

# **SCIENCE**

## **CURRICULUM GUIDE**

### **GRADES 9 - 12**



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TABLE OF CONTENTS

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Rationale for the Study of Science in Pattonville .....	4
Goals for Graduates .....	5
Content and Resources .....	6
Instructional Strategies .....	8
Curriculum Evaluation and Revision .....	9
Vertical Alignment and Articulation .....	10
Scope and Sequence .....	11
Individual Course Rationales, Descriptions, Objectives, and Outlines .....	12
Assessments (on file in A+ office) .....	
Appendix A: Show-Me Standards .....	65
Appendix B: Missouri's Frameworks for Curriculum Development .....	66

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## RATIONALE FOR THE STUDY OF SCIENCE 9-12 IN PATTONVILLE

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In order to become a scientifically literate individual, a student needs to actively participate in scientific investigations based on real life questions. In a classroom environment, and outside of the classroom, such investigation requires the use of technology for scientific inquiry. The use of technology is a complex social enterprise that allows people to change the world. Scientific inquiry enables a person to further the growth of technology and to anticipate both beneficial and adverse effects of technology on a personal, community and global environment.

Students must develop a basic understanding of properties and principles of matter and energy. The flow of matter and energy provides equilibrium in nature and channeling of resources leads to economic productivity. An understanding of the principles and properties of force and motion leads to explanations of the nature of the universe and human's place within the universe. In addition, study of the universe helps students to understand the scientific and economic importance that space exploration contributes to society. As students learn more about their role in the universe they also acquire a greater understanding of the finite nature of our planet and the forces in play on the Earth. Students need knowledge of the processes and physical nature of the Earth. Interactions between these processes impact weather, oceanography, climate, environments and resources needed to survive.

Understanding and appreciating the diversity of life comes from students' ability to see the patterns of similarities and differences that permeate the living world. Curiosity and need have combined to open the living world from the complexities of the genetic code to the interplay of living things within their environment. Finally, knowledge of the living environment provides students with an understanding of their place in the natural world and how humans can and do impact the environment to the benefit or detriment of themselves and other living organisms.

Paraphrased from the **Missouri Assessment Annotations for the Science Curriculum Frameworks** and the **AAAS Project 2061 Science for All Americans**

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## GOALS FOR GRADUATES IN SCIENCE

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The goals for Pattonville graduates in Science are based on the Missouri Show-Me Standards, both in performance as well as specific knowledge standards.

For Performance Standards, Pattonville students will:

1. acquire the knowledge and skills to gather, analyze and apply information and ideas;
2. acquire the knowledge and skills to communicate effectively within and beyond the classroom;
3. acquire the knowledge and skills to recognize and solve problems, and
4. acquire the knowledge and skills to make decisions and act as responsible members of society.

For Science Knowledge Standards, Pattonville students will acquire a solid foundation that includes knowledge of:

- properties and principles of matter and energy;
- properties and principles of force and motion;
- characteristics and interactions of living organisms;
- changes in ecosystems and interactions of organisms with their environments;
- processes (such as plate movement, water cycle, air flow) and interactions of Earth's biosphere, atmosphere, lithosphere and hydrosphere;
- composition and structure of the universe and the motions of the objects within it;
- processes of scientific inquiry (such as formulating and testing hypotheses), and
- impact of science, technology and human activity on resources and the environment.

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## CONTENT AND PROCESSES RELATED TO EQUITY, TECHNOLOGY, RESEARCH AND WORKPLACE READINESS SKILLS

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Throughout the Science Program, teachers integrate appropriate content and processes related to gender equity, racial/ethnic equity, disability awareness. The application of technology, research strategies and workplace readiness skills insures that graduates of the Pattonville School District successfully demonstrate understanding and application of the Show-Me-Standards.

Examples of integration of those content and processes are listed below.

**Equity** – All Pattonville High school science courses integrate meaningful equity issues, including gender, multicultural and disability awareness content into specific, appropriate lessons:

Biology	DNA co-discoverer Rosalind Franklin; MO native Luther Burbank pioneer of peanut biology and uses
Chemistry	Contributions of Marie Curie
Physical Science	Contributions of Albert Einstein
Physics	Contributions to astrophysics by Stephen Hawkins
Physical Science	Competition for fossil fuels between rich and poor
Geology/Astronomy	Contributions of Stephen Hawkins
Human Anatomy	Diseases/disorders library research per unit
Forensic Science	Use of DNA evidence has overturned rulings

**Research** – All Pattonville High school science courses integrate meaningful research techniques into specific, appropriate lessons:

Biology	Subject search using computer/library on specific diseases
Chemistry	Gathering background information for lab report
Physical Science	Alternative fuel research project
Physics	Background investigations for lab analysis
Physical Science	Library/computer search for biome report
Geology/Astronomy	Current NASA data from long distance probes
Human Anatomy	Personal data collecting for Nutrition Portfolio
Forensic Science	Background research for unsolved crime

**Technology** – All Pattonville High School science courses integrate meaningful technology techniques into specific, appropriate lessons:

Biology	Using computer for search on a specific disease
Chemistry	Using CBL's for collecting data for acid/base lab
Physical Science	Using CBL's for collecting data for power pentathalon
Physics	Using PASCO interactive computer probes and graphing calculators for acceleration lab
Physical Science	Reading weather equipment and charting information
Geology/Astronomy	Utilizing the planetarium and observatory
Human Anatomy	Writing and organizing a written portfolio using computer
Forensic Science	Presenting a PowerPoint presentation on a historical unsolved crime

**Workplace Readiness Skills** - All Pattonville High School science course integrate meaningful work readiness skills into specific, appropriate lessons:

Biology	Career fields - environmental, medical, botanical and chemical
Chemistry	Technical writing for laboratory reports; career exploration in lab research and applied research
Physical Science	Meeting deadlines for long-term project
Physics	Standardizing equipment in preparation for lab analysis; career exploration in engineering
Physical Science	Participating cooperatively in group work
Geology/Astronomy	Maintaining organized notebooks
Human Anatomy	Determining best learning techniques; summer job shadowing opportunities at local hospitals
Forensic Science	Presenting research findings to class; career exploration into police crime units

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## INSTRUCTIONAL STRATEGIES

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Pattonville School District has identified a set of instructional strategies designed to meet the assessed needs of students. Instruction should be performance-based and demonstrate research-based best practices. These may include, but are not limited to, academic reading and writing in all content areas, hands-on active learning, inquiry-oriented learning, and differentiated instruction. Appropriate strategies are selected for each program of instruction to meet the unique needs of the student.

Research from Educational Research Service claims that the following teaching techniques are effective in increasing science achievement:

- Analogies,
- Concept Mapping,
- Computer Simulations,
- Microcomputer-based lab investigations,
- Systematic approaches to Problem Solving,
- Conceptual understanding in Problem Solving,
- Real life situations, and
- Discrepant events.

Research from Results, the Key to Continuous School Improvement claims that teamwork gets results. Therefore collaborative groups of teachers discuss student needs, design appropriate lessons, develop framework-based assessments, and continuously review the results for improvement.

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## CURRICULUM EVALUATION AND REVISION

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Evaluation of the curriculum is ongoing and is the responsibility of all those who are involved in the process of writing curriculum. Teachers at all levels are asked to identify the content strengths and weaknesses of the curriculum objectives, the suggested resources, and assessment tools. Annually, administrators and teachers look at the school-wide results on state and national assessments and determine areas that need to be addressed.

A formal comprehensive evaluation of the program occurs every five years to six years. This evaluation takes into consideration data collected from assessments, parents, teachers and administrators. Changes in state and national standards, critical issues in the content area, and new developments in educational pedagogy are considered. Using this information the committee makes recommended changes.

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## VERTICAL ALIGNMENT AND ARTICULATION

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Individual learner objectives in the curriculum have been articulated through development of the curriculum in alignment with the Show-Me Standards and Curriculum Frameworks. Evidence of articulation by grade level and course sequence includes:

- curriculum organization by content standards with correlation to process goals,
- scope and sequence in curriculum guides,
- essential curriculum,
- grade level meetings,
- early dismissal and staff development day meetings within and across content areas and grade levels,
- summer curriculum workshops in curriculum and assessment writing,
- the Literacy Project (reading, writing, and thinking across the curriculum),
- departmental meetings,
- team meetings,
- advisory meetings, and
- the Curriculum Coordinating Council.

