Unit #9: Digestive & Urinary Systems

Content Area:	Science
Course(s):	Anatomy and Physiology
Time Period:	Fourth Marking Period
Length:	3 Weeks
Status:	Published

Unit Overview

This unit explores the physical and chemical mechanisms of digestion, elimination, transportation and absorption within the body to change the food and derive energy. We will also focus on essential nutrition and food labeling. It also explains the role of the urinary system to regulate body wastes (i.e. water, electrolyte balance, volume of body fluids). This unit also discusses the function of filtration, reabsorption and secretion of urine by the kidneys.

STAGE 1- DESIRED RESULTS

Educational Standards

Standards- 2020 New Jersey Student Learning Standards- Science

Performance Expectations

Life Sciences	
SCI.HS-LS1-6	Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.
SCI.HS-LS1-7	Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
SCI.HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Science and Engineering Practices

- Practice 1: Asking Questions and Defining Problems
- Practice 2: Developing and Using Models
- Practice 3: Planning and Carrying Out Information
- Practice 4: Analyzing and Interpreting Data
- Practice 5: Using Mathematics and Computational Thinking
- Practice 6: Constructing Explanations and Designing Solutions
- Practice 7: Engaging in Argument from Evidence
- Practice 8: Obtaining, Evaluating, and Communicating Information

Cross Cutting Concepts

- Systems and System Models
- Energy and Matter
- Structure and Functions
- Stability and Change

Disciplinary Core Ideas

Life Sciences

- LS1.A: Structure and function
- LS1.B: Growth and development of organisms
- LS1.C: Growth and development of organisms

Essential Questions

- How does structure relate to function?
- · How does the body metabolize essential nutrients?
- How do the kidneys maintain fluid balance?

Enduring Understanding

- The macroscopic and microscopic structures of the digestive system function to derive essential nutrients
- Enzymes play an essential role in digesting and excretion
- the organs and tissues of the Urinary System work to eliminate organic waste products from the body's fluids

Students will know... Vocabulary Definitions:

absorption, alimentary canal, bolus, cavity, chyme, diarrhea, digestion, emulsify, feces, jaundice, lumen, mastication, papilla, peristalsis, peritoneum, rugae, ulcer, uvula, esophagus, stomach, duodenum, jejunum, cecum, colon, anus, sphincter, micturition, polyuria, urination, anabolism, basal metabolic rate, calorie, catabolism, glycolysis, thermoregulation, vitamin

Predictable misconceptions:

- Students may believe that the mass of the food you eat, directly translates to weight gain
- Students may believe that the digestive system works in isolation
- Students may believe that the kidneys only filter liquids ingested
- Students may believe that only dietary fat can cause weight gain and associated health issues

Students will be able to...

- list in sequence each of the component parts or segments of the alimentary canal from the mouth to the anus and identify the accessory organs of digestion.
- list and describe the four layers of the wall of the alimentary canal.
- discuss the basics of protein, fat and carbohydrate digestion and give the end products of each process.
- define and contrast anabolism and catabolism.
- define basal metabolic rate and list some facts that affect it.
- identify the major organs of the urinary system and give the generalized function of each.
- explain the importance of filtration, reabsorption and secretion in urine formation .

• explain how the kidneys act as vital organs in maintaining homeostasis.

STAGE 2- EVIDENCE OF LEARNING

Formative Assessment Suggestions

- 3- Minute Pause
- A-B-C Summaries
- Analogy Prompt
- Choral Response
- Debriefing
- Exit Card / Ticket
- Hand Signals
- Idea Spinner
- Index Card Summaries
- Inside-Outside Circle Discussion (Fishbowl)
- Journal Entry
- Misconception Check
- Observation
- One Minute Essay
- One Word Summary
- Portfolio Check
- Questions & Answers
- Quiz
- Self-Assessment
- Student Conference
- Think-Pair-Share
- Web or Concept Map

Authentic Assessments Suggestions

- 1. virtual & 3D anatomical models to identify the gross anatomy of the digestive & urinary systems
- 2. label and identify structures drawings

- 3. aspirin lab to model changing pH environment through digestive tract
- 4. discuss the swallowing mechanism, have students place their hands on their larynx so that they can feel it rise when they swallow
- 5. Love Your Gut digestive system game travel through the digestive system to learn the structures and enzymes working at each location
- 6. digestive system quiz
- 7. research thirst mechanism, discuss the impact of dehydration on health; discuss why I&O (fluid intake and output) records are so carefully maintained on ill patients
- 8. research why sports drinks are effective and when they are most effective
- 9. urinary / excretory system quiz
- 10. have students research eating disorders such as anorexia and bulimia, and discuss the nutritional and physiological implications of these behavioral diseases
- 11. research & discuss fecal transplants
- 12. nutritional label reading exercise
- 13. research pathologies
- 14. case studies

Benchmark Assessments

chapter 14 test: digestive system and metabolism

chapter 15 test: urinary system

STAGE 3- LEARNING PLAN

Instructional Map

- anatomy & physiology of the digestive system
- metabolism

- nutrition
- anatomy & physiology of the urinary system
- fluid balance, electrolyte balance & pH balance

