Course Title: Life Science 7

Subject: Science

Grade Level: 7

Duration: 1 year

Prerequisite: Science 6

Elective or Required: Required

Department Mission Statement:

The Glen Ridge Public School’s science curriculum seeks to inspire scientific literate citizens who will be able to complete in the technologically driven global community. Our program fosters a spirit of intellectual curiosity and collaborative problem solving that is innovative, hands-on, inquiry based and developmentally appropriate. This is done through the study of Life, Physical, Earth & Space, and Engineering Sciences.

Our students will use scientific methodology to evaluate and critique global issues. Students will be challenged and encouraged to take risks and develop critical scientific thinking skills.

Course Description:

The focus of the seventh grade Life Science curriculum is to provide a strong foundation in the basic principles of biology while developing emergent higher level thinking skills. The introduction of new concepts will build upon previous scientific knowledge to enhance student perspective of the world in which they live as well as instill confidence and a desire to pursue scientific study.

The course begins with an overview of living systems. Scientific inquiry, scientific method, taxonomy, measurements, laboratory skills, tools, safety and classification concepts will be reintroduced. The course will then connect physical science through the exploration of elements, compounds, water and inorganic and organic
molecules. The cell, the basic unit of life for all organisms, is the starting point for the next series of topics. Prokaryotic and eukaryotic cell structure and function, cell processes, and microscopes will be reintroduced and discussed in more detail. Through the genetics unit, studying the structure of DNA will serve as a bridge between topics of chromosome structure and function, cell growth, cell reproduction, genetic disorders and patterns of trait inheritance by organisms. These topics will lead into the introduction of new concepts such as adaptations, natural selection and fossil evidence to describe how organisms have evolved over time. The course will conclude with elements of plant and animal structure, function and diversity through exploring the six kingdoms of life.

The Next Generation Science Standards and New Jersey Core Curriculum Content standards will be met using a hands-on approach that encourages scientific inquiry and teamwork. An emphasis on math will be achieved through graphing, working with ratios and probability, using scientific notation and converting between SI and English measurement systems. An emphasis on writing will be achieved through writing lab reports, recording observations, using vocabulary, and answering analysis questions. A special emphasis on investigation, problem-solving and critical thinking skills will be achieved through completing projects, conducting research, performing labs, using technology, analyzing the textbook and journal articles.


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**Date Submitted:** Summer 2014
Life Science 7

Unit 1: Living Systems (Chapters 1-3)

Approximate # Of Weeks: 4 weeks

Essential Questions:

Chapter 1: Studying Life
- What is the goal of science?
- Why do we need science?
- What are the roles of scientists?
- Why is safety important in a laboratory setting?
- What are the steps to the scientific method?
- How can one use the scientific method to solve a problem or answer a question?
- What is a control?
- What are the standard/universal units of measurement in science?
- How do we collect, organize and report scientific data?
- What constitutes useful scientific evidence?
- How does scientific knowledge benefit, deepen, and broaden from scientists sharing and debating ideas and information with peers?

Chapter 2: Living Things
- What characteristics define a living organism?
- How can life be studied at different levels?
- How does technology like the microscope aid biologists learning about the natural world?
- What are the five characteristics of all living things?
- What is the difference between a stimulus and a response?
- What are living versus non-living things?
- Where does life come from?
- How are living things organized?

Chapter 3: Classifying Living Things
- How are living things classified?
- Who is Carolus Linnaeus and what was his contribution to science?
- What is taxonomy? (Chapter 15)
- How do dichotomous keys aid in organism identification?

Upon completion of this unit students will be able to:
- Apply safety rules when working in the lab (NGSS: PS4.C; NJCCC: 5.1.8.A.1, 5.1.8.D.2)
• Assess the impact various types of scientists and their contributions have on past and present society (NGSS: ESS3.C; NJCCC: 5.1.8.A.1, 5.1.8.A.3, 5.1.8.D.1)
• Determine the benefits and limits of science and technology (NGSS: PS4.C; NJCCC: 5.1.8.A.1, 5.1.8.A.3, 5.1.8.D.1, 5.1.8.D.4)
• Apply the scientific method to solve a scientific problem (NGSS: PS4.C; NJCCC: 5.1.8.A.2)
• Measure with scientific units (NGSS: PS4.C; NJCCC: 5.1.8.A.2-3, 5.1.8.D.3)
• Record qualitative and quantitative data using appropriate instruments, units and measurement skills in gathering each (NGSS: PS4.C; NJCCC: 5.1.8.A.2-3, 5.1.8.D.2)
• Analyze scientific data in chart and graph form (NGSS: PS4.C; NJCCC: 5.1.8.A.2-3, 5.1.8.D.1-2)
• Differentiate between useful and non-useful scientific evidence (NGSS: PS4.C; NJCCC: 5.1.8.C.1, 5.1.8.D.1)
• Compare and contrast living and nonliving things (NGSS: LS1.A; NJCCC: 5.1.8.A.3, 5.1.8.C.1)
• Identify the characteristics of living things (NGSS: LS1.A; NJCCC: 5.1.8.A.3, 5.1.8.C.1)
• Demonstrate the difference between a stimulus and response (NGSS: LS1.A; NJCCC: 5.1.8.A.3, 5.1.8.C.1)
• Describe how organisms are organized (NGSS: LS3.A; NJCCC: 5.1.8.A.3, 5.1.8.C.1)
• Describe how and why organisms are classified (NGSS: LS3.A; NJCCC: 5.1.8.A.3, 5.1.8.C.1)
• Classify organisms into one of the six kingdoms based on their characteristics (NGSS: LS3.A; NJCCC: 5.1.8.B.4)
• Interpret scientific names to find relationships between organisms (NGSS: LS4.A; NJCCC: 5.1.8.A.3)
• Demonstrate how to use a dichotomous key to identify organisms (NGSS: LS4.A; NJCCC: 5.1.8.A.3, 5.1.8.C.1)

**Common Core Standards:**
• CCSS.ELA.RST.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
• CCSS.ELA.RST.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
• CCSS.ELA.RST.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
CCSS.ELA.WHST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

CCSS.ELA.WHST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

CCSS.MATH.CONTENT.6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

Interdisciplinary Standards (njcccs.org)
- Standard 8.1 – Computer and Information Literacy
  All students will use computer applications to gather and organize information and to solve problems.
- Standard 8.2 – Technology Education
  All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world as they relate to the individual, society, and the environment.

