

SEVENTH GRADE SCIENCE
CURRICULUM MAP
Amherst Regional Middle School

SCHOOL WIDE ESSENTIAL QUESTIONS:

Who am I?

Who Are They?

Who are We?

OVERARCHING ENDURING UNDERSTANDING FOR Science:

The natural world is composed of interdependent systems. Understanding how natural systems work enables us to take care of them.

Science 7 is an exploratory general science course designed to enable our students to acquire knowledge of the natural world through understanding the systems that function within it. These systems focus on several topics included within life sciences. Units include: Classification, Cells, Human Body Systems, Reproduction and Heredity, Evolution, and Ecology.

During the year students will develop an appreciation for the nature of science and how scientists do their work. This allows students to build a perspective on how science connects to the world and how they interact with it. Conceptual model building towards this goal is achieved through interactive laboratory activities, group discussion and projects designed to facilitate critical thinking and observation skills. Group and study skills are emphasized throughout the year. Students will use a variety of materials for curricular resources including Glencoe Ecology and Human Body Systems textbooks and teacher generated materials.

Unit Title - Life Science: Classification

Time Frame: 4 weeks

Unit Enduring Understanding: Classification is a tool that humans use to give sense and order to the world. Using classification we can see that living things share common characteristics and requirements.

Unit Essential Questions:

How and why do we classify things?

What do all living things have in common?

What are the six kingdoms and what characteristics separate them?

ARMS Science 7		Massachusetts Frameworks Standards Life Science (Biology), Grades 6-8	
<ul style="list-style-type: none"> ▪ Understand the characteristics of living things. (Made of cells, reproduce, use energy, respond to stimuli, etc.) ▪ Apply classification skills to build a dichotomous key. ▪ Use senses to make good qualitative observations using precise language and quantitative observations using measuring tools. ▪ State the six kingdoms and their identifying characteristics. ▪ Give examples of organisms from each kingdom. 		<ol style="list-style-type: none"> 1. Classify organisms into the currently recognized kingdoms according to characteristics that they share. Be familiar with organisms from each kingdom. 4. Recognize that within cells, many of the basic functions of organisms (e.g., extracting energy from food and getting rid of waste) are carried out. The way in which cells function is similar in all living organisms. 5. Inquiry and Experimentation Select appropriate tools for making quantitative observations: thermometers, meter sticks 	
<p>Summative Assessments: Develop a classification system which efficient, clear to users, and accurate.</p>			
<p>Activities leading to assessments: dichotomous key for letters, letters Library use and research skills Computer file structure and file naming rules Nature of science, thinking like a scientist. Carousel activity: what do you know what this is definitions of disciplines of science. Tools of a scientist: what is this for: structure and function of the tools? Observation: Field biology Experimental design: Fast Plants School grounds Make 10 scientific observations.</p>			
Kingdom	Prokaryote	Protist	reptile
Species	Animal	Eubacteria	amphibian
Dichotomous Key	Plant	Archebacteria	fish
Eukaryote	Fungi	mammal	vertebrate
		bird	invertebrate

Unit Title - Life Science: Cells

Time Frame: 8 weeks

Unit Enduring Understanding: All living things are made up of cells, which are the building blocks of life. Cells need matter and energy to function.

Unit Essential Questions:

- What are the functions of the major cell structures?
- What do cells need to function?
- How does energy cycle through the cell?
- How big are cells and how do we observe them?

ARMS Science 7	Massachusetts Frameworks Standards
<ul style="list-style-type: none"> ▪ Understand that the way cells function is similar in all living organisms. ▪ Explain the cell theory and how it is the basis for understanding cell structure and cell function ▪ Identify the general parts and functions of the cell (Golgi body, mitochondria, vacuole, ribosome, endoplasmic reticulum, cell membrane, cell wall, cytoplasm, nucleus, chloroplast) ▪ Build a model of a typical plant and animal cell, which will illustrate the similarities and differences between plant and animal cells, and will incorporate the structure and function of the cell parts ▪ Understand that cells transfer energy through respiration and photosynthesis ▪ Model how cells transfer matter through diffusion and osmosis ▪ Demonstrate proper care and use of microscopes 	<ol style="list-style-type: none"> 2. Recognize that all organisms are composed of cells, and that many organisms are single-celled (unicellular), e.g., bacteria, yeast. In these single-celled organisms, one cell must carry out all of the basic functions of life. 3. Compare and contrast plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, cytoplasm, chloroplasts, mitochondria, vacuoles). 4. Recognize that within cells, many of the basic functions of organisms (e.g., extracting energy from food and getting rid of waste) are carried out. The way in which cells function is similar in all living organisms. 16. Recognize that producers (plants that contain chlorophyll) use the energy from sunlight to make sugars from carbon dioxide and water through a process called photosynthesis. This food can be used immediately, stored for later use, or used by other organisms. <p>Inquiry and Experimentation</p> <p>Select appropriate tools and technology (microscopes) and make quantitative observations.</p>
<p>Summative Assessments:</p> <p>Put mystery or newly discovered creature in a kingdom based on cell and organism by relating structure and function.</p> <p>Develop an analogy comparing a cell to another system.</p>	
<p>Activities lead to assessments:</p> <p>Build a model of the cell.</p> <p>Check onion cell lab</p>	