Modifications/Differentiation of Instruction

Differentiation Strategies for Special Education Students

- Remove unnecessary material, words, etc., that can distract from the content
- Use of off-grade level materials
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Time allowed
- Level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Varied homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Ability to work at their own pace
- Present ideas using auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment
- Differentiated checklists and rubrics, if available and appropriate

Differentiation Strategies for Gifted and Talented Students

- Increase the level of complexity
- Decrease scaffolding
- Variety of finished products
- Allow for greater independence
- Learning stations, interest groups

- Varied texts and supplementary materials
- Use of technology
- Flexibility in assignments
- Varied questioning strategies
- Encourage research
- Strategy and flexible groups based on formative assessment or student choice
- Acceleration within a unit of study
- Exposure to more advanced or complex concepts, abstractions, and materials
- Encourage students to move through content areas at their own pace
- After mastery of a unit, provide students with more advanced learning activities, not more of the same activity
- Present information using a thematic, broad-based, and integrative content, rather than just singlesubject areas

Differentiated Strategies for ELL Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials, including visuals
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Allow students to work at their own pace
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Role play
- Provide graphic organizers, highlighted materials
- Strategy and flexible groups based on formative assessment

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- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment

504 Plans

Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

- walk, breathe, eat, or sleep
- communicate, see, hear, or speak
- read, concentrate, think, or learn
- stand, bend, lift, or work

Examples of accommodations in 504 plans include:

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- adjusted class schedules or grading
- verbal testing

- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

Modification Strategies

- Extended Time
- Frequent Breaks
- Highlighted Text
- Interactive Notebook
- Modified Test
- Oral Directions
- Peer Tutoring
- Preferential Seating
- Re-Direct
- Repeated Drill / Practice
- Shortened Assignments
- Teacher Notes
- Tutorials
- Use of Additional Reference Material
- Use of Audio Resources

High Preparation Differentiation

- Alternative Assessments
- Choice Boards
- Games and Tournaments
- Group Investigations
- Guided Reading
- Independent Research / Project
- Interest Groups
- Learning Contracts
- Leveled Rubrics
- Literature Circles
- Menu Assignments
- Multiple Intelligence Options

- Multiple Texts
- Personal Agendas
- Project Based Learning (PBL)
- Stations / Centers
- Think-Tac-Toe
- Tiered Activities / Assignments
- Varying Graphic Organizers

Low Preparation Differentiation

- Choice of Book / Activity
- Cubing Activities
- Exploration by Interest (using interest inventories)
- Flexible Grouping
- Goal Setting With Student
- Homework Options
- Jigsaw
- Mini Workshops to Extend Skills
- Mini Workshops to Re-teach
- Open-ended Activities
- Think-Pair-Share by Interest
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Learning Style
- Think-Pair-Share by Readiness
- Use of Collaboration
- Use of Reading Buddies
- Varied Journal Prompts
- Varied Product Choice
- Varied Supplemental Materials
- Work Alone / Together

Horizontal Integration- Interdisciplinary Connections

See Appendix

Vertical Integration- Discipline Mapping

Prerequisites: Students who wish to take Honors Anatomy & Physiology should have earned and A or B in both Biology and Chemistry courses.

Students who have successfully completed Honors Anatomy & Physiology are encouraged to enroll in: Physics, Zoology, Forensics or Human Impact on the Environment

Additional Materials

Textbook : Essentials of Human Anatomy & Physiology 11e, Elaine N. Marieb masteringaandp.com

Internet Resources

Love Your Gut Game http://www.loveyourgut.com/games/gut_week_game.php

Crash Course, Digestive System, Part 1 <u>https://www.youtube.com/watch?v=yIoTRGfcMqM</u>

Crash Course, Digestive System, Part 2 https://www.youtube.com/watch?v=pqgcElaXGME

Crash Course, Digestive System, Part 3 https://youtu.be/jGme7BRkpuQ

Crash Course, Metabolism & Nutrition, Part 1 https://youtu.be/fR3NxCR9z2U

Crash Course, Metabolism & Nutrition, Part 2 https://youtu.be/fR3NxCR9z2U

Crash Course, Urinary System, Part 1 https://www.youtube.com/watch?v=I128tW1H5a8

Crash Course, Urinary System, Part 2 <u>https://www.youtube.com/watch?v=DlqyyyvTl3k</u>

Ted Ed - How Do Your Kidneys Work? <u>https://youtu.be/FN3MFhYPWWo?list=PLtx-gUNKJwDz2h9S5Yvil7NmwuofKC9C3</u>

Ted Ed - What does the liver do? https://www.youtube.com/watch?v=wbh3SjzydnQ

Ted Ed - What would happen if you didn't drink water? <u>https://www.youtube.com/watch?v=9iMGFqMmUFs&index=13&list=PLtx-qUNKJwDz2h9S5Yvil7NmwuofKC9C3</u>