Activities – include 21st Century Technologies:
- Read, outline and answer related text questions
- Take notes using guided note sheet
- Take notes from PowerPoint lectures
- Complete book worksheets
- Watch videos
- Complete article summaries and analyses
- Complete a text book scavenger hunt
- Put a puzzle together and use the scientific theory to find the missing pieces
- Successfully complete assessments: quizzes and tests
- Successfully complete labs and activities
- Complete a lab equipment scavenger hunt
- Listen and watch They Might Be Giants: Computer Assisted Design music video
- Debate the advancements of biotechnology
- Listen and watch They Might Be Giants: Science is Real music video
- Perform the lab “Dancing Raisins” to work with the scientific method
- Perform the lab “Who Can Blow the Largest Bubble?” to work with the scientific method
- Have a paper airplane competition to apply the scientific method
- Listen and watch They Might Be Giants: Put it to the Test music video
• Design an experiment using cabbage juice
• Make a metric system ruler to practice converting between units
• Measure and record the mass, length and volume of various objects in the room using metric units
• Construct and interpret a line graph and a bar graph based on experimental data.
• Analyze the accuracy of measurements made using laboratory equipment
• Classify multiple organisms using dichotomous keys
• Play review Jeopardy games to assess knowledge
• Make a “Characteristics of Living Things” project booklet
• Differentiate between and inference and observation
• Differentiate between a scientific theory and a scientific law

Enrichment Activities:
• Design a classification system of nuts and bolts
• Design a classification system of pipe cleaners of various shapes and colors

Methods of Assessments/Evaluation:
• Chapter tests and quizzes
• Pre-assessments of material
• Exit slips (written or oral)
• Think Pair Share
• Review Jeopardy
• 1-2-3-4 Class Assessment
• Discovery Ed./United Streaming
• PowerPoint Presentations
• Calculators
• Thumbs Up/Thumbs Down
• Revisit Essential Questions
• Lab reflective
• Laboratory activities
• Characteristics of Life Project
• Self-Assessment (Check-off competencies)
• Homework
• Independent work
• Observation of whole group and individual

Resources/Including Online Resources
• Online Textbook Information: http://www.cposcience.com
• Teacher Webpage
• Discovery Ed./United Streaming, http://www.discoveryeducation.com
• Life Science video series
• CPO science chapter concept video series
• CPO chapter assessments, activities and projects
- Youtube.com
- Journal articles
- Popular Science magazine
- Odyssey magazine
- www.pbs.org
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Unit 2: Organisms and the Environment (Chapters 4-6)

Approximate # Of Weeks: 4 weeks

Essential Questions:

Chapter 4: Physical Science Connections
- Why is the study of basic Chemistry important to studying Biology?
- How do the interactions of atoms, elements and compounds affect living things?
- What is the smallest unit of matter?
- What charge is associated with protons, electrons and neutrons?
- How do electrons fill the orbitals of atoms?
- What is an element?
- What are defining characteristics of the sections of the periodic table: metals, non-metals and metalloids?
- How do atoms and compounds form bonds?
- What is the difference between ionic and covalent bonds?
- What is the difference between atoms, elements, molecules, compounds and mixtures?
- What is the difference between atomic number and mass number of an element?
- What is a chemical reaction and how do they affect living organisms?
- What is the difference between endothermic and exothermic reactions?
- What is a solution and how are they important to the study of Biology?
- How do the properties of water’s relate to its importance and function to living things?
- What are the defining characteristics of the four organic molecules: carbohydrates, lipids, proteins and nucleic acids?
- How do the organic compounds interact in forming living things?
- How do enzymes function?

Upon completion of this unit students will be able to:
- Explain the structure of matter: solid, liquid, gas and plasma (NGSS: PS1.A; NJCCC: 5.2.8.A.1, 5.2.D.2-3)
- Relate the particle structure of an atom to the identity of elements and distinguish isotopes (NGSS: PS1.A; NJCCC: 5.2.8.A.1-4)
- Draw proper atomic structure diagrams for each element (NGSS: PS1.A; NJCCC: 5.2.8.A.1-4)
- Distinguish between protons, electrons and neutrons (NGSS: PS1.A; NJCCC: 5.2.8.A.1-4)
- Distinguish between atomic number and mass number of an element (NGSS:
PS1.A; NJCCC: 5.2.8.A.1-4)
- Distinguish between metals, non-metals and metalloids (NGSS: PS1.A; NJCCC: 5.2.8.A.6-7)
- Relate the formation of covalent and ionic chemical bonds to the stability of atoms (NGSS: PS1.A; NJCCC: 5.2.8.A.5-7)
- Interpret the formulas of chemical compounds and the meaning of chemical equations (NGSS: PS1.A; NJCCC: 5.2.8.A.5-7)
- Distinguish between endothermic and exothermic reactions (NGSS: PS1.B; NJCCC: 5.2.8.A.5-7)
- Relate water’s properties to the formation of living things (NGSS: PS1.A; NJCCC: 5.2.8.A.3)
- Explain water’s action as a solvent and in the formation of acids and bases (NGSS: PS1.A; NJCCC: 5.2.8.A.3)
- Distinguish organic compounds and explain their importance in living things (NGSS: PS1.A-B; NJCCC: 5.2.8.A.3)
- Compare both structure and function of carbohydrates, lipids, proteins and nucleic acids (NGSS: PS1.A-B; NJCCC: 5.2.8.A.3)
- Describe the structure of proteins and relate it to the function of enzymes in living systems (NGSS: PS1.A-B; NJCCC: 5.2.8.A.3)

Common Core Standards:
- CCSS.ELA.RST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context
- CCSS.ELA.RST.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms
- CCSS.MATH.CONTENT.7.NS.A.1.A Describe situations in which opposite quantities combine to make 0.

