

**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: Nature of Science

Time Frame: 3 - 4 weeks

Unit Enduring Understanding:

Science is one of several ways of understanding. Science is based on evidence gathered through observations of the natural world.

Unit Essential Questions:

What is a fair test?

What is a scientific theory?

ARMS Science 7	State/National Standards
<ol style="list-style-type: none">1) Formulate a testable hypothesis, and design and construct a controlled experiment.2) Select appropriate tools and technology for experiment.3) Draw conclusions based on evidence.4) Present and explain findings.5) Differentiate between scientific explanations and nonscientific explanations.6) Be able to safely work in a lab.	<p>Grades 6-8 (MSF Experimental Design Standards)</p> <ul style="list-style-type: none">• Formulate a testable hypothesis.• Design and conduct an experiment specifying variables to be changed, controlled, and measured.• Select appropriate tools and technology (e.g., calculators, computers, thermometers, meter sticks, balances, graduated cylinders, and microscopes), and make quantitative observations.• Present and explain data and findings using multiple representations, including tables, graphs, mathematical and physical models, and demonstrations.• Draw conclusions based on data or evidence presented in tables or graphs, and make inferences based on patterns or trends in the data.• Communicate procedures and results using appropriate science and technology terminology.• Offer explanations of procedures, and critique and revise them.
<p>Unit Vocabulary</p> <p>Hypothesis Independent Variable Dependent Variable Controlled variables Constants</p>	
<p>Activities Leading to Assessment</p> <p>Fortune Fish Field Observations Qualitative and Quantitative observations Experimenting Mass of Gum (2010) Pulse Lab (2010) Tennis Ball Temperature Lab (2010)</p>	

Unit Title - Life Science: Cells

Time Frame: 9 - 11 weeks

Unit Enduring Understanding:

Cells are the building blocks of life, they make up all living things, and they need matter and energy to function.

Unit Essential Questions:

- How big are cells and how do we observe them?
- How does matter get into and out of cell?
- What are the functions of the major cell structures?
- How do plant and animal cells get energy?

Unit Standards

ARMS Science 7	State/National Standards
<ol style="list-style-type: none">1) 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 function2) Identify the general parts and functions of the cell (Golgi body, mitochondria, vacuole, ribosome, endoplasmic reticulum, cell membrane, cell wall, cytoplasm, nucleus, chloroplast)3) 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 parts4) Understand that cells transfer energy through respiration and photosynthesis5) Model how cells transfer matter through diffusion and osmosis6) Demonstrate proper care and use of microscopes7) Recognize that unicellular organisms have varied and unique methods of obtaining nutrients and locomotion.8) Understand that cell size is limited by the relationship between the size of its surface area (membrane) and its volume (cytoplasm).	<p>LS 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.</p> <p>LS 3. Compare and contrast plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, cytoplasm, chloroplasts, mitochondria, vacuoles).</p> <p>LS 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.</p> <p>LS 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>

Unit Vocabulary

Cell Membrane
Cytoplasm
Nucleus
Ribosomes
Lysosomes
Mitochondria/on
Endoplasmic Reticulum
Golgi Bodies

Cell
Cell Theory
Function
Structure
Diffusion
Osmosis
Active transport
Passive transport

Vacuole
Chlorophyll
Chloroplast
Prokaryote
Eukaryote

Concentration (of a substance)
Permeable
Protein
Microscope

Activities leading to assessments

1. Cheek and onion cell lab
2. Model how cells transfer matter through diffusion and osmosis (Egg Lab)
3. 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.
4. Develop an analogy comparing a cell to another system.
5. Plays for activities in the cell and in photosynthesis (2010)

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Unit Title - Life Science: Human Body Systems Time Frame: 4-5 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	State/National Standards																																																																		
1) Illustrate the hierarchical organization of the body: cells to tissues to organs to systems to organisms 2) Identify the general functions and major organs of digestion, respiration, circulation systems in the human body. 3) Identify how the digestive, circulatory, respiratory systems of the human body work together with cells to help the body obtain and use energy.	LS 5. Describe the hierarchical organization of multicellular organisms from cells to tissues to organs to systems to organisms. LS 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.																																																																		
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Unit Title - Life Science: Heredity and Reproduction

Time: 6 - 8 weeks

As of 1.31.11

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?