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SCOPE & SEQUENCE FOR SCIENCE GRADES 9 - 12

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Grade	BIOLOGY	CHEMISTRY	EARTH/ENVIRONMENT	PHYSICS
9	Biology I Biology I Honors Biology Concepts of Living Systems	Concepts of Matter & Energy		
10		Physical Science Chemistry I Honors Chemistry	Physical Science Concepts of Earth & Environment	Physical Science Concepts of Force, Motion & Universe
11	Biology II AP Biology Human Anatomy Human Anatomy/English	AP Chemistry Chemistry 2	Same as above plus Geology / Astronomy	Physics 1
12	Same as above plus Forensic Science 1 Forensic Science 2	Same as above	Same as above	AP Physics

COURSES WITH PREREQUISITE LISTING    SCIENCE GRADES 9 - 12

COURSE NAME	GRADE LEVEL				SEMESTER		FULL YEAR	PREREQUISITE
	9	10	11	12	1	2		
Biology I	X	X	X	X			X	Recommendation and/or concurrent with Algebra 1A and/or Geometry
Biology II			X	X				Biology I & Chemistry completed or concurrently enrolled
Advanced Placement Biology			X	X			X	Biology I and Chemistry and GPA 3.2 or teacher approval
Human Anatomy			X	X			X	Biology I
Human Anatomy/English			X	X			X	Biology and concurrent enrollment in English part of this class
Geology/Astronomy			X	X			X	Chemistry &/or ICP
Introduction to Chemistry & Physics (ICP)		X	X	X			X	Algebra I or Geometry B
Chemistry		X	X	X			X	Algebra IA with "C" or better requested
Chemistry II			X	X			X	Chemistry & Algebra IIA with "C" or better suggested
Advanced Placement Chemistry			X	X			X	Chemistry & Algebra IIA with "B" or better suggested, & concurrent AP Chemistry Lab
Physics I			X	X			X	Algebra IIA
Advanced Placement Physics				X			X	Physics I
Forensic Science I			X	X	X			Chemistry or ICP AND Anatomy or concurrent Anatomy enrollment
Forensic Science II			X	X		X		Chemistry or ICP AND Anatomy or concurrent Anatomy enrollment

# Course Descriptions

## BIOLOGY 1

**Course Rationale:** In general biology, an understanding of major themes and topics are surveyed. In first semester students investigate biology from an evolutionary and environmental perspective, which includes a survey of the kingdoms of life and their interactions. Second semester focuses on cellular aspects of life, including cellular processes, genetics and DNA. Scientific inquiry is incorporated throughout the entire year in all units.

**Course Description:** Biology is an introductory course dealing with contemporary and historical issues of life sciences. A broad study of organisms and their environment allow students an opportunity to compare and contrast the mechanisms of life on both a macro and micro level. Laboratory activities, homework and long-term assignments will be included. Assessments will include quizzes, tests, and projects with both objective and written literacy components.

SCIENCE/Biology 1						
SC3: Characteristics and interactions of living organisms.						
1. There is a fundamental unity underlying the diversity of all living organisms.						
A. Organisms progress through life cycles unique to different types of organisms.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
1. Identify the changes occurring in development of an organism and factors affecting the development.	SC3	3.1 B	K Ap An	<ul style="list-style-type: none"> <li>• Patterns of development activity</li> <li>• Notes</li> <li>• Development video</li> </ul>	Formal written assessment	80%
1. There is a fundamental unity underlying the diversity of all living organisms.						
B. Biological classifications are based on how organisms are related.						
2. Distinguish how morphological and physiological characteristics are used to classify organisms.*	SC3 1.3	3.1 E	C An	<ul style="list-style-type: none"> <li>• "Learning to be a Taxonomist"</li> <li>• Protist lab</li> <li>• Hydra and Planaria lab</li> <li>• Crossword Puzzle</li> </ul>	Compare / Contrast Paragraphs Lab Analysis	80%

\*Item is tracked for A+

SCIENCE/Biology 1

SC3:Students will acquire characteristics and interactions of living organisms.

2. Living organisms carry out life processes in order to survive.

A. All cells carry out life processes as directed by DNA using a variety of different structures or organelles.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
3. Identify cell organelles and their functions.*	SC3 1.4 2.1	3.2 A 3.1 C	K S E	<ul style="list-style-type: none"> <li>Notes</li> <li>Color / Label cell diagram</li> <li>Cell video</li> <li>Cell Microscope lab</li> </ul>	Cell Analogy Project	80%
4. Compare and contrast how photosynthesis and respiration transform energy to be used by the cell as complementary processes.	SC3	3.2 B 3.2 D	An	<ul style="list-style-type: none"> <li>Compare and Contrast Worksheet</li> <li>Video</li> <li>Geochemical cycles activity</li> <li>Yeast food preference lab</li> </ul>	Formal written assessment Lab Analysis	80%
5. Explain how cells carry out chemical transformations that use energy for the synthesis or breakdown of organic compounds.	SC3 CA4	3.2 D	C	<ul style="list-style-type: none"> <li>Foldable</li> <li>Organic compound identification lab</li> <li>Sentences-Literacy</li> </ul>	Formal written assessment	80%
6. Decode a DNA strand to determine an amino acid sequence and relate it to a structure or function.	SC3	3.2 E	Ap	<ul style="list-style-type: none"> <li>Genotype into Phenotype Lab</li> </ul>	Finished picture for Lab Formal written assessment	80%
7. Apply the concept of selective permeability to predict the movement of water and other molecules across a cell membrane based on concentration gradients.	SC3 1.3 1.6	3.2 F	Ap S	<ul style="list-style-type: none"> <li>Egg Lab demonstrations</li> <li>Plasmolysis Lab</li> <li>Iodine / Starch Lab / Baggie</li> </ul>	Formal written assessment Lab analysis	80%

\*Item is tracked for A+

SCIENCE/Biology 1

SC3: Characteristics and interactions of living organisms.						
3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.						
A. Reproduction can occur asexually or sexually.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
8. Distinguish between asexual and sexual reproduction and explain advantages and disadvantages of both.	SC3 CA4	3.3 A 3.3 D	C Ap	<ul style="list-style-type: none"> <li>• Meibops</li> <li>• Literacy Projects</li> <li>• Notes</li> </ul>	Lab Write-up Formal written assessment	80%
3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.						
B. Heritable variation occurs in all species due to information coded by DNA.						
9. Label a DNA molecule.	SC3	3.3 B	K Ap	<ul style="list-style-type: none"> <li>• DNA coloring Worksheet</li> <li>• DNA Model Lab</li> </ul>	Formal written assessment	80%
10. Identify environmental factors that cause DNA mutations.	SC3	3.3 B 3.3 D	K	<ul style="list-style-type: none"> <li>• Notes</li> <li>• Gene mutation activity</li> <li>• Reading roadmap</li> </ul>	Constructed Response	80%
3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.						
C. Pairs of chromosomes contain the genetic information passed from parents to offspring during reproduction to maintain genetic continuity.						
11. Illustrate the need for two types of cell reproduction by comparing the beginning and ending products of both mitosis and meiosis.	SC3 FA4	3.3 C	Ap	<ul style="list-style-type: none"> <li>• String Lab</li> <li>• Color / Label Mitosis and Meiosis</li> <li>• Dramatization Activity</li> </ul>	Formal written assessment	80%

SCIENCE/Biology 1

SC3: Characteristics and interactions of living organisms.

3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.

D. The pattern of inheritance for many traits can be predicted by using the principles of Mendelian genetics.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
12. Explain how genotypes contribute to phenotypic variation within a species.	SC3	3.3 E	Ap An	<ul style="list-style-type: none"> <li>Make a Face Lab</li> <li>Human Traits Lab</li> </ul>	Lab analysis Quiz	80%
13. Predict the probability of occurrence of specific traits, including sex-linked traits, in an offspring using a monohybrid cross. *	SC3 MA3	3.3 E	Ap An	<ul style="list-style-type: none"> <li>Punnett Square Problems</li> <li>Sex-linked coin toss lab</li> </ul>	Formal written assessment	80%
14. Explain how sex-linked traits may or may not result in the expression of a genetic disorder depending on gender	SC3	3.3 E	S E	<ul style="list-style-type: none"> <li>Pedigree</li> <li>Human pedigree Lab "hemophilia"</li> <li>Genetic Disorders Research/Brochure</li> </ul>	Formal written assessment Brochure Rubric	80%

SC4. Changes in ecosystems and interactions of organisms with their environments.