Interdisciplinary Standards (njcccs.org)
- Standard 9.1 21st-Century Life & Career Skills
  All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

Activities – include 21st Century Technologies:
- Read, outline and answer related text questions
- Take notes using guided note sheet
- Take notes from PowerPoint lectures
- Complete book worksheets
- Successfully complete assessments
- Successfully complete labs and activities
- Play review Jeopardy games to assess knowledge
- Watch videos
- Complete article summaries and analyses
- Play element bingo
- Listen and watch They Might Be Giants: Solid, Liquid, Gas music video
- Listen and watch They Might Be Giants: Meet the Elements music video
- Listen and watch They Might Be Giants: Why Does the Sun Really Shine music video
- Sing the “Atoms Family song”
- Learn the “Matterville” atom analogy
- Design an element from the periodic table
- Play an element word game to identify where elements are on the periodic table
- Write a poem about the properties of an element
- Color in a periodic table to identify metals, non-metals and metalloids
- Complete a lab that compares and contrasts physical and chemical changes and properties
- Compare and contrast the exothermic and endothermic reactions of CaCl₂ and NaOH
- Use glow sticks to investigate how temperature effects molecule speed
- Design an “Elephant Toothpaste” exergonic reaction using hydrogen peroxide, potassium iodide, food coloring and soap
- Create ionic and covalent bonds using Styrofoam balls and pipe cleaners
- Create static electricity with balloons to show positive and negative charges
- Perform a lab that investigates the properties of water: adhesion, cohesion, surface tension, capillary action and dissolving capabilities
- Create a pressure vacuum to draw a hardboiled egg into an Erlenmeyer flask
- Play with dry ice

**Enrichment Activities:**
- Test the pH of household substances for acids and bases
- Design a snowflake via crystallization using pipe cleaners and borax
- Use the enzyme Rennet to separate curds and whey to make cheese
- Test for the presence of carbohydrates, lipids and proteins in foods

**Methods of Assessments/Evaluation:**
- Chapter tests and quizzes
- Pre-assessments of material
- Exit slips (written or oral)
- Think Pair Share
- Review Jeopardy
- 1-2-3-4 Class Assessment
- Discovery Ed./United Streaming
- PowerPoint Presentations
- Thumbs Up/Thumbs Down
- Revisit Essential Questions
- Lab reflective
- Laboratory activities
- Atom project
- Element poem creative writing project
- Self-Assessment (Check-off competencies)
- Homework
- Independent work
- Observation of whole group and individual
- Element bingo board game

Resources/Including Online Resources
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Unit 3: Cell Biology (Chapters 7-9)

Approximate # Of Weeks: 10 weeks

Essential Questions:

Chapter 7: Cell Structure and Function
- How was the invention of the microscope important to the discovery of cells and the development of the cell theory?
- Which scientists were involved in the development of the cell theory and what were the roles of each?
- How is the cell the basic unit of life?

Chapter 8: Cell Processes
- What is the structure of the cell membrane and how does it determine what materials enter or leave cells?
- What are the structures and function of the cell organelles?
- How are the organelles related to each other?
- What are the limits to cell size?
- What is diffusion?
- How do materials enter and leave cells via passive and active transports?
- What are the different types of passive and active transports?
- What is the difference between hyper-, hypo- and isotonic solutions?
- What is photosynthesis and where and how does it occur?
- What is cellular respiration and where and how does it occur?
- What is fermentation and why does it take place?
- How are photosynthesis and cellular respiration linked?

Chapter 9: The Microscopic World
- What is the structure and function of protozoans?
- What is the relationship between protozoans and the beginning of life on Earth?
- What are the sizes, shapes and types of bacteria?
- What is the relationship between bacteria and the beginning of life on Earth?
- What is the importance of bacteria in industry?
- What is a virus and how is it structured?
- How do viruses infect cells?
- What is a vaccine and how does it combat a virus?

Upon completion of this unit students will be able to:
- Relate advances in microscope technology to discoveries about cell structure (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
- Explain the contributions of von Leeuwenhoek, Hooke, Schleiden, Schwann
and Virchow to the development of the Cell Theory (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)

- State the main ideas of the cell theory (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
- Relate the structure and function of the parts of a typical eukaryotic cell (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
- Compare and contrast plant and animal cells (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
- Examine the fluid mosaic model of the plasma membrane and relate its function to its structure (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
- Explain the processes of diffusion, active and passive transport and assess their importance to cell homeostasis (NGSS: LS1.C; NJCCC: 5.3.8.A.1-2)
- Predict the direction of diffusion of a dissolved substance (NGSS: LS1.C; NJCCC: 5.3.8.A.1-2)
- List the requirements for photosynthesis (NGSS: LS1.C; NJCCC: 5.3.8.A.1-2, 5.2.8.B.1-2)
- List the requirements for respiration (NGSS: LS1.C; NJCCC: 5.3.8.A.1-2, 5.2.8.B.1-2)
- Relate the reactions of photosynthesis to the structure of the leaf and chloroplast (NGSS: LS1.C; NJCCC: 5.3.8.A.1-2, 5.2.8.B.1-2)
- Relate the process of aerobic respiration to the structure of the mitochondrion (NGSS: LS1.C; NJCCC: 5.3.8.A.1-2, 5.2.8.B.1-2)
- Relate the process of aerobic respiration to breathing (NGSS: LS1.C; NJCCC: 5.3.8.A.1-2, 5.2.8.B.1-2)
- Explain the relationship between protozoans and bacteria and early Earth (NGSS: LS1.C; NJCCC: 5.3.8.A.1-2, 5.2.8.B.1-2)
- Compare and contrast the active and latent cycles of a virus (NGSS: LS1.C; NJCCC: 5.3.8.A.1-2, 5.2.8.B.1-2)
- Compare and contrast RNA viruses and DNA viruses (NGSS: LS1.C; NJCCC: 5.3.8.A.1-2, 5.2.8.B.1-2)
- State how a virus structure determines its function (NGSS: LS1.C; NJCCC: 5.3.8.A.1-2, 5.2.8.B.1-2)

