COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 1: Cells and Tissues	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.
- Explain cell functions in terms of chemical reactions and energy changes.
- Explain how cells store and use information to guide their functions.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.B - Explain how genetic information is passed from one generation to the next at the molecular level.
- Describe the roles of nucleic acids in cellular reproduction and protein synthesis.
- Describe genetic engineering techniques, applications and impacts.
- Explain birth defects from the standpoint of embryological development and/or changes in genetic makeup.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.2.12.A - Apply concepts about the structure and properties of matter.
- Identify factors affecting reaction rates including catalysts.
- Classify types of chemical reactions.
- Predict chemical properties (e.g., reactivity) based on atomic structure.
- Apply rules of systemic nomenclature and formula writing to chemical substances.

3.2.12.B - Apply and analyze energy sources and conversions and their relationship to heat and temperature.
- Illustrate chemical concepts through the use of models.

3.3.12.C - Apply energy sources and conversions and their relationship to heat and temperature.
- Analyze chemical reactions in terms of heat generation.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.7.12.A - Apply scientific research methods to complex problems.
- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.
- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.

- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. Students will predict and evaluate the permeability of a membrane.
2. Students will compare and contrast tissue types.
3. Students will predict recovery rates for patients with medical conditions based on tissue characteristics.
4. Students will assess the practical use of tissue transplants.

5. Students will present a medical condition/disease at a class medical conference on tissues.

ACTIVITIES:

1. Identify four elements in living things.
2. Identify ten organelles on the cell model and explain their functions.
3. Apply the scientific method to determine the permeability of a membrane.
4. Differentiate functions and locations of the four tissue types.
5. Create a flow chart showing tissue repair (wound healing).
6. Create a brochure to advertise the price of tissues for transplants and research.
7. Evaluate the effectiveness of current tissue technologies.

RESOURCES:

ASSESSMENTS:

- Presentations: (Example: News report as a channel 28 Action News Team)
- Displays: (hallway window or cardboard presentation display)
- Skits/plays: (a system components comes to life on a journey through the system)
- Individualized Study: (approved topic of system under study with report and poster)
- Dissection: (assessed on dissection technique and proper labeling of organs)
- Lab Reports

Standard Assessments:

- Quizzes
- Written Tests
- Research Paper: (five pages with sources cited)
- Organ Model Identification
- Wall Chart Identification.
- Essays

- Text:
  Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD.
  1997.
- Models: brain, heart, spine, skeleton, shoulder, knee, cell
- Wall Charts: all systems
- Histology Slides: 154
- Anatomy Drawings
- Laboratory exercises
- Videos
- Audio Filmstrips
- Internet:

  www.looksmart.com (a great starting point for subject of choice)

  www.innerbody.com

  www.madsci.org/~lynn/VH/

  www.nlm.nih.gov/research/visible/visible_human.html
- CD: A.D.A.M. (ordered)
- Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat
- Simulation kits: Blood Typing

  Urinalysis

Parent Assessments: (Students work with parent (s) and parent grades the work)

- Pathway of cell from glucose to used up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds.
- Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition.
- Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation.

REMEDIATION:

1. Diagram the process of mitosis.
2. Complete the review questions 1-30, page 91

➢ Stethoscopes ➢ Sphygmomanometers	***ENRICHMENT:*** 1. Develop a display to explain developmental aspects of cells and tissues. 2. Use the following terms to explain non-age-related modifications of cells and tissues. Neoplasm metastasis atrophy Malignant biopsy Benign Hyperplasia 3. Predict three evolutionary improvements to transcription and translation in protein synthesis. 4. Complete the "at the Clinic" questions 1-6, page 91-92

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 1: Chemical Pathways	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.
- Explain cell functions in terms of chemical reactions and energy changes.
- Explain how cells store and use information to guide their functions.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.B - Explain how genetic information is passed from one generation to the next at the molecular level.
- Describe the roles of nucleic acids in cellular reproduction and protein synthesis.
- Describe genetic engineering techniques, applications and impacts.
- Explain birth defects from the standpoint of embryological development and/or changes in genetic makeup.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.2.12.A - Apply concepts about the structure and properties of matter.
- Identify factors affecting reaction rates including catalysts.
- Classify types of chemical reactions.
- Predict chemical properties (e.g., reactivity) based on atomic structure.
- Apply rules of systemic nomenclature and formula writing to chemical substances.

3.2.12.B - Apply and analyze energy sources and conversions and their relationship to heat and temperature.
- Illustrate chemical concepts through the use of models.

3.3.12.C - Apply energy sources and conversions and their relationship to heat and temperature.
- Analyze chemical reactions in terms of heat generation.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.7.12.A - Apply scientific research methods to complex problems.
- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.

- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. Compare and contrast the properties of water with its uses in the body.
2. Apply the pH scale to various substances.
3. Construct the pathway of chemicals through the cell showing the end products.

4. Evaluate the effectiveness of medical imaging techniques.

ACTIVITIES:

1. Contrast synthesis, decomposition and exchange reactions.
2. Explain the importance of water.
3. Compare and contrast the four organic compounds
4. Predict outcomes of pH abnormalities.
5. Complete a pH lab.
6. Apply knowledge of organic compounds to cellular metabolism and chemical pathways.
7. Differentiate between x-rays, PET, CAT, PT, and MRI.