3. Genetic variation sorted by the natural selection process explains evidence of biological evolution.

A. Evidence for the nature and rates of evolution can be found in anatomical and molecular characteristics of organisms and in the fossil record.

15. Analyze fossil evidence and use it to explain the relatedness of organisms.	SC4	4.3 A	An	<ul style="list-style-type: none"> <li>Rock Strata</li> <li>Geologic Time Line</li> </ul>	Completed Time Line Analysis questions	80%
16. Support the theory of evolution using evidence such as fossil record, DNA, biochemistry, embryology and morphology.	SC3 SC4	4.3 A 3.1 E 3.3 B	E	<ul style="list-style-type: none"> <li>Notes</li> <li>More than a Eyewitness Power point</li> <li>Amino Acid Sequence Analysis activity</li> </ul>	Constructed response question on written formal assessment	80%

\*Item is tracked for A+

SCIENCE/Biology 1

SC4. Changes in ecosystems and interactions of organisms with their environments.						
3. Genetic variation sorted by the natural selection process explains evidence of biological evolution.						
C. Natural selection is the process of sorting individuals based on their ability to survive and reproduce within their ecosystem.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
17. Infer the effect on a population given various environmental changes.	SC3 SC4 1.3	4.1 B 4.1 C	An	<ul style="list-style-type: none"> <li>Yeast Population Lab</li> <li>Peppered Moth lab</li> <li>Clam adaptation activity</li> </ul>	Lab Analysis	80%
18. Classify adaptations as physiological, structural or behavioral and explain their evolutionary advantage.	SC3 1.4	4.3 C	An	<ul style="list-style-type: none"> <li>Internet Search</li> <li>Study Guide Table</li> <li>Animal Imposters video</li> </ul>	Fill in chart on test	80%
1. Organisms are interdependent with one another and their environment.						
A. All populations, which have the ability to be of infinite size, live together in interactive communities in order to survive and maintain a balanced ecosystem due to finite environmental resources.						
19. Explain the nature of different relationships between organisms and a community.	SC3 SC4	4.1 A 4.1 B	An	<ul style="list-style-type: none"> <li>Symbiosis worksheet-Internet search</li> <li>NatureScape Activity</li> <li>Animal Imposters Video</li> <li>Food web activity</li> </ul>	Formal written assessment	80%
1. Organisms are interdependent with one another and their environment.						
B. Natural and human caused environmental changes have an affect on organisms in various ecosystems.						
20. Predict possible effects on ecosystems due to human and environmental impact.	SC4 SC8 CA3	4.1 C 4.1 D 4.3 C	S	<ul style="list-style-type: none"> <li>Zebra Mussels Reading and Activity</li> <li>Urban Sprawl</li> <li>Video</li> </ul>	Formal written assessment	80%
1. Organisms are interdependent with one another and their environment.						
C. Matter and energy undergo a series of transformations as they move through an ecosystem.						
21. Analyze the effect on energy and matter flow through an ecosystem given different environmental conditions.*	SC4 SC5	4.2 A 4.2 B	An	<ul style="list-style-type: none"> <li>Food Chain Lab</li> <li>Energy in Wetlands Game</li> </ul>	Formal written assessment	80%

\*Item is tracked for A+

SCIENCE/Biology 1

SC 7: Scientific Inquiry

1. Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.

Scientific inquiry includes formulating a testable question, gathering qualitative or quantitative data, formulating explanations and then communicating those results.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
22. Gather data from qualitative and quantitative observations in order to formulate explanations.	SC 7	7.1B 7.1C	Ap	<ul style="list-style-type: none"> <li>• M &amp; M Lab</li> <li>• Kool-Aid Lab</li> <li>• Yeast Respiration Lab</li> <li>• Yeast Population Lab</li> <li>• I Caught You-You're It Lab</li> <li>• Human Characteristic Lab</li> <li>• Testing Organic Molecules Lab</li> <li>• NatureScape</li> </ul>	Scoring Guide for Data/Graphs <ol style="list-style-type: none"> <li>1. Table includes all necessary data</li> <li>2. All labels correctly identified</li> <li>3. All variables correctly identified.</li> <li>4. Correct type of graph used</li> <li>5. Explanations can be drawn from the collected data.</li> </ol>	80%
23. Explain and communicate the results of laboratory investigations, including data tables, graphs, and identification of variables.	SC 7	7.1E	S E	<ul style="list-style-type: none"> <li>• M &amp; M Lab</li> <li>• Kool-Aid Lab</li> <li>• Yeast Respiration Lab</li> <li>• Yeast Population Lab</li> <li>• I Caught You-You're It Lab</li> <li>• Human Characteristic Lab</li> <li>• Testing Organic Molecules Lab</li> <li>• NatureScape</li> </ul>	Laboratory reports Question Scoring Guides: Paragraph answers are graded using a modified process explanation scoring guide.	80%
24. Design, test, evaluate and retest experimental variables that answer a formulated hypothesis.	SC 7	7.1A	An E	Sample Investigations include: <ul style="list-style-type: none"> <li>➤ Yeast Respiration Lab</li> <li>➤ Kool-Aid Lab</li> <li>➤ Egg Osmosis Lab</li> </ul>	See Scoring Guides in the appropriate units above.	80%

SCIENCE/Biology 1

SC 8: Impact of Science, Technology and Human Activity

1. Science and technology affect, and are affected by, society.

Social, political, economic, ethical and environmental factors strongly influence, and are influenced by, the direction of progress of science and technology.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
25. Identify and evaluate the drawbacks and benefits of solutions to a given problem	SC8 CA4 3.1, 3.5, 3.8	8.1B	Ap E	<ul style="list-style-type: none"> <li>Zebra Mussel article</li> <li>Urban Sprawl</li> </ul>	Formal written assessment Summary paragraphs	80%
26. Identify and describe how explanations of scientific phenomena have changed over time	SC8 1.6	8.2A	K An	<ul style="list-style-type: none"> <li>Learning to be a taxonomist</li> </ul>	Formal written assessment	80%
27. Identify sources as to credibility for scientific accuracy; discuss and report on the information from that source about a current science problem/ discovery/ solution	SC8 CA3, CA4, CA6, 1.7	8.3D	An E	<ul style="list-style-type: none"> <li>Genetic Disorder-Research Brochure</li> <li>Eyes of Nye Cloning video</li> </ul>	Scoring Rubric	80%

## BIOLOGY 2

**Course Rationale:** Today's teenagers are exposed to a world that is rapidly changing due to scientific discoveries and technology. To be able to understand and appreciate the changes that are taking place, the students must have a good basic foundation in science and opportunities must exist for those students to further expand upon the knowledge and curiosity through additional science courses. Biology II is a course in which those students interested in the biological aspect of life are able to gain added knowledge and skills. This course imparts knowledge of some of the more important principles of biology in a manner that achieves an understanding of the processes of scientific inquiry and logic.

**Course Description:** Biology II is an advanced course designed for students who plan to continue their study in science and may be considering careers in biology or related fields. The course will cover basic biochemistry, cellular processes, genetics, microbiology, and mammalian anatomy and physiology. Students are expected to participate in the dissection of a cat. Independent and group work are expected in Biology II.

SCIENCE/Biology 2						
SC 3: Students in Missouri public schools will acquire a solid foundation which includes knowledge of characteristics and interactions of living organisms.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Demonstrate that the pattern for many traits can be predicted by using the principles of Mendelian genetics.*	1.5, 1.6, 2.3, 3.5	VII D 1-4	E, S, An	<ul style="list-style-type: none"> <li>• Genetics Problems To Be Solved</li> <li>• Punnett Square Activities</li> <li>• Current Event Discussions</li> <li>• Translation Activity</li> </ul>	Genetics Test Problems to be solved sheet	75% 80%
2. Analyze the effects of damage and/or disease on the structure and function of various body organs and systems.*	1.3, 1.6, 2.3	I B 2, VII B 3	S, E	<ul style="list-style-type: none"> <li>• Cat Dissection</li> <li>• Mader Book And Study Guides</li> <li>• Cat Dissection Manual</li> <li>• Question Sheets</li> <li>• Terms To Know Hand Outs</li> </ul>	Circulatory Practical Digestive Practical Muscle Practical	80% 80% 80%
SC 3: Students in Missouri public schools will acquire a solid foundation which includes knowledge of characteristics and interactions of living organisms. SC 7: Students in Missouri public schools will acquire a solid foundation which includes knowledge of the process of scientific inquiry (such as formulating and testing hypothesis).						
3. Dissect various mammalian systems to identify components, determine function and how it is related to structure and explain the interdependence of systems.*	1.3, 1.6, 2.3	I B 2 VII B 3 and 5	S E	<ul style="list-style-type: none"> <li>• Cat dissection</li> <li>• System charts/posters</li> <li>• Cat anatomy text</li> <li>• Terms to know lists</li> </ul>	External anatomy practical Muscle practical Skeletal practical Reproductive practical Nervous system practical	80% 80% 80% 80% 80%

\*Item is tracked for A+

**SCIENCE/Biology 2**

SC 3: Students in Missouri public schools will acquire a solid foundation which includes knowledge of characteristics and interactions of living organisms.  
 SC 7: Students in Missouri public schools will acquire a solid foundation which includes knowledge of the process of scientific inquiry (such as formulating and testing hypothesis).