Common Core Standards:

- CCSS.ELA.RST.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
- CCSS.ELA.RST.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms
- CCSS.ELA.WHST.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- CCSS.ELA.WHST.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.
• **CCSS.ELA.WHST.7** Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

• **CCSS.ELA.WHST.8** Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

• **CCSS.MATH.CONTENT.7.RP.A.2.A** Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

**Interdisciplinary Standards (njcccs.org)**

• **Standard 9.1 21st-Century Life & Career Skills**
  All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

• **Standard 6.3 Active Citizenship in the 21st Century**
  All students will acquire the skills needed to be active, informed citizens who value diversity and promote cultural understanding by working collaboratively to address the challenges that are inherent in living in an interconnected world.

**Activities – include 21st Century Technologies:**

- Read, outline and answer related text questions
- Take notes using guided note sheet
- Take notes from PowerPoint lectures
- Complete book worksheets
- Successfully complete assessments
- Successfully complete labs and activities
- Watch videos
- Complete article summaries and analyses
- Play review Jeopardy games to assess knowledge
- Complete the "Microscope and it’s parts" worksheet to identify and learn the functions of the parts of microscope
- Investigate the letter “e” and colorful threads using a compound, light microscope
- Investigate the similarities and differences between prokaryotic and eukaryotic cells via a microscope lab
- Observe diatom symmetry and structure
- Prepare a gelatin cytoplasm and observe cytoplasm properties by shining a flashlight through it
• Design a plant or animal cell using small household items to represent cell organelles and other structures
• Design a Life of an Organelle Facebook poster
• Create an analogy for the parts of a cell
• Draw and color the parts of the cell
• Test the rate of the diffusion of iodine and water at different temperatures
• Test the rate of the diffusion of different colored dye at varying temperatures
• Observe if fusion occurs by tying a string around a carrot in salt water
• Play with cell membrane models and show how proteins move substances
• Listen and watch They Might Be Giants: Roy G. Biv music video
• Listen and watch They Might Be Giants: Photosynthesis music video
• Observe a rainbow to show the visible light spectrum
• Compare respiration to a check and a dollar bill
• Design a bacteria
• Write a limerick about a bacteria
• Learn the structure and function of various types of bacteria via a plush bacteria lab
• Watch Jimmy Neutron virus episode
• Observe virus structure and function using a plush model

**Enrichment Activities:**
• Compare and contrast the levels of CO$_2$ use and O$_2$ production by different-sized Elodea plants
• Compare and contrast levels of CO$_2$ produced before and after exercise
• Submerge an unshelled egg in water and syrup to investigate diffusion and properties of the cell membrane
• Smell balloons to determine what spices are inside to investigate diffusion of different-sized particles

**Methods of Assessments/Evaluation:**
• Chapter tests and quizzes
• Pre-assessments of material
• Exit slips (written or oral)
• Think Pair Share
• Review Jeopardy
• 1-2-3-4 Class Assessment
• Discovery Ed./United Streaming
• PowerPoint Presentations
• Thumbs Up/Thumbs Down
• Revisit Essential Questions
• Lab reflective
• Laboratory activities
• Cell Facebook Project
• Team Create an Animal or Plant Cell project
• Oral presentation of cell project
• Peer-grading of cell project
• Self-Assessment (Check-off competencies)
• Homework
• Independent work
• Observation of whole group and individual
• Review laboratory analysis questions
• Review in-class worksheets

Resources/Including Online Resources
• Online Textbook Information: http://www.cposcience.com
• Teacher Webpage
• Discovery Ed./United Streaming, http://www.discoveryeducation.com
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• Youtube.com
• Journal articles
• Popular Science magazine
• Odyssey magazine
• www.pbs.org
Life Science 7

Unit 4: Genetics (Chapters 10-12)

Approximate # Of Weeks: 10 weeks

Essential Questions:

Chapter 10: Reproduction
- What is a chromosome and how does its structure relate to its function?
- What are the stages of the cell cycle and how are they important?
- Why is mitosis important in maintaining genetic stability?
- What is cell differentiation and how is it used in genetic engineering?
- What is meiosis and how is it similar and different from mitosis?
- What are traits and how are they inherited?

Chapter 11: Heredity
- What is the difference between heredity and genetics?
- What was Mendel’s role in the history of genetics?
- What are dominant alleles and recessive alleles?
- What is the difference between an individual’s genotype and phenotype?
- How does genotype influence phenotype?
- How can techniques, such as Punnett Squares, karyotypes and pedigree charts be used to predict future offspring?
- How are traits passed from one generation to the next in cases of incomplete dominance, codominance, multiple alleles, polygenic traits and sex-linked traits?