RESOURCES:

- Text: Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD. 1997.
- Models: brain, heart, spine, skeleton, shoulder, knee, cell
- Wall Charts: all systems
- Histology Slides: 154
- Anatomy Drawings

ASSESSMENTS:

- Presentations: (Example: News report as a channel 28 Action News Team)
- Displays: (hallway window or cardboard presentation display)
- Skits/plays: (a system components comes to life on a journey through the system)
- Individualized Study: (approved topic of system under study with report and poster)
- Dissection: (assessed on dissection technique and proper labeling of organs)
- Lab Reports

Standard Assessments:

- Quizzes
- Written Tests
- Research Paper: (five pages with sources cited)
- Organ Model Identification
- Wall Chart Identification.
- Essays

➢ Laboratory exercises ➢ Videos ➢ Audio Filmstrips ➢ Internet: www.looksmart.com (a great starting point for subject of choice) www.innerbody.com www.madsci.org/~lynn/VH/ www.nlm.nih.gov/research/visible/visible_human.html ➢ CD: A.D.A.M. (ordered) ➢ Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat ➢ Simulation kits: Blood Typing Urinalysis ➢ Stethoscopes ➢ Sphygmomanometers	***Parent Assessments:*** (Students work with parent (s) and parent grades the work) ➢ Pathway of cell from glucose to used up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds. ➢ Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition. ➢ Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation. ***REMEDIATION:*** 1. Complete the review questions 1-34, page 53-54. 2. Create a table of the organic

	compounds showing monomers, polymers, functions and structure. ***ENRICHMENT:*** 1. Create a DNA molecule 2. Create a display of the ATP cycle. 3. Complete the "At the Clinic" questions 1-4, page 54.

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 1: An Orientation to the Body	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.B - Explain how genetic information is passed from one generation to the next at the molecular level.
- Measure the variability of a trait.
- Describe the roles of nucleic acids in cellular reproduction and protein synthesis.
- Describe genetic engineering techniques, applications and impacts.
- Explain birth defects from the standpoint of embryological development and/or changes in genetic makeup.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.2.12.A - Apply concepts about the structure and properties of matter.
- Identify factors affecting reaction rates including catalysts.

3.2.12.B - Apply and analyze energy sources and conversions and their relationship to heat and temperature.
- Demonstrate an understanding of energy and heat by applying appropriate formulas to solve problems.

3.3.12.C - Apply energy sources and conversions and their relationship to heat and temperature.
- Analyze chemical reactions in terms of heat generation.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.6.12.A - Apply advanced tools, materials, and techniques to answer complex questions.
- Select and safely apply appropriate tools, materials, and processes necessary to solve complex problems that could result I more than one solution.
- Evaluate and use technological resources to solve complex multi-step problems.

3.6.12.E - Assess the effectiveness of computer communications systems.
- Analyze the effectiveness of on-line information resources to meet the needs for collaboration, research, publications, communications, and productivity.

3.7.12.A - Apply scientific research methods to complex problems.

- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.
- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.

- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.

- Know and use the ongoing scientific processes to continually improve and better understand how things work.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.

- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.

- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.

- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.

- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.

UNIT OBJECTIVES:

1. Students will apply the concept of physiology to anatomical structures.
2. Students will construct an examination process to determine if an alien is alive.
3. Students will recommend three body systems essential to living, three systems that could be eliminated and the evolutionary adaptations necessary for survival.
4. Students will apply 5 survival needs to maintain homeostasis.
5. Students will evaluate court cases involving medical issues.

ACTIVITIES:	*ASSESSMENTS:*

1. Differentiate between anatomy and physiology. 2. Apply functions to each of the body systems. 3. List organizational levels. 4. Rank by importance, the life functions. 5. Write a journal describing settlement on Mars (survival needs) to maintain homeostasis. 6. Redesign the body to eliminate the negative feedback. 7. Write a Supreme Court decision on euthanasia. 8. Write a story for the local newspaper focusing on the legal/ethical issues related to breast cancer testing and insurance coverage. ***RESOURCES:*** ➢ Text: Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD. 1997. ➢ Models: brain, heart, spine, skeleton, shoulder, knee, cell	➢ Presentations: (Example: News report as a channel 28 Action News Team) ➢ Displays: (hallway window or cardboard presentation display) ➢ Skits/plays: (a system components comes to life on a journey through the system) ➢ Individualized Study: (approved topic of system under study with report and poster) ➢ Dissection: (assessed on dissection technique and proper labeling of organs) ➢ Lab Reports ***Standard Assessments:*** ➢ Quizzes ➢ Written Tests ➢ Research Paper: (five pages with sources cited) ➢ Organ Model Identification ➢ Wall Chart Identification. ➢ Essays ***Parent Assessments:*** (Students work with parent (s) and parent grades the work) ➢ Pathway of cell from glucose to used

➢ Wall Charts: all systems ➢ Histology Slides: 154 ➢ Anatomy Drawings ➢ Laboratory exercises ➢ Videos ➢ Audio Filmstrips ➢ Internet: www.looksmart.com (a great starting point for subject of choice) www.innerbody.com www.madsci.org/~lynn/VH/ www.nlm.nih.gov/research/visible/visible_human.html ➢ CD: A.D.A.M. (ordered) ➢ Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat ➢ Simulation kits: Blood Typing Urinalysis ➢ Stethoscopes ➢ Sphygmomanometers	up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds. ➢ Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition. ➢ Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation. ***REMEDIATION:*** 1. Complete the review questions on page 19-20. 2. Develop a flow chart of the Core 3,4,5. ***ENRICHMENT:*** 1. Develop a model with body directions, surfaces and planes to assess terminology. 2. Complete at the Clinic: questions 1 – 4 on page 20

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 1: Skin and Body Membranes	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.

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- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

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  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.
- Know and use the ongoing scientific processes to continually improve and better understand how things work.
- Critically compare or contrast the status of existing theories.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.

- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

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- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. Students will evaluate the importance of the life functions.
2. Students will explain skin coloration.
3. Students will differentiate the anatomy and physiology of the skin and body membranes.
4. Students will predict evolutionary trends in human skin.
5. Students will present a medical condition/disease of the skin at a class medical conference.

ACTIVITIES:	***ASSESSMENTS:***
1. Develop a table comparing membrane type, location and structure (tissue type). 2. Rank by importance eight functions of the integumentary system. 3. List the movement of a skin cell from birth to the time it flakes off into the universe. 4. Draw, label and describe the	➢ Presentations: (Example: News report as a channel 28 Action News Team) ➢ Displays: (hallway window or cardboard presentation display) ➢ Skits/plays: (a system components comes to life on a journey through the system) ➢ Individualized Study: (approved topic

functions of structures of the skin, including, appendages. 5. Describe factors in skin coloration. 6. Predict the results of developmental changes in the skin as it ages. ***RESOURCES:*** ➢ Text: Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD. 1997. ➢ Models: brain, heart, spine, skeleton, shoulder, knee, cell ➢ Wall Charts: all systems ➢ Histology Slides: 154 ➢ Anatomy Drawings ➢ Laboratory exercises	of system under study with report and poster) ➢ Dissection: (assessed on dissection technique and proper labeling of organs) ➢ Lab Reports ***Standard Assessments:*** ➢ Quizzes ➢ Written Tests ➢ Research Paper: (five pages with sources cited) ➢ Organ Model Identification ➢ Wall Chart Identification. ➢ Essays ***Parent Assessments:*** (Students work with parent (s) and parent grades the work) ➢ Pathway of cell from glucose to used up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds. ➢ Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This

➢ Videos ➢ Audio Filmstrips ➢ Internet: www.looksmart.com (a great starting point for subject of choice) www.innerbody.com www.madsci.org/~lynn/VH/ www.nlm.nih.gov/research/visible/visible_human.html ➢ CD: A.D.A.M. (ordered) ➢ Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat ➢ Simulation kits: Blood Typing Urinalysis ➢ Stethoscopes ➢ Sphygmomanometers	includes an interview with a family member with a medical condition. ➢ Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation. ***REMEDIATION:*** 1. Complete the review questions 1-15, page 112. 2. Highlight the key concepts using anatomy diagrams. ***ENRICHMENT:*** 1. Diagram three forms of skin cancer

	and explain the "A,B,C,D" rule. 2. Explain the functional causes of these appearances: Vampires (porphyria), and Touch-Me-Nots (epidermolysis bullosa). 3. Complete the "At the Clinic" Questions 1-5, page 112.

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 2: Muscular System	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.7.12.A - Apply scientific research methods to complex problems.
- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.
- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.

- Know and use the ongoing scientific processes to continually improve and better understand how things work.
- Critically compare or contrast the status of existing theories.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. Students will differentiate between the anatomy and physiology of the muscles.
2. Students will explain the sliding filament theory.
3. Students will demonstrate muscle locations, attachments and movements.

ACTIVITIES:

1. Compare and contrast 3 muscle types.
2. Describe the Microscopic structures of skeletal muscle.
3. Create a flow chart depicting the events of muscle contraction from the nerve impulse to relaxation.
4. Connect muscles with their

ASSESSMENTS:

- Presentations: (Example: News report as a channel 28 Action News Team)
- Displays: (hallway window or cardboard presentation display)
- Skits/plays: (a system components comes to life on a journey through the

movements.

5. Differentiate advantages and disadvantages of muscles, tendons and ligaments.

RESOURCES:

- Text:
  Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD. 1997.
- Models: brain, heart, spine, skeleton, shoulder, knee, cell
- Wall Charts: all systems
- Histology Slides: 154
- Anatomy Drawings
- Laboratory exercises

system)

- Individualized Study: (approved topic of system under study with report and poster)
- Dissection: (assessed on dissection technique and proper labeling of organs)
- Lab Reports

Standard Assessments:

- Quizzes
- Written Tests
- Research Paper: (five pages with sources cited)
- Organ Model Identification
- Wall Chart Identification.
- Essays

Parent Assessments: (Students work with parent (s) and parent grades the work)

- Pathway of cell from glucose to used up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds.
- Family health history – Student

➢ Videos ➢ Audio Filmstrips ➢ Internet: www.looksmart.com (a great starting point for subject of choice) www.innerbody.com www.madsci.org/~lynn/VH/ www.nlm.nih.gov/research/visible/visible_human.html ➢ CD: A.D.A.M. (ordered) ➢ Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat ➢ Simulation kits: Blood Typing Urinalysis ➢ Stethoscopes ➢ Sphygmomanometers	interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition. ➢ Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation. ***REMEDIATION:*** 1. Review and complete questions 1-23, page 193. 2. Diagram the microscopic anatomy of a skeletal muscle. 3. Highlight key concepts using anatomy diagrams. ***ENRICHMENT:*** 1. Identify all muscles of the body. 2. Diagram 3 ways ATP is regenerated during muscle activity. 3. Describe role of red, white and intermediary muscle cells and analyze the use of energy and advantages of each for athletic activities.

	4. Complete the "At the Clinic" Questions 1-5, pages 193-194.

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 2: Skeletal System	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.7.12.A - Apply scientific research methods to complex problems.
- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.
- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.

- Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.
- Know and use the ongoing scientific processes to continually improve and better understand how things work.
- Critically compare or contrast the status of existing theories.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. Students will differentiate between the anatomy and physiology of the skeletal system.
2. Students will explain bone's strength, flexibility and adaptability.
3. Students will synthesize the microscopic anatomy of a long bone.