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
4. Design and conduct laboratory investigations that will analyze cellular processes and evaluate their significance.*	1.3, 1.4, 1.8	I A 1-4 VII A 1 and 2	An S E	<ul style="list-style-type: none"> <li>• Cell Lab</li> <li>• Osmosis Lab</li> <li>• Graphing Exercises</li> <li>• Compare And Contrast Hypotonic And Hypertonic Solutions</li> <li>• Beaker Content Analysis Sheet.</li> </ul>	Osmosis lab notebook Cell lab notebook Beaker analysis Unit test	75% 75% 75% 75%
SC 7: Students in Missouri public schools will acquire a solid foundation which includes knowledge of the process of scientific inquiry (such as formulating and testing hypothesis).						
5. Organize data and information for analysis and presentation	1.8	I A 1-4 VII B 1	S An E	<ul style="list-style-type: none"> <li>• Concept Maps</li> <li>• Data Tables</li> <li>• Graphing</li> <li>• Compare And Contrast Sheet</li> <li>• Organic Compound Lab</li> </ul>	Organic Compound Lab Notebook Unit test	75% 75%
SC 8: Students in Missouri public schools will acquire a solid foundation which includes knowledge of the impact of science, technology and human activity on resources and environment. CA 4: Students in Missouri public schools will acquire a solid foundation which includes knowledge of and proficiency in writing formally (such as reports, narratives, essays).						
6. Analyze the significance of DNA and investigate how it can be changed by nature and/or manipulated by man using technology.*	1.1-3, 1.6, 2.1, 2.4 4.1	IA 4 VII C 1	AN S E	<ul style="list-style-type: none"> <li>• Electrophoresis Lab</li> <li>• Transcription And Translation Activities</li> <li>• Crime Solving Activity</li> <li>• Biotechnology Research Paper.</li> </ul>	Biotech Test Biotech research paper	75% 80%

**Resources:**

Adopted Text: Biology Sylvia Mader 9th Edition  
 Other Text: Pictorial Anatomy of the Cat Stephen Gilbert, 1994  
 Technology: [www.mhhe.com/maderbiology9](http://www.mhhe.com/maderbiology9) teachers and students  
 Digital content manager for teachers  
 Essential Study Partner disk for students  
 Cat anatomy video  
 NABT and NSTA teacher resources available  
 Preserved specimens  
 Laboratory equipment

\*Item is tracked for A+

## ADVANCED PLACEMENT BIOLOGY

**Course Rationale:** This course is designed to be the equivalent of a college introductory biology course usually taken by biology majors during their first year. The College Board governs the AP Biology curriculum. The following two scenarios may be available to students who: A. Take the AP Biology National Exam in May, and B. Score high enough on the exam to satisfy their particular choice of college's requirements. 1. Some AP students, as college freshmen, are permitted to take upper-level courses in biology or to register for courses in which biology is a prerequisite. 2. Other students may have fulfilled a basic requirement for a laboratory science course and will be able to take other courses to pursue their majors. The AP Biology course is designed to be taken by students after the successful completion of a first course in high school biology and one in high school chemistry. It aims to provide students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology.

**Course Description:** The two main goals of AP Biology are to help students develop a conceptual framework for modern biology and to help students gain an appreciation of science as a process. The ongoing information explosion in biology makes these goals even more challenging. Primary emphasis in AP Biology will be on developing an understanding of concepts rather than on memorizing terms and technical details. Essential to this conceptual understanding are the following: a grasp of science as a process rather than as an accumulation of facts; personal experience in scientific inquiry; recognition of unifying themes that integrate the major topics of biology; and application of biological knowledge and critical thinking to environmental and social concerns.

<b>SCIENCE/Advanced Placement Biology</b>						
SC 3: Students in Missouri public schools will acquire a solid foundation which includes knowledge of characteristics and interactions of living organisms.						
SC 7: Students in Missouri public schools will acquire a solid foundation which includes knowledge of the process of scientific inquiry (such as formulating and testing hypothesis).						
CA 4: Students in Missouri public schools will acquire a solid foundation which includes knowledge of and proficiency in writing formally (such as reports, narratives, essays).						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Design and conduct laboratory investigations that will analyze cellular processes and evaluate their significance.*	1.3, 1.8, 2.1, 2.3	I A 1,4 VII A 2 VII B 1-3	An S E	<ul style="list-style-type: none"> <li>• Osmosis Lab</li> <li>• Enzyme Catalysis Lab</li> <li>• Photosynthesis Lab</li> <li>• Respiration Lab</li> <li>• Lab Notebook Set Up Instructions</li> <li>• Unit Test</li> </ul>	Lab notebook evaluation for all labs. Osmosis Lab notebook Unit test	85%  85%
2. Analyze the significance of DNA and investigate how it can be changed by nature and/or manipulated by man using technology.*	1.1, 1.3, 1.5, 2.1, 2.3, 3.8	I A 1 I A 4 VII A1 VII B 3 VII C 1-2 VII C1-2	An S E	<ul style="list-style-type: none"> <li>• Electrophoresis Lab</li> <li>• Transformation Lab</li> <li>• Hardy Weinberg Problems And Mutation Lab</li> <li>• Punnett Square Problems, Punctuated Equilibrium</li> <li>• And Phyletic Gradualism Essay</li> <li>• Unit Test</li> </ul>	Lab notebook evaluation for all labs. Punctuated equilibrium and phyletic gradualism essay Unit test	85% 85% 85%

\*Item is tracked for A+

3. Identify chemical transformations carried out by cells that allow conversion of energy from one form to another, the breakdown of molecules into smaller units, and the building of larger molecules from smaller ones.*	1.2, 1.6, 2.1, 2.2	VII A 1-2 VII B 1-3	An S E	<ul style="list-style-type: none"> <li>• Water Essay</li> <li>• Biochemistry Questions</li> <li>• Cell Membrane Models</li> <li>• Respiration And Photosynthesis Labs</li> <li>• Cell Structure Study Guides</li> <li>• Unit Test</li> </ul>	Water essay Lab notebook evaluations for all labs Unit test	85% 85% 85%
SC 3: Students in Missouri public schools will acquire a solid foundation which includes knowledge of characteristics and interactions of living organisms. SC 7: Students in Missouri public schools will acquire a solid foundation which includes knowledge of the process of scientific inquiry (such as formulating and testing hypothesis).						
4. Evaluate the adaptive features of various plants and animals that have contributed to their success.*	1.3, 1.6, 2.1	VII A 4 VII B 3	S E	<ul style="list-style-type: none"> <li>• Transpiration Lab</li> <li>• Character Elimination Worksheet</li> <li>• Animal Phyla Posters And Follow Up Questions</li> <li>• Power Points</li> <li>• Unit Test</li> </ul>	Poster presentations Transpiration Lab Notebook Character elimination Unit test	85% 85% 85% 85%
5. Identify patterns that affect the dynamics of communities within their ecosystems.*	1.6, 1.8, 2.1	VIII A 1 VIII B 1-2	C Ap An	<ul style="list-style-type: none"> <li>• Population Growth Pattern Models</li> <li>• Nutrient Cycles</li> <li>• Behavior Lab</li> <li>• Study Guide Questions</li> <li>• Concept Maps</li> <li>• Unit Test</li> </ul>	Concept Maps Ecology Test Behavior Lab Notebook	85% 85% 85%

\*Item is tracked for A+

## HONORS BIOLOGY

**Course Rationale:** Research demonstrates a connection between challenging, advanced level courses and the ability of a student to achieve high levels on achievement and aptitude tests. This course will expand the study of biology for students having attained a 3.2 grade point average and/or receiving teacher recommendation in the 8<sup>th</sup> grade. The intent of this course is to encourage students to reach their greatest potential in science and prepare them for advanced level work in science at the high school level.