Chapter 12: The Code of Life
- What is the structure of DNA and what does it do?
- Who contributed to the discovery of DNA as the genetic material and its structure?
- How is the structure of DNA related to its functions in replication and protein synthesis?
- How are DNA and RNA similar? Different?
- What are the roles of RNA molecules in protein synthesis?
- How do changes in genes lead to changes in phenotypes and potential genetic disorders?
- How do changes in chromosome number occur and how do they affect organisms?
- What is the genetic link to cancer?
- How do selective breeding, DNA fingerprinting and biotechnology contribute to societal advancements?
- What is the Human Genome Project and what are its applications and future implications?
Upon completion of this unit students will be able to:

- Explain the importance of mitosis in maintaining genetic continuity (NGSS: LS3.A-B; NJCCC: 5.3.8.D.1-2)
- List the major differences between mitosis and meiosis (NGSS: LS3.A-B; NJCCC: 5.3.8.D.1-2)
- Explain the need for reduction division of chromosomes during gamete formation (NGSS: LS3.A-B; NJCCC: 5.3.8.D.1-2)
- Draw the phases of the cell cycle and state why each phase is important to growing organisms and cellular repair (NGSS: LS3.A-B; NJCCC: 5.3.8.D.1-2)
- Distinguish between plant and animal cell mitosis and cytokinesis (NGSS: LS3.A-B; NJCCC: 5.3.8.D.1-2)
- Describe the experiments of Gregor Mendel (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)
- Explain how traits are inherited (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)
- Distinguish between dominant and recessive traits (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)
- Predict the results of crosses using a Punnett Square (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)
- Compare and contrast the difference between an individual’s genotype and phenotype (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)
- Define and discuss dominance, incomplete dominance and codominance (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)
- Define polygenic inheritance and cite examples of polygenic traits (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)
- Describe the process of crossing over and explain how it increases genetic variety (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)
- List the contributions of various scientists to the identification of DNA as the genetic material (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)

Explain the process of DNA replication (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)

List the structural similarities and differences between DNA and RNA (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)

Identify the three types of RNA and their functions (NGSS: LS1.A-B, LS3.A-B; NJCCC: 5.3.8.D.1-2)


Common Core Standards:
- CCSS.ELA.RST.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- CCSS.ELA.RST.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context
- CCSS.ELA.RST.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms
- CCSS.ELA.RST.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
- CCSS.ELA.RST.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
- CCSS.ELA.WHST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- CCSS.MATH.CONTENT.7.RP.A.2.A Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight
line through the origin.

- **CCSS.MATH.CONTENT.7.RP.A.2.B** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

- **CCSS.MATH.CONTENT.7.SP.A.1** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

- **CCSS.MATH.CONTENT.7.SP.A.2** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

- **CCSS.MATH.CONTENT.7.SP.C.5** Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

- **CCSS.MATH.CONTENT.7.SP.C.6** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.

- **CCSS.MATH.CONTENT.7.SP.C.8.C** Design and use a simulation to generate frequencies for compound events.

**Interdisciplinary Standards (njcccs.org)**

- **Standard 9.1 21st-Century Life & Career Skills**
  All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

- **Standard 9.3 - Career Awareness, Exploration, and Preparation**
  All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

**Activities – include 21st Century Technologies:**

- Read, outline and answer related text questions
- Take notes using guided note sheet
- Take notes from PowerPoint lectures
- Complete book worksheets
- Successfully complete assessments
- Successfully complete labs and activities
- Watch videos
- Complete article summaries and analyses
- Play review Jeopardy games to assess knowledge
- Design a Chromosome by cutting traits out of magazines
- Create a mitosis flip book
- Identify interphase and mitotic phases: interphase, prophase, metaphase, anaphase, telophase and cytokinesis in onion root tip cells
- Study G0 phase through observing a plush neuron cell
- Send a mitosis article Tweet or text
- Listen and watch They Might Be Giants: The Bloodmobile music video
- Create a baby dragon by pairing homologous chromosomes
- Read, summarize, analyze and answer questions about an article on Mendelian genetics
- Play with plush red and white blood cells and plasma
- Present a genetic disorder
- Complete monohybrid, dihybrid, incomplete dominance, codominance, multiple allele, sex-linked inheritance and pedigree problem sets
- Complete a Sponge Bob genetics worksheet
- Study polygenic traits through analyzing hand spans
- Play with an antibodies and antigens model
- Perform a “Smiley Face” genetics lab
- Put together a DNA puzzle
- Make a DNA model out of candy
- Solve a crime using the “Who Dun’ It?” blood lab
- Model DNA replication, transcription and translation using a BioRad kit
- Read and analyze the article “Rosalind Franklin: The Woman Who Should Have Won the Nobel Prize”
- Debate: Who were the true discoverers of DNA; did Watson and Crick deserve the accolades they received? Does Rosalind Franklin deserve more credit for her work?

**Enrichment Activities:**
- Model the division of chromosomes during mitosis and meiosis using pipe cleaners
- Perform a “Penny Probability” lab
- Analyze concerns about gene therapy presented in a journal article
- Replicate, transcribe and translate a sequence of DNA on paper
- Analyze the article “Is Addiction in Your Genes?”
- Create a baby dragon with mutations

**Methods of Assessments/Evaluation:**
- Chapter tests and quizzes
- Pre-assessments of material
- Exit slips (written or oral)
- Think Pair Share
- Review Jeopardy
• 1-2-3-4 Class Assessment
• Discovery Ed./United Streaming
• PowerPoint Presentations
• Thumbs Up/Thumbs Down
• Revisit Essential Questions
• Lab reflective
• Laboratory activities
• Self-Assessment (Check-off competencies)
• Homework
• Independent work
• Calculators
• Observation of whole group and individual
• Partner grading of genetic worksheets
• Teacher grading of genetic worksheets
• White board genetics problem races

Resources/Including Online Resources
• Online Textbook Information: http://www.cposcience.com
• Teacher Webpage
• Discovery Ed./United Streaming, http://www.discoveryeducation.com
• Life Science video series
• CPO science chapter concept video series
• CPO chapter assessments, activities and projects
• Youtube.com
• Journal articles
• Popular Science magazine
• Odyssey magazine
• www.pbs.org
Life Science 7

Unit 5: Evolution and Change (Chapters 13 & 14)

Approximate # Of Weeks: 3 weeks

Essential Questions:

Chapter 13: Evolution
- What is evolution?
- What are the major lines of evidence provide the basis for evolution?
- How do fossils form and how do they provide evidence for evolution?
- What does the fossil record show?
- What was Lamarck’s theory of evolution?
- What is Darwin’s theory of evolution by natural selection?
- How is natural selection related to species fitness, variations and adaptations?
- How does the example of the peppered moths contribute to the theory of evolution?
- What are the three steps in which a species evolves?
- What is extinction?