ACTIVITIES:

1. Prioritize the three main functions of the skeletal systems.
2. Identify the bones of the body.
3. Predict how bone is formed and remodeled throughout life.

ASSESSMENTS:

- Presentations: (Example: News report as a channel 28 Action News Team)
- Displays: (hallway window or cardboard presentation display)

4. Create a chart listing the types of bones (4), their locations, and explain the relationship of form and function for each. 5. Diagram the regions of a long bone and its microscopic anatomy. 6. Differentiate between the male and female pelvis. 7. Dissect a bone and identify its parts. ***RESOURCES:*** ➢ Text: Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD. 1997. ➢ Models: brain, heart, spine, skeleton, shoulder, knee, cell ➢ Wall Charts: all systems	➢ Skits/plays: (a system components comes to life on a journey through the system) ➢ Individualized Study: (approved topic of system under study with report and poster) ➢ Dissection: (assessed on dissection technique and proper labeling of organs) ➢ Lab Reports ***Standard Assessments:*** ➢ Quizzes ➢ Written Tests ➢ Research Paper: (five pages with sources cited) ➢ Organ Model Identification ➢ Wall Chart Identification. ➢ Essays ***Parent Assessments:*** (Students work with parent (s) and parent grades the work) ➢ Pathway of cell from glucose to used up protein – Students are given the task to teach their parent (s) the

➢ Histology Slides: 154 ➢ Anatomy Drawings ➢ Laboratory exercises ➢ Videos ➢ Audio Filmstrips ➢ Internet: www.looksmart.com (a great starting point for subject of choice) www.innerbody.com www.madsci.org/~lynn/VH/ www.nlm.nih.gov/research/visible/visible_human.html ➢ CD: A.D.A.M. (ordered) ➢ Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat ➢ Simulation kits: Blood Typing Urinalysis ➢ Stethoscopes ➢ Sphygmomanometers	functions of the cell using all four organic compounds. ➢ Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition. ➢ Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation. ***REMEDIATION:*** 1. Complete the review questions 1-31, page 151-152. 2. Highlight key concepts using the anatomy diagrams. ***ENRICHMENT:*** 1. Compare and contrast cervical, thoracic and lumbar vertebrae. 2. Suggest design improvements to

	intervertebral disks and spinal curvatures. 3. Differentiate between scoliosis, lordosis, and kyphosis. 4. Diagram the three categories of joints and compare the movement of each. 5. Complete the "At the Clinic" questions 1-5, page 152.

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 2: The Nervous System	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.7.12.A - Apply scientific research methods to complex problems.
- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.
- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.

- Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.
- Know and use the ongoing scientific processes to continually improve and better understand how things work.
- Critically compare or contrast the status of existing theories.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. Students will differentiate between the anatomy and physiology of the central nervous system.
2. Students will differentiate between the anatomy and physiology of the peripheral nervous system.
3. Students will assess the structural advantages and disadvantages of a neuron and it's conduction path.
4. Students will present a medical condition/disease of the nervous system at a classroom medical conference.

ACTIVITIES:

1. List the functions of the nervous system, neurons and neuroglia.
2. Classify neurons according to structure of function
3. Differentiate between central and peripheral, autonomic and sympathetic parasympathetic nervous systems
4. Produce a model that demonstrates the events of a nerve impulse and conduction from one neuron to another.
5. Color-code the structure of a neuron that best represents its important anatomical regions.
6. Differentiate between the 4 regions of the brain
7. Name the 3 meningeal layers and the function of each.

RESOURCES:

- Text:
  Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD. 1997.
- Models: brain, heart, spine, skeleton, shoulder, knee, cell

ASSESSMENTS:

- Presentations: (Example: News report as a channel 28 Action News Team)
- Displays: (hallway window or cardboard presentation display)
- Skits/plays: (a system components comes to life on a journey through the system)
- Individualized Study: (approved topic of system under study with report and poster)
- Dissection: (assessed on dissection technique and proper labeling of organs)
- Lab Reports

Standard Assessments:

- Quizzes
- Written Tests
- Research Paper: (five pages with sources cited)
- Organ Model Identification
- Wall Chart Identification.
- Essays

- Wall Charts: all systems
- Histology Slides: 154
- Anatomy Drawings
- Laboratory exercises
- Videos
- Audio Filmstrips
- Internet:

  www.looksmart.com (a great starting point for subject of choice)

  www.innerbody.com

  www.madsci.org/~lynn/VH/

  www.nlm.nih.gov/research/visible/visible_human.html
- CD: A.D.A.M. (ordered)
- Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat
- Simulation kits: Blood Typing

  Urinalysis
- Stethoscopes
- Sphygmomanometers

Parent Assessments: (Students work with parent (s) and parent grades the work)

- Pathway of cell from glucose to used up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds.
- Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition.
- Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation.

REMEDIATION:

1. Draw and label a neuron.
2. Complete all review questions 1-25, page 239.
3. Highlight key concepts using anatomy drawings.

	ENRICHMENT: 1. Compare the origins of a CVA with Alzheimer's disease, a contusion, and concussion and how EEG; evaluate neural functioning. 2. Identify the functions of each cranial nerve. 3. Name the 4 major nerve plexuses, the major nerves of each and their distribution. 4. Show the signs, causes and consequences of spina bifida, annechaly, cerebal palsy. 5. Complete the "At the Clinic" Questions 1-5, page 239-240.

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 3: Body Defenses	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.7.12.A - Apply scientific research methods to complex problems.
- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.

- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.
- Know and use the ongoing scientific processes to continually improve and better understand how things work.
- Critically compare or contrast the status of existing theories.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
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3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
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- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
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- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. The students will differentiate between the endocrine glands, the hormones they produce and their functions.