**Course Description:** This two-semester class is a challenging course designed for students who anticipate a science-based career, desire an accelerated, comprehensive program and intend to continue in advanced courses in science. Instruction will include laboratory investigations, and independent research and analysis. The level of difficulty is hard. The amount of homework will be approximately five hours per week.

SCIENCE/Honors Biology						
SC3: Characteristics and interactions of living organisms.						
1. There is a fundamental unity underlying the diversity of all living organisms.						
A. Organisms progress through life cycles unique to different types of organisms.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
1. Apply the understanding of changes occurring in development of organisms as related to the factors affecting development.	SC 3	3.1 B	Ap	<ul style="list-style-type: none"> <li>• Internet activity, 9-month trip</li> <li>• Reading in Biology-Prentice Hall</li> <li>• Ch. 26, pages 660-664</li> <li>• Ch. 39, pages 1016-1021</li> </ul>	Unit test constructed response	80%
B. Biological classifications are based on how organisms are related.						
2. Classify organisms into a hierarchy of groups and/or subgroups based on structural and physiological characteristics.	SC 3	3.1 E 3.3 A	An	<ul style="list-style-type: none"> <li>• Hydra lab</li> <li>• Protist lab</li> <li>• Penguin classification activity</li> <li>• Cladogram activity</li> </ul>	Unit test	80%
3. Explain how and why classifications have changed due to the development of new information.	SC 3 SC 8 1.4	3.1 E 8.2 A	C	<ul style="list-style-type: none"> <li>• The Great Kingdom Debate /Internet Activity</li> <li>• Red Wolf activity-PowerPoint</li> </ul>	Taxonomy quiz	80%
4. Evaluate the importance of all organisms based on their classifications into groups and subgroups. *	SC 3 CA 4 CA 1 2.1	3.1 E	E	<ul style="list-style-type: none"> <li>• The Great Kingdom Debate/Internet Activity</li> </ul>	Kingdom Letter	80%

\*Item is tracked for A+

SCIENCE/Honors Biology

SC3:Students will acquire characteristics and interactions of living organisms.						
2. Living organisms carry out life processes in order to survive.						
A. All cells carry out life processes as directed by DNA using a variety of different structures or organelles.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
5. Identify cell organelles and explain their function. *	SC 3 1.4 2.1	3.2 A 3.1 C	K C	<ul style="list-style-type: none"> <li>Textbook sec. 7.2, pgs 178-181</li> <li>Cell PowerPoint</li> <li>Cell labeling/coloring activity</li> </ul>	Cell Analogy Scoring Guide	80%
6. Explain the interconnectedness of cellular respiration and photosynthesis. *	SC 3 CA 4 CA 1 2.1	3.2B	An	<ul style="list-style-type: none"> <li>Yeast respiration lab (On the Menu)</li> <li>Stomata Lab</li> </ul>	Lab Analysis	80%
7. Identify the biological classes of organic molecules and their functions in living systems.	SC 3 CA 4	3.2 D 3.2 E	K An	<ul style="list-style-type: none"> <li>Organic compounds lab (The Human Factory Lab)</li> <li>Textbook sec. 2.3, pgs 44-48 and sec. 2.4, pgs 49-55</li> </ul>	Lab reports Unit test	80%
8. Apply the concept of selective permeability to predict the movement of water and other molecules across a cell membrane based on concentration gradients.	SC 3 1.1 CA 4	3.2 F	Ap	<ul style="list-style-type: none"> <li>Diffusion and Osmosis lab</li> <li>Lab demonstrations</li> <li>Textbook sec. 7.3, pgs 182-189</li> <li>Transport Powerpoint</li> <li>Cell Membrane Simulation Lab</li> </ul>	Unit test constructed response Lab Analysis	80%
3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.						
A. Reproduction of organisms can occur asexually or sexually using the processes of cellular reproduction (mitosis and meiosis).						
9. Analyze the advantages and disadvantages of sexual vs. asexual reproduction.	SC 3 CA4	3.3 A 3.3 C 3.3 D	An	<ul style="list-style-type: none"> <li>Draw cells with all possible homologous pair combinations in metaphase.</li> <li>Meibop lab</li> <li>Meiosis PowerPoint</li> </ul>	Unit test constructed response	80%

\*Item is tracked for A+

SCIENCE/Honors Biology

SC3: Characteristics and interactions of living organisms.

3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.

B. Heritable variation occurs in all species due to information coded by DNA.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
10. Explain how the DNA code determines the sequence of amino acids necessary for protein synthesis.	SC 3	3.2 E 3.3 B	C Ap	<ul style="list-style-type: none"> <li>Dramatization of protein synthesis</li> <li>Textbook sec. 12.3, pgs 300-306</li> <li>Geno into Pheno activity</li> <li>Inquiry activity on protein synthesis</li> <li>TnT activity</li> </ul>	Unit test constructed response	80%
11. Explain the structural properties of DNA and its replication.	SC 3	3.3 B 3.2 E	An	<ul style="list-style-type: none"> <li>DNA modeling lab</li> <li>Textbook sec. 12.1 and 12.2, pgs 286-299</li> <li>DNA coloring activity</li> </ul>	Unit test constructed response	80%
12. Identify the possible causes of DNA mutations and their effects on an organism.	SC 3 1.4 1.8 2.1	3.3 B	K	<ul style="list-style-type: none"> <li>Gone wrong? Gone Right? lab</li> <li>Textbook sec. 12.4, pgs 307-308 and pgs 1052-1053</li> <li>Genetic Disorder Research</li> </ul>	Genetic Disease Presentation Lab analysis	80%
13. Analyze a DNA sequence to determine traits of an organism and relatedness between organisms.	SC 3	3.3 B	An	<ul style="list-style-type: none"> <li>Geno into Pheno activity</li> <li>Gel electrophoresis lab (Who Dunnit?)</li> </ul>	Unit test constructed response	80%
3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.						
D. The pattern of inheritance for many traits can be predicted by using the principles of Mendelian genetics.						
14. Explain how genotypes contribute to phenotypic variation within a species	SC 3	3.3 E	An	<ul style="list-style-type: none"> <li>Variations on a theme lab</li> <li>What if our child...lab</li> <li>Pedigree worksheet</li> </ul>	Unit test constructed response	80%
15. Predict the probability of occurrence of specific traits. Including sex-linked traits, in an offspring using a monohybrid cross.	SC 3 MA 3	3.3 E	Ap An	<ul style="list-style-type: none"> <li>Textbook sec. 11.2, pgs 267-274 and sec.14-2, pgs 350-353</li> <li>Punnett square worksheets and practice problems</li> </ul>	Unit test constructed response	80%
16. Explain how genotypes may or may-not result in the expression of a genetic disorder.	SC 3 1.4 1.8 2.1	3.3 E	S An	<ul style="list-style-type: none"> <li>What if our child...lab</li> <li>Genetic disorder presentation research</li> </ul>	Unit test constructed response Genetic Disorder PowerPoint presentation	80%

