convict suspects.

Modifications (ELL, Special Education, At-Risk Students, Gifted & Talented, & 504 Plans)

ELL:

- Work toward longer passages as skills in English increase
- Use visuals

Home of the Spartans!

#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

- Introduce key vocabulary before lesson
- Teacher models reading aloud daily
- Provide peer tutoring
- Use of Bilingual Dictionary
- Guided notes and/or scaffold outline for written assignments
- Provide students with English Learner leveled readers.

Supports for Students With IEPs:

- Allow extra time to complete assignments or tests
- Guided notes and/or scaffold outline for written assignments
- Work in a small group
- Allow answers to be given orally or dictated
- Use large print books, Braille, or books on CD (digital text)
- Follow all IEP modifications

At-Risk Students:

- Guided notes and/or scaffold outline for written assignments
- Introduce key vocabulary before lesson
- Work in a small group
- Lesson taught again using a differentiated approach
- Allow answers to be given orally or dictated
- Use visuals / Anchor Charts
- Leveled texts according to ability

Gifted and Talented:

- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Organize and offer flexible small group learning activities
- Provide whole group enrichment explorations
- Teach cognitive and methodological skills
- Use center, stations, or contracts
- Organize integrated problem-solving simulations
- Propose interest-based extension activities
- Expose students to beyond level texts.

Home of the Spartans!
#spartanlegacy



Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:

Meeting the needs of all students with a proud tradition of academic excellence.

Supports for Students With 504 Plans:

- Follow all the 504 plan modifications
- Text to speech/audio recorded selections
- Amplification system as needed
- Leveled texts according to ability
- Fine motor skill stations embedded in rotation as needed
- Modified or constrained spelling word lists
- Provide anchor charts with high frequency words and phonemic patterns

Home of the Spartans!
#spartanlegacy