2. The students will predict the success of future health supplements.
3. The students will present a medical condition/disease of the endocrine glands at a classroom medical conference.

ACTIVITIES:

1. Complete a table identifying the major endocrine glands, the hormones produced, and their functions.
2. Compare and contrast endocrine and exocrine glands.
3. Connect negative feedback, blood levels of hormones and the effective results.

RESOURCES:

- Text: Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD.

ASSESSMENTS:

- Presentations: (Example: News report as a channel 28 Action News Team)
- Displays: (hallway window or cardboard presentation display)
- Skits/plays: (a system components comes to life on a journey through the system)
- Individualized Study: (approved topic of system under study with report and poster)
- Dissection: (assessed on dissection technique and proper labeling of organs)
- Lab Reports

Standard Assessments:

- Quizzes
- Written Tests
- Research Paper: (five pages with sources cited)
- Organ Model Identification
- Wall Chart Identification.

1997.

- Models: brain, heart, spine, skeleton, shoulder, knee, cell
- Wall Charts: all systems
- Histology Slides: 154
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  www.innerbody.com

  www.madsci.org/~lynn/VH/

  www.nlm.nih.gov/research/visible/visible_human.html
- CD: A.D.A.M. (ordered)
- Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat
- Simulation kits: Blood Typing

  Urinalysis
- Stethoscopes
- Sphygmomanometers

- Essays

Parent Assessments: (Students work with parent (s) and parent grades the work)

- Pathway of cell from glucose to used up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds.
- Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition.
- Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation.

REMEDIATION:

1. Complete the review questions 1-16, page 292.
2. Highlight key concepts using anatomy diagrams.

ENRICHMENT:

1. Create a display showing the formation of a function of insulin and complete a glucagon and its effect on blood sugar levels.

	2. "At the Clinic" questions 1-4, page 293.

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 3: Endocrine System	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

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3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.

- Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.
- Know and use the ongoing scientific processes to continually improve and better understand how things work.
- Critically compare or contrast the status of existing theories.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. The students will differentiate between the endocrine glands, the hormones they produce and their functions.
2. The students will predict the success of future health supplements.
3. The students will present a medical condition/disease of the endocrine glands at a classroom medical conference.

ACTIVITIES:	***ASSESSMENTS:***
4. Complete a table identifying the major endocrine glands, the	➢ Presentations: (Example: News report

hormones produced, and their functions. 5. Compare and contrast endocrine and exocrine glands. 6. Connect negative feedback, blood levels of hormones and the effective results. ***RESOURCES:*** ➢ Text: Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD. 1997. ➢ Models: brain, heart, spine, skeleton, shoulder, knee, cell ➢ Wall Charts: all systems ➢ Histology Slides: 154	as a channel 28 Action News Team) ➢ Displays: (hallway window or cardboard presentation display) ➢ Skits/plays: (a system components comes to life on a journey through the system) ➢ Individualized Study: (approved topic of system under study with report and poster) ➢ Dissection: (assessed on dissection technique and proper labeling of organs) ➢ Lab Reports ***Standard Assessments:*** ➢ Quizzes ➢ Written Tests ➢ Research Paper: (five pages with sources cited) ➢ Organ Model Identification ➢ Wall Chart Identification. ➢ Essays ***Parent Assessments:*** (Students work with parent (s) and parent grades the work) ➢ Pathway of cell from glucose to used

➢ Anatomy Drawings ➢ Laboratory exercises ➢ Videos ➢ Audio Filmstrips ➢ Internet: www.looksmart.com (a great starting point for subject of choice) www.innerbody.com www.madsci.org/~lynn/VH/ www.nlm.nih.gov/research/visible/visible_human.html ➢ CD: A.D.A.M. (ordered) ➢ Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat ➢ Simulation kits: Blood Typing Urinalysis ➢ Stethoscopes ➢ Sphygmomanometers	up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds. ➢ Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition. ➢ Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation. ***REMEDIATION:*** 1. Complete the review questions 1-16, page 292. 2. Highlight key concepts using anatomy diagrams. ***ENRICHMENT:*** 3. Create a display showing the formation of a function of insulin and complete a glucagon and its effect on blood sugar levels. 4. "At the Clinic" questions 1-4, page 293.

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 3: Special Senses	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability

(Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.7.12.A - Apply scientific research methods to complex problems.
- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.
- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.
- Know and use the ongoing scientific processes to continually improve and better understand how things work.
- Critically compare or contrast the status of existing theories.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. Students will differentiate between the anatomy and physiology of the eye, ear, nose and tongue sensors.
2. Students will predict evolutionary trends in human sensory systems.
3. Students will present a medical condition/disease of a special sense at a class medical conference.

ACTIVITIES:

1. Identify the structures of the eye, ear, tongue and explain these functions.
2. Differentiate between the 3 tunics of the eye.
3. Compare rods and cones.
4. Trace the pathway of light from its source to the brain.
5. Create a flow chart of sound from source to the brain.
6. Diagram the 4 areas of taste and explain the factors that modify the sense of taste.