Chapter 14: Earth and Life History
- How does sedimentary rock form?
- What are two ways to measure the age of fossils?
- What is the difference between spontaneous generation and biogenesis?
- How did scientists Redi, Spallanzani, Oparin, Miller and Urey, Pasteur and Needham contribute to the theory of biogenesis?
- How have humans evolved and who were their ancestors?
- What are the differences among living and deceased primates?
- What evidence do we use to hypothesize about the development of the hominid?
- What are distinguishing characteristics of primates?

Upon completion of this unit students will be able to:
- Discuss how the fossils form and how the fossil record is used to support evolution (NGSS: ESS1.C; NJCCC: 5.3.8.E.2)
- Distinguish between relative and absolute dating of fossils (NGSS: ESS1.C; NJCCC: 5.3.8.E.2)
- Cite evidence in support of evolution from comparative embryology, comparative anatomy and modern biochemistry (NGSS: LS4.A; NJCCC: 5.3.8.E.1-2)
- Summarize the major geological and biological events of the Geologic Time Scale (NGSS: ESS1.C; NJCCC: 5.3.8.E.1-2)
- Compare modern theories of the origin of life on earth through studying the
experiments of Redi, Spallanzani, Oparin, Miller and Urey, Pasteur and Needham (NGSS: ESS1.C; NJCCC: 5.1.8.B.3-4)

- Explain the hypothesis of spontaneous generation (NGSS: LS1.A; NJCCC: 5.1.8.C.3)
- Compare and contrast early experiments about spontaneous generation and biogenesis (NGSS: ESS1.C; NJCCC: 5.1.8.C.3)
- Trace how scientific methods led to the idea of biogenesis (NGSS: ESS1.C; NJCCC: 5.1.8.B.3-4, 5.4.8.1-2)
- Explain Oparin’s hypothesis for the origin of life on Earth (NGSS: ESS1.C; NJCCC: 5.1.8.B.3-4, 5.4.8.1-2)
- Identify characteristics of the first true cells (prokaryotic and eukaryotic) (NGSS: ESS1.C; NJCCC: 5.1.8.B.3-4, 5.4.8.1-2)
- Identify and evaluate the basic assumptions of Lamarck’s theory of evolution (NGSS: LS4.A-B; NJCCC: 5.3.8.E.1-2)
- Summarize the theory of evolution by natural selection (NGSS: LS4.A-B; NJCCC: 5.3.8.E.1-2)
- Relate the idea of natural selection to the origin of structural, behavioral and physiological adaptations (NGSS: LS4.A-C; NJCCC: 5.3.8.E.2)
- Compare and contrast small and mass extinctions throughout the world, throughout time (NGSS: ESS1.C; NJCCC: 5.3.8.E.1)
- Cite evidence from the industrial revolution as an example of evolution (NGSS: ESS1.C; NJCCC: 5.3.8.E.1)
- Define primates and relate their adaptations to life in the trees (NGSS: LS4.B; NJCCC: 5.3.8.E.2)
- Sequence the evolutionary history of modern primates (NGSS: LS4.A-C; NJCCC: 5.3.8.E.2)
- Compare and contrast the adaptations of australopithecines with those of apes and humans (NGSS: LS4.A-C; NJCCC: 5.3.8.E.2)
- Summarize and discuss the importance of the major anatomical changes in hominids during human evolution (NGSS: LS4.A-C; NJCCC: 5.3.8.E.2)

Common Core Standards:
- CCSS.ELA.RST.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
- CCSS.ELA.RST.2 Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- CCSS.ELA.WHST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA.WHST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate
information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

- **CCSS.ELA.WHST.10** Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences

- **CCSS.MATH.CONTENT.7.EE.B.4.A** Solve word problems leading to equations of the form \( px + q = r \) and \( p(x + q) = r \), where \( p \), \( q \), and \( r \) are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.

- **CCSS.MATH.CONTENT.7.EE.B.4.B** Solve word problems leading to inequalities of the form \( px + q > r \) or \( px + q < r \), where \( p \), \( q \), and \( r \) are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

**Interdisciplinary Standards (njcccs.org)**

- **Standard 6.3 Active Citizenship in the 21st Century**
  All students will acquire the skills needed to be active, informed citizens who value diversity and promote cultural understanding by working collaboratively to address the challenges that are inherent in living in an interconnected world.

**Activities – include 21st Century Technologies:**

- Read, outline and answer related text questions
- Take notes using guided note sheet
- Take notes from PowerPoint lectures
- Complete book worksheets
- Successfully complete assessments
- Successfully complete labs and activities
- Watch videos
- Complete article summaries and analyses
- Play review Jeopardy games to assess knowledge
- Create a game that assess knowledge of early scientists: Redi, Spallanzani, Oparin, Miller and Urey, Pasteur, Needham
- Summarize and analyze the article “Germ Warfare”
- Listen and watch They Might Be Giants: My Brother the Ape music video
- Listen and watch They Might Be Giants: I am a Paleontologist music video
- Complete a final project that that traces an organism’s adaptation through time
- Observe and distinguish between amber, imprint, cast, ice and mineralized fossils
- Play an embryo evolution activity to show that organisms are related through ancestry
- Tape their thumbs down and perform tasks such as tying shoes, texting and writing their name to show the importance of opposable thumbs
• Perform a peppered moth simulation activity that describes the importance of coloration in avoiding predation
• Read the comic strip “Survival of the Sneakiest” and compare and contrast beneficial to non-beneficial environmental traits
• Create origami creatures to simulate evolution or an organism through evolving paper
• Camouflage a frog, butterfly or other small organism to something in the classroom to show how coloration adaptations are advantageous to an organism’s survival
• Read and analyze “The Dodo Bird: Why it Wasn’t Fit Enough”
• Play a natural selection beak lab