Cell Membrane	Cell
Cytoplasm	Cell Theory
Nucleus	Function
Ribosomes	Structure
Lysosomes	Diffusion
Mitochondria/on	Osmosis
Endoplasmic Reticulum	Active transport
Golgi Bodies	Passive transport
Vacuole	Concentration (of a substance)
Chlorophyll	Permeable
Chloroplast	Protein
	Microscope

Unit Title - Life Science: Human Body Systems Time Frame: 8 weeks

Unit Enduring Understanding: The human body is organized into systems which interact to sustain life.

Unit Essential Questions:

- How is the body organized?
- How do the body systems work together?
- How does the body use food?

ARMS Science 7		Massachusetts Frameworks Standards
<ul style="list-style-type: none"> ▪ Illustrate the hierarchical organization of the body: cells to tissues to organs to systems to organisms ▪ Identify the general functions and major organs of all the body systems. ▪ Identify the specific functions of the digestive, circulatory, and respiratory systems of the human body and model/describe how these systems help the body obtain and use energy. 		<ol style="list-style-type: none"> 5. Describe the hierarchical organization of multicellular organisms from cells to tissues to organs to systems to organisms. 6. Identify the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, excretion, protection from disease, and movement, control, and coordination) and describe ways that these systems interact with each other.
<p>Summative Assessments: Pre and Post test: Explain how the respiratory, digestive, and circulatory systems interact to cause a person who exercises on an empty stomach to have fast pulse and breathing rate and be light headed and weak.</p>		
<p>Activities lead to assessments: Energy in the human body curriculum Intro to body systems activity Measuring skin surface area lab Fast food nutrition project Model of lungs Human body and the web page project</p>		
<p style="text-align: center;">Digestion System</p> energy rich molecules carbohydrate glucose mouth esophagus stomach small intestine large intestine salivary glands pancreas gall bladder liver	<p style="text-align: center;">Circulatory System</p> artery vein capillary heart pulse blood red blood cell	<p style="text-align: center;">Respiratory System</p> diaphragm inhaling exhaling esophagus epiglottis trachea lungs bronchi bronchioles alveoli

mechanical digestion chemical digestion peristalsis villi chyme acid enzymes mucus digestion		
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Unit Title - Life Science: Heredity

Time Frame: 4 weeks

Unit Enduring Understanding: An organism's characteristics are passed from one generation to the next. Instructions for these characteristics are located on the organism's chromosomes.

Unit Essential Questions:

How do organisms reproduce?

How do organisms get their characteristics?

Why are offspring similar and different from their parents?

ARMS Science 7	Massachusetts Frameworks Standards Life Science (Biology), Grades 6-8	
<ul style="list-style-type: none">▪ Compare sexual and asexual reproduction.▪ Recognize that every organism needs a set of instructions to determine its traits.▪ Model how genetic information is passed on to offspring from each parent▪ Recognize the hereditary information as contained in genes on the chromosomes of each cell.	<p>7. Recognize that every organism requires a set of instructions that specifies its traits. These instructions are stored in the organism's chromosomes. Heredity is the passage of these instructions from one generation to another.</p>	<p>8. Recognize that hereditary information is contained in genes located in the chromosomes of each cell. A human cell contains about 30,000 different genes on 23 different chromosomes.</p> <p>9. Compare sexual reproduction (offspring inherit half of their genes from each parent) with asexual reproduction (offspring is an identical copy of the parent's cell).</p>
Summative Assessments: Human Genetics project: Model of human heredity and End of Unit Test		
Activities leading to Assessments: Stacops Paper pets		
Unit Vocabulary		
DNA	Chromosomes	Genes
Genotype	Phenotype	Dominant
Recessive	Trait	Sexual Reproduction
Asexual Reproduction	Heredity	Egg
Sperm	Generation	Offspring

Unit Title - Life Science: Evolution

Time Frame: 4 weeks

Unit Enduring Understanding: Over time, populations of organisms adapt to their changing environment through natural selection.