ASSESSMENTS:

- Presentations: (Example: News report as a channel 28 Action News Team)
- Displays: (hallway window or cardboard presentation display)
- Skits/plays: (a system components comes to life on a journey through the system)
- Individualized Study: (approved topic of system under study with report and poster)
- Dissection: (assessed on dissection

7. Describe location, structure, and function of the olfactory receptors. ***RESOURCES:*** ➢ Text: Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD. 1997. ➢ Models: brain, heart, spine, skeleton, shoulder, knee, cell ➢ Wall Charts: all systems ➢ Histology Slides: 154 ➢ Anatomy Drawings ➢ Laboratory exercises ➢ Videos ➢ Audio Filmstrips ➢ Internet: www.looksmart.com (a great starting	technique and proper labeling of organs) ➢ Lab Reports ***Standard Assessments:*** ➢ Quizzes ➢ Written Tests ➢ Research Paper: (five pages with sources cited) ➢ Organ Model Identification ➢ Wall Chart Identification. ➢ Essays ***Parent Assessments:*** (Students work with parent (s) and parent grades the work) ➢ Pathway of cell from glucose to used up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds. ➢ Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition.

point for subject of choice) www.innerbody.com www.madsci.org/~lynn/VH/ www.nlm.nih.gov/research/visible/visible_human.html ➢ CD: A.D.A.M. (ordered) ➢ Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat ➢ Simulation kits: Blood Typing Urinalysis ➢ Stethoscopes ➢ Sphygmomanometers	➢ Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation. ***REMEDIATION:*** 1. Complete all review questions 1-29 (264). 2. Highlight key concepts using anatomy diagrams. 3. Label parts of ear, eye, tongue and nose. ***ENRICHMENT:*** 1. As a dentist, explain these conditions to your patients: accommodation, astigmatism, blind spot, cataract,

	emmetropia, glaucoma, hyperopia, myopia, refraction. 2. Write a report of vision correction surgeries. 3. Differentiate between sensurineural and conductive deafness. 4. Complete the "At the Clinic" Questions 1-6, page 265.

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 4: Blood and Circulatory Systems	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.7.12.A - Apply scientific research methods to complex problems.
- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.
- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.
- Know and use the ongoing scientific processes to continually improve and better understand how things work.
- Critically compare or contrast the status of existing theories.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.

- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. Students will utilize modern scientific thought to judge the ancient adage that blood and the heart are the center of life.
2. Students will identify the anatomy of the heart.
3. Students differentiate anatomy and physiology of the cardiovascular system.

ACTIVITIES:

1. Describe the functions of blood that makes it essential for homeostasis.
2. Compare and contrast plasma and formed elements.
3. Chart the events in hemostasis.
4. Differentiate between the 4 blood groups.
5. Trace the pathway of blood through the heart and lungs.

ASSESSMENTS:

- Presentations: (Example: News report as a channel 28 Action News Team)
- Displays: (hallway window or cardboard presentation display)
- Skits/plays: (a system components comes to life on a journey through the system)
- Individualized Study: (approved topic of system under study with report and

6. Explain systole, diastole, stroke volume, cardiac cycle, heart sounds, murmur, blood pressure and pulse. 7. Compare and contrast the structure and function of arteries, veins, and capillaries. 8. Name 2 types of structures in the lymphatic system and explain how it is functionally related to the cardiovascular and immune systems. 9. Describe the composition of lymph, how it is formed and transported. 10. Differentiate the function of lymph nodes, tonsils, the thymus, Peyers' patches and the spleen. ***RESOURCES:*** ➢ Text: Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD. 1997.	poster) ➢ Dissection: (assessed on dissection technique and proper labeling of organs) ➢ Lab Reports ***Standard Assessments:*** ➢ Quizzes ➢ Written Tests ➢ Research Paper: (five pages with sources cited) ➢ Organ Model Identification ➢ Wall Chart Identification. ➢ Essays ***Parent Assessments:*** (Students work with parent (s) and parent grades the work) ➢ Pathway of cell from glucose to used up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds. ➢ Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family

➢ Models: brain, heart, spine, skeleton, shoulder, knee, cell ➢ Wall Charts: all systems ➢ Histology Slides: 154 ➢ Anatomy Drawings ➢ Laboratory exercises ➢ Videos ➢ Audio Filmstrips ➢ Internet: www.looksmart.com (a great starting point for subject of choice) www.innerbody.com www.madsci.org/~lynn/VH/ www.nlm.nih.gov/research/visible/visible_human.html ➢ CD: A.D.A.M. (ordered) ➢ Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat ➢ Simulation kits: Blood Typing Urinalysis ➢ Stethoscopes ➢ Sphygmomanometers	member with a medical condition. ➢ Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation. ***REMEDIATION:*** 1. Complete all review questions 1-17 (pg. 312) and 1-33 (pg. 352-353). 2. Highlight all key concepts using anatomy diagrams. ***ENRICHMENT:*** 1. Name the elements of the intrinsic conduction system of the heart and

	describe the pathway of impulses through this system 2. Identify the body's major arteries and veins and name the body region supplied by each. 3. Read an electrocardiogram and create a display. 4. Describe the unique feature of special circulation of the body, arterial circulation of brain, hepatic-portal circulation and fetal circulation. 5. Complete "At the Clinic" Questions 1-6 (page 312) and 1-6 (page 353).

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***

UNIT 4: Respiratory System

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.7.12.A - Apply scientific research methods to complex problems.
- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.
- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.

- Know and use the ongoing scientific processes to continually improve and better understand how things work.
- Critically compare or contrast the status of existing theories.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.8.12.D - Analyze scale as a way of relating concepts and ideas to one another by some measure.
- Compare and contrast various forms of dimensional analysis.
- Analyze and apply appropriate measurement scales when collecting data.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. Students will differentiate between the anatomy and physiology of the respiratory system.
2. Students will explain the physics of breathing using respiratory terminology.
3. Students will assess the risks of our atmosphere and develop devises to filter air, which can be used in the external nares.
4. Students will present a medical condition/disease at a medical conference on the respiratory system.