**Enrichment Activities:**
• Read, summarize and analyze the article “Dog: How and where did a wild animal become our best friend?”
• Engage in a “Survivor Natural Selection” adaptation lab that helps develop fluency in concepts of evolution, specifically how adaptations and environmental changes work together in the process of natural selection
• Complete a critical reading on the theory of evolution and answer analysis questions on the reading

**Methods of Assessments/Evaluation:**
• Chapter tests and quizzes
• Pre-assessments of material
• Exit slips (written or oral)
• Think Pair Share
• Review Jeopardy
• 1-2-3-4 Class Assessment
• Discovery Ed./United Streaming
• PowerPoint Presentations
• Thumbs Up/Thumbs Down
• Revisit Essential Questions
• Lab reflective
• Laboratory activities
• Evolution final project
• Self-Assessment (Check-off competencies)
• Homework
• Independent work
• Observation of whole group and individual
• Poster display of organism and trait
• Project peer-editing
• Open ended questions on worksheets and assessments
• Evolution video questions
• Article summaries
Resources/Including Online Resources
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- Teacher Webpage
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- Odyssey magazine
- www.pbs.org
Life Science 7

Unit 6: Structure and Function in Living Things (Chapters 15-17)

Approximate # Of Weeks: 3 weeks

Essential Questions:

Chapter 15: The Diversity of Life
- How does taxonomy relate to systematics?
- How do you make a cladogram?
- What are the similarities and differences between cladograms and evolutionary trees?
- What are the characteristics of organisms in the Kingdom Protista?
- What are the characteristics of organisms in the Kingdom Fungi?
- What are algae and what are economic uses of algae?
- What are fungi and what are economic uses of fungi?

Chapter 16: Plants
- What are some main characteristics that all plants have?
- How are plants classified?
- What are similarities and differences between non-vascular and vascular plants?
- What are characteristics of seedless plants versus seeded plants?
- What the key differences between monocots and dicots?
- What are key differences between angiosperms and gymnosperms?
- How does each plant structure relate to its function?
- What are the key differences in angiosperm and gymnosperm reproduction?

Chapter 17: Animals
- What is an animal?
- What characteristics do all animals share?
- Why are sponges animals?
- What do you have in common with a worm, sea star, frog, fish and bird?
- How are animals organized?
- What are major characteristics of invertebrate (sponge, cnidarian, flatworm, roundworm, annelid, mollusk, arthropod and echinoderm) structure and function?
- How does invertebrate structure related to the functioning of the organism?
- What are major characteristics of vertebrate (fish, amphian, reptile, bird and mammal) structure and function?
- How does vertebrate structure related to the functioning of the organism?

Upon completion of this unit students will be able to:
• Construct a cladogram and an evolutionary tree (NGSS: LS4.A; NJCCC: 5.3.8.E.2)
• Trace the relationships between organisms using a cladogram (NGSS: LS4.A; NJCCC: 5.3.8.E.2)
• Describe characteristics shared by all protists (NGSS: LS1.A, LS4.A; NJCCC: 5.3.8.E.2)
• Compare and contrast the three groups of protists and explain why protists are so difficult to classify (NGSS: LS4.A; NJCCC: 5.3.8.E.2)
• Identify characteristics shared by all fungi (NGSS: LS1.A, LS4.A; NJCCC: 5.3.8.E.2)
• Classify fungi into groups based on their method of reproduction (NGSS: LS4.A; NJCCC: 5.3.8.E.2)
• Identify the economic importance of fungi (NGSS: ESS3.A, LS4.A; NJCCC: 5.3.8.E.2)
• Identify characteristics common to all plants (NGSS: LS4.A; NJCCC: 5.3.8.E.2)
• Explain which plant adaptations make it possible for plants to survive on land (NGSS: LS1.A, LS4.A; NJCCC: 5.3.8.E.2)
• Compare and contrast vascular and nonvascular plants (NGSS: LS1.A, LS4.A; NJCCC: 5.3.8.E.2)
• Explain how the structure of roots, stems, leaves and flowers related to their function (NGSS: LS1.A, LS4.A; NJCCC: 5.3.8.E.2)
• Identify characteristics of seedless and seeded plants (NGSS: LS1.A, LS4.A; NJCCC: 5.3.8.E.2)
• Compare and contrast angiosperms and gymnosperms. (NGSS: LS4.A; NJCCC: 5.3.8.E.2)
• Compare and contrast monocots and dicots (NGSS: LS4.A; NJCCC: 5.3.8.E.2)
• Identify characteristics all animals have in common (NGSS: LS4.A; NJCCC: 5.3.8.E.2)
• Explain how vertebrate structure relates to the functioning of the organism (NGSS: LS1.A, LS4.A; NJCCC: 5.3.8.E.2)

Common Core Standards:
• CCSS.ELA.RST.9 Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
• CCSS.ELA.WHST.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
• CCSS.ELA.WHST.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
Interdisciplinary Standards (njcccs.org)

- **Standard 9.1 21st-Century Life & Career Skills**
  All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

- **Standard 6.3 Active Citizenship in the 21st Century**
  All students will acquire the skills needed to be active, informed citizens who value diversity and promote cultural understanding by working collaboratively to address the challenges that are inherent in living in an interconnected world.