Unit Standards

ARMS Science 7	State/National Standards
1) Compare sexual and asexual reproduction including multi-cellular and single cellular organisms. 2) Identify the components, function, and processes of plant and animal (human) reproductive systems. 3) Recognize that every organism needs a set of instructions to determine its traits. 4) Model how genetic information is passed on to offspring from each parent 5) Recognize the hereditary information as contained in genes on the chromosomes of each cell. 6) Determine the probability of an offspring inheriting a trait from its parents.	LS 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. LS 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. LS 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).

Unit Vocabulary

Chromosomes	Heredity	Asexual	Plant:	Animal (human)
Genes	Genotype	Reproduction	Stamen	Penis
DNA	Recessive/Dominant	Sexual Reproduction	Pistil	Testicle
Allele	Phenotype/ Trait	Offspring	Pollen	Ovary
	Heterozygous/	clone	Ovary	Urethra
	homozygous	Egg	Fruit	Uterus
	Generation	Sperm	Seed	Fallopian tubes
	Incomplete dominance	Gamete		vas deferens
	Hybrid and pure breed	Fertilize		Vagina
		zygote		

Activities leading to Assessments

planting counting Fast Plants F2 seeds Pea Plant seeds Plant cloning Flower dissection	Paper pets / Katydee Bops XY Paper Clip Chromosomes Cow auction/ Cow Farm Field trip Utah Web: Genetic Learning Center Race Vid: Power of Illusion.	Pipe cleaner DNA DNA earrings while Gattaca (Family version) DNA extraction peas Albino corn seeds germination
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Unit Title - Life Science: Evolution

Time Frame: 4 - 5 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	MCAS Standards Life Science (Biology), Grades 6-8												
<ol style="list-style-type: none"> 1) Give examples of adaptations and describe how these traits help an organism to survive. 2) Understand that adaptations arise from genetic mutations. 3) Identify that genetic variations and environmental factors are causes of evolution and the diversity of organisms 4) Understand adaptations confer a positive or negative survival advantage to organisms. 5) Relate the extinction of species to a mismatch of adaptation and the environment. 6) Recognize that evidence drawn from geology, fossils, and comparative anatomy provides the basis of the theory of evolution. 7) Explain how environments change over time due physical conditions, interactions among organisms, and the actions of humans. 8) State the six kingdoms and their identifying characteristics. 9) Give examples of organisms from each kingdom. 	<p>LS 1. Classify organisms into the currently recognized kingdoms according to characteristics that they share. Be familiar with organisms from each kingdom.</p> <p>LS 10. Give examples of ways in which genetic variation and environmental factors are causes of evolution and the diversity of organisms.</p> <p>LS 11. Recognize that evidence drawn from geology, fossils, and comparative anatomy provide the basis of the theory of evolution.</p> <p>LS 12. Relate the extinction of species to a mismatch of adaptation and the environment.</p> <p>LS 18. Recognize that biological evolution accounts for the diversity of species developed through gradual processes over many generations.</p>												
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<p>Activities leading to Assessments:</p> <ul style="list-style-type: none"> 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 													

Unit Title - Ecology

Time Frame: 6 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	State/National Standards																					
<ol style="list-style-type: none"> 1) How do changes an ecosystem affect the living organisms in the environment? 2) Understand the hierarchical organization of biosphere, biome, ecosystem, community, population, and species. 3) Describe how abiotic factors influence life in an ecosystem. (Air, water, soil, temperature, season, and climate.) 4) Understand how the carbon and water cycles are an integral part of photosynthesis. 5) Explain the roles and relationships among producers, consumers and decomposers in the process of energy transfer in an ecosystem 6) Create a model of the water and carbon cycles 7) Explain how ecosystems change over time due physical conditions, interactions among organisms, and the actions of humans. 	<p>LS 13. Give examples of ways in which organisms interact and have different functions within an ecosystem that enable the ecosystem to survive.</p> <p>LS 14. Explain the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.</p> <p>LS 15. Explain how dead plants and animals are broken down by other living organisms and how this process contributes to the system as a whole.</p> <p>LS 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> <p>LS 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>																					
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<p>Activities leading to Assessments: Ecology textbook resources</p>																						

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