ACTIVITIES:	***ASSESSMENTS:***
1. Trace the path of oxygen from the time it enters your nostrils until CO2 is	➢ Presentations: (Example: News report as a channel 28 Action News Team)

exhaled. 2. Describe the protective mechanisms of the respiratory system 3. Prepare a speech to the NART (National Association of Respiratory Therapists) in which you encourage them (using humor) to use human terms for their medical jargon: cellular respiration external respiration internal respiration tital volume vital capacity residual air pulmonary ventilation expiration inspiration expiratory reserve volume inspiratory reserve volume 4. Dissect lung tissue.	➢ Displays: (hallway window or cardboard presentation display) ➢ Skits/plays: (a system components comes to life on a journey through the system) ➢ Individualized Study: (approved topic of system under study with report and poster) ➢ Dissection: (assessed on dissection technique and proper labeling of organs) ➢ Lab Reports ***Standard Assessments:*** ➢ Quizzes ➢ Written Tests ➢ Research Paper: (five pages with sources cited) ➢ Organ Model Identification ➢ Wall Chart Identification. ➢ Essays ***Parent Assessments:*** (Students work with parent (s) and parent grades the work) ➢ Pathway of cell from glucose to used up protein – Students are given the task to teach their parent (s) the functions of the cell using all four

RESOURCES:

- Text:
  Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD. 1997.
- Models: brain, heart, spine, skeleton, shoulder, knee, cell
- Wall Charts: all systems
- Histology Slides: 154
- Anatomy Drawings
- Laboratory exercises
- Videos
- Audio Filmstrips
- Internet:

  www.looksmart.com (a great starting point for subject of choice)

  www.innerbody.com

  www.madsci.org/~lynn/VH/

  www.nlm.nih.gov/research/visible/visible_human.html
- CD: A.D.A.M. (ordered)
- Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat

organic compounds.

- Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition.
- Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation.

REMEDIATION:

1. Complete review questions 1-21, page 406
2. Highlight key concepts using anatomy diagrams

ENRICHMENT:

1. Describe the process of gas

➢ Simulation kits: Blood Typing Urinalysis ➢ Stethoscopes ➢ Sphygmomanometers	exchanges in the lungs and tissues. 2. Compare risk verses asset for each physical factor that influences respiratory rate. 3. Complete the "At the Clinic" questions, 1-5, page 406.

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 4: Urinary System	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.7.12.A - Apply scientific research methods to complex problems.
- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.
- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.
  - Prioritize the necessary information.
  - Formulate questions that must be answered.
- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.

- Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.
- Know and use the ongoing scientific processes to continually improve and better understand how things work.
- Critically compare or contrast the status of existing theories.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. Students will differentiate between the anatomy and physiology of the urinary system.
2. Students will present a medical condition/disease of the urinary system at a medical conference.

ACTIVITIES:	***ASSESSMENTS:***
1. Describe the process of urine formation, identifying the areas of the	➢ Presentations: (Example: News report

nephron that are responsible for filtration, reabsorption, and secretion and the composition of the resultant urine. 2. Using a model, identify each region of the kidney (hilus, cortex, medulla, medullary pyramids, calces, pelvis, and renal columns.) 3. Connect the structure and function of ureters, urinary bladder and urethra. 4. Dissect a kidney and label each region. 5. Complete the urinalysis simulation lab. ***RESOURCES:*** ➢ Text: Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N., PhD. 1997. ➢ Models: brain, heart, spine, skeleton, shoulder, knee, cell	as a channel 28 Action News Team) ➢ Displays: (hallway window or cardboard presentation display) ➢ Skits/plays: (a system components comes to life on a journey through the system) ➢ Individualized Study: (approved topic of system under study with report and poster) ➢ Dissection: (assessed on dissection technique and proper labeling of organs) ➢ Lab Reports ***Standard Assessments:*** ➢ Quizzes ➢ Written Tests ➢ Research Paper: (five pages with sources cited) ➢ Organ Model Identification ➢ Wall Chart Identification. ➢ Essays ***Parent Assessments:*** (Students work with parent (s) and parent grades the work) ➢ Pathway of cell from glucose to used

- Wall Charts: all systems
- Histology Slides: 154
- Anatomy Drawings
- Laboratory exercises
- Videos
- Audio Filmstrips
- Internet:

  www.looksmart.com (a great starting point for subject of choice)

  www.innerbody.com

  www.madsci.org/~lynn/VH/

  www.nlm.nih.gov/research/visible/visible_human.html
- CD: A.D.A.M. (ordered)
- Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat
- Simulation kits: Blood Typing

  Urinalysis
- Stethoscopes
- Sphygmomanometers

up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds.

- Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition.
- Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation.

REMEDIATION:

1. Complete the review questions 1-19, page 470.
2. Highlight the key concepts using the anatomy diagrams.

	ENRICHMENT: 1. Identify hormones active in the urinary system and explain their roles. 2. Differentiate between polyuria, anuria, oliguria, and diuresis. 3. Describe the effects of aging on the urinary system. 4. Complete the "At the Clinic" questions 1-5, page 470.

COURSE: Human Anatomy/Physiology	***GRADE(S): 11, 12***
UNIT 4: Digestive System	

NATIONAL STANDARDS:

SCIENCE THEMES: Systems and Interactions, Models, Patterns of Change, Stability (Constancy), Energy, Scale, Change Over Time

PROCESS SKILLS: Observing, Classifying, Measuring, Analyzing and Interpreting Data, Formulating Hypotheses, Predicting, Experimenting/Testing, Variable Recognition and Control

BENCHMARKS:

STATE STANDARDS:

3.1.10.D - Explain the chemical and structural basis of living organisms.
- Know the role of hormones in regulating biologic activities.