Unit Essential Questions:

What is the evidence that organisms have evolved throughout the Earth's history?

How does natural selection result in evolution?

ARMS Science 7	Massachusetts Frameworks Standards Life Science (Biology), Grades 6-8	
<ul style="list-style-type: none"> ▪ Give examples of adaptations and describe how these traits help an organism to survive. ▪ Understand that adaptations arise from genetic mutations. ▪ Identify that genetic variations and environmental factors are causes of evolution and the diversity of organisms ▪ Understand adaptations confer a positive or negative survival advantage to organisms. ▪ Relate the extinction of species to a mismatch of adaptation and the environment. ▪ Recognize that evidence drawn from geology, fossils, and comparative anatomy provides the basis of the theory of evolution. ▪ Explain how environments change over time due physical conditions, interactions among organisms, and the actions of humans. 	<p>10. Give examples of ways in which genetic variation and environmental factors are causes of evolution and the diversity of organisms.</p> <p>11. Recognize that evidence drawn from geology, fossils, and comparative anatomy provide the basis of the theory of evolution.</p> <p>12. Relate the extinction of species to a mismatch of adaptation and the environment.</p> <p>17. Identify ways in which ecosystems have changed throughout geologic time in response to physical conditions, interactions among organisms, and the actions of humans. Describe how changes may be catastrophes such as volcanic eruptions or ice storms.</p> <p>18. Recognize that biological evolution accounts for the diversity of species developed through gradual processes over many generations.</p>	
<p>Summative Assessments: Develop a natural selection game.</p>		
<p>Activities leading to Assessments: Systems and change text activities Changes in Bikes over time Breakfast for birds Now you see it. Salamander pursuit Natural selection of Paper Pets Horse Tooth Lab Scaphognathus Lab</p>		
Fossil Species Population Evolution	Adaptation Competition Natural Selection Common Ancestor	Extinction Diversity Offspring Artificial Selection

Unit Title - Ecology

Time Frame: 8 weeks

Unit Enduring Understandings: Organisms are interdependent and changes in ecosystems impact which organisms survive.

Unit Essential Questions:

How are organisms interdependent?

How does energy and matter move in an ecosystem?

How do changes in an ecosystem affect the survival of organisms?

ARMS Science 7	Massachusetts Frameworks Standards
<ul style="list-style-type: none">▪ How do changes an ecosystem affect the living organisms in the environment?▪ Understand the hierarchical organization of biosphere, biome, ecosystem, community, population, and species.▪ Describe how abiotic factors influence life in an ecosystem. (Air, water, soil, temperature, season, and climate.)▪ Understand how the carbon and water cycles are an integral part of photosynthesis.▪ Explain the roles and relationships among producers, consumers and decomposers in the process of energy transfer in an ecosystem▪ Create a model of the water and carbon cycles▪ Explain how ecosystems change over time due physical conditions, interactions among organisms, and the actions of humans.	<ol style="list-style-type: none">16. Recognize that producers (plants that contain chlorophyll) use the energy from sunlight to make sugars from carbon dioxide and water through a process called photosynthesis. This food can be used immediately, stored for later use, or used by other organisms.17. Explain the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.2. Knows the processes involved in the water cycle (e.g., evaporation, condensation, precipitation, surface run-off, percolation) and their effects on climatic patterns3. Relate the extinction of species to a mismatch of adaptation and the environment.4. Identify ways in which ecosystems have changed throughout geologic time in response to physical conditions, interactions among organisms, and the actions of humans. Describe how changes may be catastrophes such as volcanic eruptions or ice storms.
Summative Assessments: Island project	
Activities leading to Assessments: Ecology textbook resources	

Population Organism Community Ecosystem Environment Biosphere	Prey Carrying Capacity Limiting Factor Decomposer Carbon Cycle Water Cycle	Consumer Producer Habitat Niche Food Chain Food Web Predator
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