\*Item is tracked for A+

SCIENCE/Honors Biology

SC3: Characteristics and interactions of living organisms.							
3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.							
D. The pattern of inheritance for many traits can be predicted by using the principles of Mendelian genetics.							
17. Explain how genotypes contribute to phenotypic variation within a species	SC 3	3.3 E	An	Variations on a theme lab What if our child...lab Pedigree worksheet	Unit test constructed response	80%	
18. Predict the probability of occurrence of specific traits. Including sex-linked traits, in an offspring using a monohybrid cross.	SC 3 MA 3	3.3 E	Ap An	<ul style="list-style-type: none"> <li>Textbook sec. 11.2, pgs 267-274 and sec.14-2, pgs 350-353</li> <li>Punnett square worksheets and practice problems</li> </ul>	Unit test constructed response	80%	
19. Explain how genotypes may or may-not result in the expression of a genetic disorder.	SC 3 1.4 1.8 2.1	3.3 E	S An	<ul style="list-style-type: none"> <li>What if our child...lab</li> <li>Genetic disorder presentation research</li> </ul>	Unit test constructed response Genetic Disorder PowerPoint presentation	80%	
SC4. Changes in ecosystems and interactions of organisms with their environments.							
3. Genetic variation sorted by the natural selection process explains evidence of biological evolution.							
A. Evidence for the nature and rates of evolution can be found in anatomical and molecular characteristics of organisms and in the fossil record.							
20. Analyze fossil evidence and use it to explain the relatedness of organisms.	SC 4	4.3 A	An	<ul style="list-style-type: none"> <li>More than an eyewitness PowerPoint</li> <li>Rock Strata</li> <li>From land to water-Whale Internet Activity</li> </ul>	Unit test constructed response	80%	
21. Support the theory of evolution using evidence such as fossil record. DNA, biochemistry, embryology and morphology.	SC 3 SC 4	4.3 A 3.1 E 3.3 B	An	<ul style="list-style-type: none"> <li>More than an eyewitness PowerPoint</li> <li>Form land to water-Whale Internet</li> <li>Primate lab</li> <li>A calendar of Earth's history</li> <li>Textbook pages 382-382</li> </ul>	Unit test constructed response	80%	
3. Genetic variation sorted by the natural selection process explains evidence of biological evolution.							
C. Natural selection is the process of sorting individuals based on their ability to survive and reproduce within their ecosystem.							
22. Explain how environmental factors can be agents of natural selection. *	SC 3 SC 4	4.3 C	Ap An	<ul style="list-style-type: none"> <li>Darwin Finch/Grant PowerPoint</li> <li>Are all clams created equal?</li> <li>Bean lab</li> <li>Textbook pages 380-382</li> <li>Sexual Selection in Guppies Lab</li> </ul>	Unit test constructed response Lab Analysis	80%	
23. Explain how variation in a population increases its ability to survive.	SC 4	4.3 C 4.3 B	Ap	<ul style="list-style-type: none"> <li>Are all clams created equal</li> <li>Bean lab</li> <li>Meibop Lab</li> </ul>	Unit test constructed response	80%	

\*Item is tracked for A+

SCIENCE/Honors Biology

SC4. Changes in ecosystems and interactions of organisms with their environments.

1. Organisms are interdependent with one another and their environment.

A. All populations living together within a community interact with one another and with their environment in order to survive and maintain a balanced ecosystem.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
24. Analyze how competitive and cooperative relationships amongst organisms helps to maintain a balanced ecosystem.	SC 4	4.1 A	S An	<ul style="list-style-type: none"> <li>Biotic /Abiotic Tango, Internet activity</li> <li>Farming in the rye, pg 79</li> <li>Making models of a food chain Poster Activity</li> <li>Cactus Hotel review</li> </ul>	Unit test constructed response	80%
25. Predict and explain the effect on a population's carrying capacity due to both biotic or abiotic limiting factors.	SC 4	4.1 B 7.1 E	An	<ul style="list-style-type: none"> <li>Kaibab lab</li> <li>Invasive species PowerPoint</li> <li>Mark and recapture lab (I Caught You You're It)</li> <li>Analyzing data, textbook pg. 123</li> </ul>	Unit test constructed response	80%
1. Organisms are interdependent with one another and their environment.						
B. Natural and human caused environmental changes have an affect on organisms in various ecosystems.						
26. Predict possible effects on ecosystems due to human and environmental impacts.	SC 4 SC 8 CA 3 CA 6 1.2, 1.4, 1.5, 2.1	4.1 C 4.1 D 4.3 C	An E	<ul style="list-style-type: none"> <li>Conservation Project</li> <li>Textbook chapter 6</li> </ul>	Presentation scoring guide Unit test constructed response	80%
1. Organisms are interdependent with one another and their environment.						
C. Matter and energy undergo a series of transformations as they move through an ecosystem.						
27. Analyze the effect on energy and matter flow through an ecosystem given different environmental conditions.	SC 4 SC 5	4.2 A 4.2 B	S An	<ul style="list-style-type: none"> <li>Naturescape activity</li> <li>Energy in a wetland game</li> <li>Biome Map activtiy</li> <li>Textbook sec. 3.2 and 3.3</li> <li><i>Rhizobium</i> lab or Fish Tank Nitrogen Cycling Lab</li> </ul>	Unit test constructed response	80%

SCIENCE/Honors Biology

SC 7: Scientific Inquiry

1. Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.

Scientific inquiry includes formulating a testable question, gathering qualitative or quantitative data, formulating explanations and then communicating those results.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
28. Gather data from qualitative and quantitative observations in order to formulate explanations.	SC 7 1.8	7.1 B 7.1 C	An Ap	What's in a measurement <i>Rhizobium</i> lab or Fish Tank Nitrogen Cycling Lab Osmosis lab	Lab Analysis	80%
29. Explain and communicate the results of laboratory investigations, including data tables, graphs, and identification of variables.	SC 7 1.8	7.1 E	An Ap	<i>Rhizobium</i> lab or Fish Tank Nitrogen Cycling Lab Data analysis, textbook pg. 123 Diffusion and Osmosis lab Kool-Aid Lab	Final exam constructed response Lab Analysis	80%
30. Design, test, evaluate and retest experimental variables that answer a formulated hypothesis.	SC 7 1.8	7.1 A	K E	Diffusion and Osmosis Lab Jigsaw activity appendix A, pg. 1060-1063	Lab Analysis	80%

\*Item is tracked for A+

SCIENCE/Honors Biology

SC 8: Impact of Science, Technology and Human Activity

1. Science and technology affect, and are affected by, society.

Social, political, economic, ethical and environmental factors strongly influence, and are influenced by, the direction of progress of science and technology.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (Including Performance-based)	Mastery Min. %
31. Identify and evaluate the drawbacks and benefits of technological solutions to a given problem.	SC 8 1.4, 1.8 2.1 3.1	8.1 C	S	Conservation project	Conservation project scoring guide	80%
32. Identify and describe how explanations of scientific phenomena have changed over time.	SC 8	8.2 B	C	Evolution pg. 368-378 Taxonomy pg. 457-461 Red Wolf Activity The Great Kingdom Debate	Final exam	80%
33. Summarize and reflect on a source of information about a specific science problem, discovery, or issue.	SC 8 CA 1 CA 3 CA 4	8.3 D	E	Unit articles literacy project	Summaries and reflections	80%
34. Analyze the influence or impact of society on the progress of science.	SC 8	8.3 B	An	Darwin and evolution pg. 368-378 Unit Articles	Summary and Reflections for articles	80%

## CHEMISTRY I

### Course Rationale:

Chemistry is the science devoted to the study of matter. It may be organized around one KEY premise: **The properties of matter are a consequence of its structure.** Students will be introduced to the language, organization and reactions of matter. The unifying concept of structure and functions is always central to each topic introduced. The arrangement of electrons around an atom not only suggest the patterns to its bonding, but also give insight into its shape, amount of energy stored, the physical state in which the atom reside and the stability of the atom. When applied to atoms and molecules that students are familiar with connections to the world can be bridged.

### Course Description:

Chemistry is a challenging course that requires Algebra abilities. This course will investigate properties and structures of matter. Algebraic equations are used to quantify units of matter. It is assumed that all Chemistry students have mastered basic algebraic expressions. Chemical reactions, the parts of the atom, gas laws, stoichiometry and solution chemistry are a few of the topics discussed. Laboratory investigations play an increasing role as the second semester progresses. Laboratory notebooks are expected and will be graded using a common scoring guide.