3.1.12.A - Discern structural and functional relationships in living things.
- Describe and explain structural and functional relationships in each of the five (or six) kingdoms.

3.1.12.D - Analyze the chemical and structural basis of living organisms.
- Evaluate metabolic activities using experimental knowledge of enzymes.
- Infer functions of different anatomical parts given their structure.

3.5.12.A - Analyze biochemical-related technologies of propagating, growing, maintaining, adapting, treating, and converting.
- Analyze specific examples where engineering has impacted society in protection, personal health application and physical enhancement.

3.7.12.A - Apply scientific research methods to complex problems.
- Generate questions that can be studies in science.
- Evaluate the appropriateness of questions.
- Design an investigation with adequate control and limited variables to investigate a question.
- Conduct an experiment.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

3.7.12.B - Apply problem solving in Technology as a systematic process.
- Assess the problem.
  - Appraise all aspects of the problem.

- Prioritize the necessary information.
- Formulate questions that must be answered.

- Propose, develop, and appraise a solution.
  - Design, develop, and prioritize alternative methods to achieve solutions.
  - Develop and assess the best of appropriate methodology.
- Implement and assess the solution.
  - Produce, apply, and appraise a specific solution.
- Evaluate and assess the solution.
  - Assess, redesign, and improve if necessary.
  - Analyze and contrast the impacts of the solution.
- Communicate and assess the problem, design, and solution.

3.7.12.C - Evaluate the nature of scientific and technological knowledge.
- Know and use the ongoing scientific processes to continually improve and better understand how things work.
- Critically compare or contrast the status of existing theories.

3.8.12.A - Apply concepts of system, subsystems, feedback, and control to solve complex technological problems.
- Demonstrate knowledge of systems concepts by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction, and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.8.12.C - Assess and apply patterns in science and technology.
- Compare and contrast structure and function relationships as they relate to patterns.

3.9.12.A - Synthesize and evaluate the interactions of science, technology, and society.
- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Analyze societal influences on technology and technology's influences on society.
- Evaluate technological solutions that differ among societies.
- Evaluate socially proposed limitations of scientific research and technological application.

3.9.12.B - Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials, and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies hat extend and enhance human abilities.
- Identify and recommend solutions to international problems by applying appropriate physical, communication, or biochemical-related technologies.

3.9.12.C - Assess scientific and technological solutions.
- Identify and discuss the consequences for not keeping abreast of technological advancements.
- Propose solutions to specific scientific and technological applications, identifying possible financial considerations.
- Analyze scientific and technological solutions through the use of risk/benefit analysis.
- Assess and predict the results of applying technology to solve a problem.
- Analyze and communicate the positive or negative impacts that a recent technological invention had on society.
- Evaluate and describe potential impacts from emerging technologies (e.g., assessment alternatives, risks, benefits, costs, economic impacts, and constraints.)

UNIT OBJECTIVES:

1. Students will differentiate between the anatomy and physiology of the digestive system.
2. Students will connect digestive activities with the movements of muscles.
3. Students will graph their metabolic activity during the school day.
4. Students will assess the influence of stress on the digestive organs.
5. Students will present a medical condition/disease of the digestive system at a

medical conference.

ACTIVITIES:

1. Describe the functions of each part of the digestive system.
2. You are a cafeteria french fry. Describe your journey from ingestion to excretion and what you are experiencing as the events of your journey change you.
3. Compare and contrast metabolism, catabolism, and anabolism.
4. Create a chart of hormones and enzymes involved in digestion showing their functions and the results of their activity.
5. Describe the composition and function of saliva.
6. Describe the mechanism of swallowing, vomiting and defecation.

RESOURCES:

- Text: Essentials of Human Anatomy and Physiology. Elaine N Marieb, R.N.,

ASSESSMENTS:

- Presentations: (Example: News report as a channel 28 Action News Team)
- Displays: (hallway window or cardboard presentation display)
- Skits/plays: (a system components comes to life on a journey through the system)
- Individualized Study: (approved topic of system under study with report and poster)
- Dissection: (assessed on dissection technique and proper labeling of organs)
- Lab Reports

Standard Assessments:

- Quizzes
- Written Tests
- Research Paper: (five pages with sources cited)
- Organ Model Identification
- Wall Chart Identification.
- Essays

PhD.
1997.

- Models: brain, heart, spine, skeleton, shoulder, knee, cell
- Wall Charts: all systems
- Histology Slides: 154
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- CD: A.D.A.M. (ordered)
- Dissection material: heart, lung, kidneys, brain, cow eye, Fetal pig, cat
- Simulation kits: Blood Typing

  Urinalysis
- Stethoscopes
- Sphygmomanometers

Parent Assessments: (Students work with parent (s) and parent grades the work)

- Pathway of cell from glucose to used up protein – Students are given the task to teach their parent (s) the functions of the cell using all four organic compounds.
- Family health history – Student interviews parents and other relatives to recognize health risks and concerns for students and family members. This includes an interview with a family member with a medical condition.
- Structure and functional areas of brain -- Students study with their parents and then take quiz. Parents grade and return with notation.

REMEDIATION:

1. Complete the review questions 1-35, page 447-448.
2. Highlight key concepts using anatomy diagrams.

ENRICHMENT:

	1. Describe the end products of protein, fat and carbohydrate digestion. 2. Create a poster or experiment, which demonstrates the significance of essential nutrients and calories. 3. Create a presentation showing the process and results of the Krebs Cycle, Glycolysis, and electron transport chain, and oxidative phosphoylation. 4. Complete the “At the Clinic” questions1-5, page 448.