Activities – include 21st Century Technologies:

- Read, outline and answer related text questions
- Conduct a pre-assessment of concepts
- Take notes using guided note sheet
- Take notes from PowerPoint lectures
- Complete book worksheets
- Successfully complete assessments
- Successfully complete labs and activities
- Watch videos
- Complete article summaries and analyses
- Play review Jeopardy games to assess knowledge
- Draw and analyze organisms from the Kingdom Protista using mini-microscopes
- Observe algae in a fish tank
- Observe yeast, mushrooms and lichens under a microscope
- Observe gymnosperms and angiosperms and compare their structures
- Dissect the parts of a vascular plant: roots, stem, leaf and flower
- Observe and analyze growth rings of a tree to understand past weather patterns
- Analyze the radial symmetry of starfish
- Compare and contrast the symmetry of objects
- Create a Kingdom Animalia classification poster
- Race squid balloons across the classroom to demonstrate jet propulsion
- Design a vertebrate and its habitat

Enrichment Activities:

- Classify different types of lichens
- Read and analyze the “Red Tide” article
- Write a paragraph comparing and contrasting marsupials to other mammals
- Identify the importance of yeast and algae to life
- Explain how the individual parts of a plant contribute to the functioning of the plant as a whole
Methods of Assessments/Evaluation:
- Chapter tests and quizzes
- Exit slips (written or oral)
- Think Pair Share
- Review Jeopardy
- 1-2-3-4 Class Assessment
- Discovery Ed./United Streaming
- PowerPoint Presentations
- Thumbs Up/Thumbs Down
- Revisit Essential Questions
- Lab reflective
- Laboratory activities
- Self-Assessment (Check-off competencies)
- Homework
- Independent work
- Observation of whole group and individual
- Poster display of animal classification
- Project peer-editing
- Open ended questions on worksheets and assessments
- Article summaries
- Lab analysis questions

Resources/Including Online Resources
- Online Textbook Information: http://www.cposcience.com
- Teacher Webpage
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- Youtube.com
- Journal articles
- Popular Science magazine
- Odyssey magazine
- www.pbs.org
Life Science 7

Unit 7: The Human Body (Chapters 18-20)

Approximate # Of Weeks: 2 weeks

Essential Questions:

Chapter 18: Human Body Systems
- How are the circulatory and respiratory systems related?
- How do the heart and lungs work together to deliver oxygenated blood to the body?
- How does blood move through arteries, veins and capillaries?
- What are the different parts of blood and how is each important?
- What is the integumentary system and what is its primary function?
- What is the endocrine system and what is its primary function?
- How do the digestive and excretory systems work together?
- What is the reproductive system and what is its primary function?

Chapter 19: Support and Movement
- What is the skeletal system and what is its primary function?
- What is the muscular system and what is its primary function?
- What are the three different types of muscle and where are they each found?
- What is the relationship between the body and simple machines?

Chapter 20: Vision and Hearing
- What is the nervous system and what is its primary function?
- How does your body respond to a stimulus?

Upon completion of this unit students will be able to:
- Relate the circulatory and respiratory system through their primary functions (NGSS: LS1.A; NJCCC: 5.3.8.E.2)
- Model how the heart and lungs work together to deliver oxygenated blood to the body (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
- Differentiate between the different parts of blood (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
- Explain blood’s tri-fold importance in the body (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
- Describe the importance of the layers of the integumentary system (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
- Describe the importance of the endocrine system and how it relates to fight or flight responses (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
- Draw the pathway of digestion and excretion (NGSS: LS1.A; NJCCC: 5.3.8.B.1)
• Differentiate between male and female reproductive systems and explain their changes during puberty (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
• Demonstrate what would happen if organisms did not have bones (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
• Differentiate between the three types of muscle and show where in the body each are found (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)
• Illustrate how the body is like a simple machine (NGSS: LS1.A, PS3.C; NJCCC: 5.3.8.A.1-2)
• Explain how the nervous system works in transmitting impulses from a body part to the brain and back (NGSS: LS1.A; NJCCC: 5.3.8.A.1-2)

Common Core Standards:
• CCSS.ELA.WHST.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
• CCSS.MATH.CONTENT.7.G.B.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Interdisciplinary Standards (njcccs.org)
• Standard 8.1 – Computer and Information Literacy
  All students will use computer applications to gather and organize information and to solve problems.
• Standard 8.2 – Technology Education
  All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world as they relate to the individual, society, and the environment.
• Standard 6.3 Active Citizenship in the 21st Century
  All students will acquire the skills needed to be active, informed citizens who value diversity and promote cultural understanding by working collaboratively to address the challenges that are inherent in living in an interconnected world.

Activities – include 21st Century Technologies:
• Read, outline and answer related text questions
• Take notes using guided note sheet
• Take notes from PowerPoint lectures
• Complete book worksheets
• Successfully complete assessments
• Successfully complete labs and activities
• Watch videos
• Complete article summaries and analyses
• Play review Jeopardy games to assess knowledge  
• Listen to heartbeat using stethoscopes  
• Take blood pressure using a sphygmomanometer  
• Observe normal red and white blood cells, plasma and sickle cells under a microscope  
• Compare and contrast human blood to frog blood by studying both under a microscope  
• Compare and contrast heart rate and blood pressure before and after exercise using a stethoscope and a sphygmomanometer  
• Read and summarize an article about skin graphs and burn victims  
• Conduct research on and present a disease to the class  
• Compare and contrast the structure and functions three types of muscle after observing them under the microscope  
• Write a persuasive paragraph about the importance of calcium in bone development

Enrichment Activities:
• Write a short story that describes the journey of a red blood cell through the human circulatory system  
• Take apart and put together the human body model  
• Research a topic: How do x-rays work? Where did the funny bone get its name? How do doctors categorize different bone fractures? What does it mean to “pull a muscle”? and present it to the class

Methods of Assessments/Evaluation:
• Chapter tests and quizzes  
• Exit slips (written or oral)  
• Think Pair Share  
• Review Jeopardy  
• 1-2-3-4 Class Assessment  
• Discovery Ed./United Streaming  
• PowerPoint Presentations  
• Thumbs Up/Thumbs Down  
• Revisit Essential Questions  
• Lab reflective  
• Laboratory activities  
• Self-Assessment (Check-off competencies)  
• Homework  
• Independent work  
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