SCIENCE/Chemistry I					
SC 1: Students will acquire a foundation in properties and principles of matter and energy.					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
1. Explain the interactions between acid and bases and the components of a solution. *	1.4	Comprehension	<ul style="list-style-type: none"> <li>• Neutralization experiments</li> <li>• Acid/Base Titration experiment pH experiments</li> <li>• Acid/Base Titration Problems</li> </ul>	<ul style="list-style-type: none"> <li>• Acid-Base Assessment Scoring Guide</li> </ul>	80%

\*Item is tracked for A+

**SCIENCE/Chemistry I**

**SC 1: Students will acquire a foundation in properties and principles of matter and energy.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
2. Describe the molecular, atomic and ionic makeup of a variety of substances; use appropriate formulae to represent the substances. *	1.5, 1.6	Comprehension	<ul style="list-style-type: none"> <li>• Write chemical formulas</li> <li>• Synthesis of MgO Lab</li> <li>• Name chemical compounds</li> </ul>	<ul style="list-style-type: none"> <li>• Chemical Formula Scoring Guide</li> </ul>	75%
3. Use diagrams and chemical equations to predict the outcome of chemical reactions. *	1.8, 3.5	Applications	<ul style="list-style-type: none"> <li>• Double Replacement Lab</li> <li>• Sodium Chloride/Sodium</li> <li>• Carbonate lab</li> <li>• Writing Chemical Equations</li> <li>• Stoichiometry Worksheet</li> </ul>	<ul style="list-style-type: none"> <li>• Types of Reaction Assessment Scoring Guide</li> </ul>	75%
4. Summarize the structure of the atom in terms of protons, neutrons and electrons, describe the development of the modern atomic theory. *	1.3, 2.1	Synthesis	<ul style="list-style-type: none"> <li>• Flame Test Lab</li> <li>• Atomic Emission Spectrum Demonstration</li> <li>• Rutherford's Model</li> <li>• Describe structure of an atom</li> </ul>	<ul style="list-style-type: none"> <li>• Atomic Structure Assessment Scoring Guide</li> </ul>	80%

\*Item is tracked for A+

**SCIENCE/Chemistry I**

**SC 1: Students will acquire a foundation in properties and principles of matter and energy.**

**SC 2: Students will acquire the properties and principles of force and motion.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
5. Measure the physical changes that results from changes in a gaseous state and describe the kinetic theory. *	1.2	Application	<ul style="list-style-type: none"> <li>• Molar Volume of a Gas Lab</li> <li>• How Strong is Your Gas? Lab</li> <li>• Solve Gas Law Problems</li> </ul>	<ul style="list-style-type: none"> <li>• Gas Laws Assessment Scoring Guide</li> </ul>	75%
<b>SC 1: Students will acquire a foundation in properties and principles of matter and energy.</b>					
<b>SC 7: Students will acquire the process of scientific inquiry.</b>					
6. Measure the mass, volume, dimensions and density of substances. *	1.3, 1.4, 3.2	Application	<ul style="list-style-type: none"> <li>• Measurement Lab</li> <li>• Density Lab</li> <li>• Solve Density Problems</li> </ul>	<ul style="list-style-type: none"> <li>• Density Assessment Scoring Guide</li> </ul>	85%

**Resources:**

Adopted Text: Introduction to Chemistry: A Foundation – Zumdahl, 3<sup>rd</sup> Edition

Technology: General Chemistry Collection – JCE Software, 1997,

Video: The World of Chemistry – series Annenberg/CPB

\*Item is tracked for A+

## CHEMISTRY II

### Course Rationale:

In order to be well prepared for further academic studies, students must be chemistry-literate. In Chemistry II, an understanding of major chemical concepts is developed. A working knowledge and appreciation of chemistry provides a foundation for problem solving. Students also gain insight into opportunities in scientific and technological careers. Chemistry II provides a rich learning environment where students experience a variety of approaches and activities. A major emphasis is placed on laboratory procedure, process and analysis. Students should complete Chemistry II to increase academic preparedness and to further mature thinking skills. Chemistry II also promotes logical thinking.

### Course Description:

Chemistry II is an advanced laboratory class intended to follow and build upon Chemistry. Students will attain a depth of understanding about the fundamentals and competence in solving chemical problems. Topics include: stoichiometry, kinetics, and equilibria. Labs will require a greater depth of processing both on the qualitative and quantitative level. Mathematical problem solving and application are emphasized throughout the course.

<b>SCIENCE/Chemistry II</b>					
<b>SC 1: Students will acquire a foundation in properties and principles of matter and energy.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
1. Analyze and separate compounds and elements by making use of their unique chemical and physical properties. *	1.3, 4.6	Analysis	<ul style="list-style-type: none"> <li>• Qualitative analysis to identify and separate silver, lead and mercury</li> <li>• Qualitative analysis to identify and separate copper, bismuth, cadmium, and tin</li> </ul>	<ul style="list-style-type: none"> <li>• Lab Reports: Analysis of various metals</li> </ul>	80%

\*Item is tracked for A+

**SCIENCE/Chemistry II**

**SC 1: Students will acquire a foundation in properties and principles of matter and energy.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
1. (Continued)			(Continued) <ul style="list-style-type: none"> <li>Qualitative analysis to identify and separate cobalt, nickel, iron, aluminum, and zinc</li> </ul>		
2. Demonstrate that radioactive isotopes are unstable and undergo spontaneous nuclear reactions, emitting particles and/or wavelike radiation; the decay of any one nucleus cannot be predicted, but a large number of nuclei decay at a predictable rate, and this predictability can be used to estimate the age of materials that contain radioactive isotopes. *	1.2, 1.3, 1.6, 3.5	Application	<ul style="list-style-type: none"> <li>Research nuclear science</li> <li>Perform nuclear experiments and master content knowledge</li> <li>Portfolio</li> <li>Research papers</li> </ul>	<ul style="list-style-type: none"> <li>Test items</li> <li>Lab reports</li> <li>Research Projects</li> </ul>	75%

\*Item is tracked for A+

**SCIENCE/Chemistry II**

**SC 1: Students will acquire a foundation in properties and principles of matter and energy.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
3. Apply understanding of the mole concept and ways in which it can be used to determine solution properties, concentrations and the interactions between solutes and solvents. *	1.3, 1.6, 2.4, 3.2	Application	<ul style="list-style-type: none"> <li>Quantitative analysis to determine the concentration of acid solutions.</li> <li>Quantitative analysis to determine the concentration of base solutions.</li> <li>Quantitative analysis to determine the concentration of common metallic ions solutions.</li> </ul>	<ul style="list-style-type: none"> <li>Lab Report: Acid-Base titration and oxidation-reduction titration</li> <li>Semester Exam</li> </ul>	80%
4. Conduct an investigation on how electrical energy is obtained/used and the consequences of its use in modern society. Identify the source of chemical energy encountered everyday in batteries and demonstrates how chemical energy is stored in chemical bonds between atoms. *	1.1, 1.2, 1.10, 3.8, 4.7	Synthesis	<ul style="list-style-type: none"> <li>Experiments in electrochemistry</li> <li>Write oxidation-reduction reactions</li> <li>Calculate the amount of energy used and produced by electromotive force</li> <li>Portfolio: including research papers on history and uses of</li> </ul>	<ul style="list-style-type: none"> <li>Electrochemistry Assessment</li> <li>Lab Reports: Batteries and electrochemical cells</li> <li>Lab Report: Electroplating</li> <li>Semester Exam</li> </ul>	75%

\*Item is tracked for A+

**SCIENCE/Chemistry II**

**SC 3: Students will acquire characteristics and interactions of living organisms.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
4. (Continued) is stored in chemical bonds between atoms. *			(Continued) Electro chemistry		
5. Use models to demonstrate the various chemical transformations carried out by cells and apply this information to different contexts of everyday life. *	1.10, 2.7	Application	<ul style="list-style-type: none"> <li>Perform biochemical experiments</li> <li>Learn organic nomenclature and functional groups</li> <li>Identify biochemical compounds</li> </ul>	<ul style="list-style-type: none"> <li>Research Report: The search for extraterrestrial life</li> <li>Semester Exam</li> </ul>	80%

**SC 8: Students will acquire the impact of science, technology and human activity on resources and the environment.**

6. Analyze and evaluate how specific technological solution may impact the environment in areas in such as global warming, water quality, genetic engineering, nuclear energy or acid rain. *	1.1, 1.2, 1.6, 1.7, 3.1, 4.1	Analysis	<ul style="list-style-type: none"> <li>Conduct research into global warming.</li> <li>Research causes of photochemical smog and its chemical reactions in the atmosphere.</li> <li>Research industrial waste and the release of toxic chemicals in air, water and land.</li> </ul>	<ul style="list-style-type: none"> <li>Action Report: Global warming</li> <li>Action Report: Toxic Waste</li> </ul>	75%
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\*Item is tracked for A+

## SCIENCE/Chemistry II

### **Resources:**

Adopted Text: Chemistry – Zumdahl, 3<sup>rd</sup> Edition,

Other: Inorganic Qualitative Analysis – Hahn and Welcher, 2<sup>nd</sup> Edition

## ADVANCED PLACEMENT CHEMISTRY

### **Course Rationale:**

This course is an advanced placement laboratory class intended to follow the national AP curriculum and culminate in students taking the AP test. Students should attain a depth of understanding of fundamentals and competence in solving chemical problems. This class differs from Chemistry II in two ways. First, an Advanced Placement course follows a national curriculum. Many similar topics to Chemistry II will be covered. In addition, covalent bonding, equilibria, coordination compounds, nuclear chemistry and organic chemistry are covered. Labs will require a greater depth of processing both on the qualitative and quantitative level. Mathematical problem solving and applications are emphasized throughout the course. A second difference between Chemistry II and AP Chemistry is the final outcome.

### **Course Description:**

Advanced Placement Chemistry is a challenging, fast-paced course that will cover topics of matter, states of matter, chemical reactions, descriptive chemistry, kinetics, equilibria, and thermodynamics. An emphasis on laboratory work and analysis is required to prepare for the AP test. College credit depends upon the AP test score and the college of choice. Students may need an additional four to six hours a week outside of class time to prepare for the test. An AP Chemistry academic lab is required in conjunction with this class. It will provide additional lab finishing time and time to ask or go over text problems.

**SCIENCE/Advanced Placement Chemistry**

**SC 7: Students will acquire the process of scientific inquiry.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
1. Synthesize compounds. *	1.2, 2.1	Synthesis	<ul style="list-style-type: none"> <li>Synthesis of a Complex Iron Salt Lab</li> <li>Direct Instruction on naming coordination compound</li> <li>Name coordination compounds</li> <li>Solve Problems using stoichiometry</li> </ul>	<ul style="list-style-type: none"> <li>Lab Report of "Synthesis of a Complex Iron Salt"</li> </ul>	80%
2. Analyze laboratory data using gravimetric analysis. *	1.2, 1.6, 1.8, 2.1	Analysis	<ul style="list-style-type: none"> <li>Analysis of silver in an Alloy-Lab</li> <li>Memorize solubility rules</li> <li>Guided practice on Stoichiometry</li> </ul>	<ul style="list-style-type: none"> <li>Lab Report "Analysis of Silver in an Alloy"</li> <li>Test on Stoichiometry</li> </ul>	80%
3. Perform chemical separations using either precipitation and filtration; dehydration; centrifugation; or chromatography. *	1.2, 1.6, 1.8, 2.1	Application	<ul style="list-style-type: none"> <li>Analysis of Silver in an Alloy Synthesis</li> <li>Complex Iron Salt Labs</li> <li>Memorize solubility rules</li> <li>Direct instruction on naming coordination compounds</li> </ul>	<ul style="list-style-type: none"> <li>Lab Report "Analysis of Silver in an Alloy"</li> <li>Lab Report "Synthesis of a Complex Iron Salt"</li> <li>Quiz on Solubility Rules</li> </ul>	80%

\*Item is tracked for A+

**SCIENCE/Advanced Placement Chemistry**

**SC 7: Students will acquire the process of scientific inquiry.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
4. Perform a titration using technology. *	1.3, 1.4	Application	<ul style="list-style-type: none"> <li>• Titration of a Diprotic Acid: Identifying an unknown-Lab</li> <li>• Direct instruction on titration problems</li> <li>• Solve Acid/base titration problems</li> <li>• Guided Practice – Titration Problems</li> </ul>	<ul style="list-style-type: none"> <li>• Lab Report "Titration of a Diprotic Acid"</li> <li>• Test on Acid/Base Titrations</li> </ul>	80%
5. Use scientific processes to observe and record phase changes. *	1.2, 2.1	Application	<ul style="list-style-type: none"> <li>• Molecular Mass of a Volatile Liquid Lab</li> <li>• Using Freezing Point Depression to Find Molecular Weight Lab</li> <li>• Guided Practice –Problems on Bonding and Intermolecular forces</li> <li>• Interpret and Draw a phase diagram</li> </ul>	<ul style="list-style-type: none"> <li>• Lab Report "Molecular Mass of a Volatile Liquid"</li> <li>• Lab Report "Using Freezing Point Depression to Find Molecular Weight"</li> <li>• Test on Bonding</li> <li>• Test on Intermolecular Forces</li> </ul>	80%

**Resources:**

Adopted Text: Chemistry – Zumdahl, 3<sup>rd</sup> Edition  
 Technology: Teacher Tools – AP Chemistry, PTAS, 1998,  
Physical Chemistry Visualized – USCD, 1995,

CBL/TI - calculator based learning

Videos: A Kinetic Study Using Spectrophotometry – Films for the Humanities & Sciences,  
 The Super-Charge World of Chemistry – Cerebellum Corporation

\*Item is tracked for A+

## HONORS CHEMISTRY

### Course Rationale:

Research demonstrates a connection between challenging, advanced level courses and the ability of a student to achieve high levels on achievement and aptitude tests. This course will expand the study of chemistry for students having attained a 3.2 grade point average and/or receiving teacher recommendation in the 9<sup>th</sup> grade. The intent is to encourage students to reach their greatest potential in science and prepare them for continued high school advanced level work in science.

### Course Description:

This two-semester class is a challenging course designed for the student who anticipates a science based career, desires an accelerated, comprehensive program and intends to take advanced courses in science. Instruction will emphasize laboratory investigations, independent research and analysis. The level of difficulty is hard. The amount of homework will be approximately five hours per week.

<b>SCIENCE/Honors Chemistry</b>					
<b>SC 1: Students will acquire a foundation in properties and principles of matter and energy.</b>					
<b>CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
1. Explain the interactions between acid and bases and the components of a solution. *	2.1	Comprehension	<ul style="list-style-type: none"> <li>• Acid/Base Titration Lab</li> <li>• Determination of the pH Lab</li> <li>• Characteristic Reactions of Acids</li> <li>• Acid/Base Titration Problem</li> </ul>	<ul style="list-style-type: none"> <li>• AP-based Exam</li> <li>• Lab: Vinegar Titration</li> </ul>	80%
2. Describe the molecular, atomic and ionic makeup of a	1.5, 1.8	Comprehension	<ul style="list-style-type: none"> <li>• Writing Chemical Formula Practice Sets</li> <li>• Naming Chemical</li> </ul>	<ul style="list-style-type: none"> <li>• AP-based Exam</li> <li>• Lab: Model Building – Lewis Structures</li> </ul>	75%

\*Item is tracked for A+

**SCIENCE/Honors Chemistry**

**SC 1: Students will acquire a foundation in properties and principles of matter and energy.**

**CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
2. (Continued) variety of substances; use the appropriate formulas to represent the substances. *			(Continued) Compounds • Synthesis of MgO Lab		
3. Use diagrams and chemical equations to predict the outcome of chemical reactions. *	1.6, 1.8	Application	<ul style="list-style-type: none"> <li>Stoichiometry Problem Sets</li> <li>Writing Chemical Equations</li> <li>Types of Chemical Reactions</li> <li>Sodium Chloride/Sodium Carbonate Lab</li> </ul>	<ul style="list-style-type: none"> <li>AP-based Exam</li> <li>Lab: Types of Chemical Reactions</li> </ul>	75%
4. Summarize the structure of an atom in terms of protons, neutrons and electrons and describe the development of the modern atomic theory.*	1.2, 1.7	Synthesis	<ul style="list-style-type: none"> <li>Describe the structure of an atom</li> <li>Developing a Logical Model</li> <li>Flame Test Lab</li> </ul>	<ul style="list-style-type: none"> <li>AP-based Exam</li> <li>Lab: Developing a Logical Model</li> </ul>	80%

**SCIENCE/Honors Chemistry**

**SC 1: Students will acquire a foundation in properties and principles of matter and energy.**

**SC 2: Students will acquire the properties and principles of force and motion.**

Measurable Learner	Assessed	Level of	Instructional	Assessments (including	Mastery
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\*Item is tracked for A+

Objectives	Show-Me Goals	Bloom's Taxonomy	Strategies/Student Activities/Resources	Performance-based)	
5. Measure the physical changes that results from changes in a gaseous state and describe the kinetic theory. *	1.2, 1.3, 1.4	Application	<ul style="list-style-type: none"> <li>• Gas Law Problem</li> <li>• Molar Volume of a Gas Lab</li> <li>• Charles' Law Lab</li> </ul>	<ul style="list-style-type: none"> <li>• AP-based Exam</li> <li>• Lab: Molar Volume of a Gas</li> </ul>	75%
<b>SC 1: Students will acquire a foundation in properties and principles of matter and energy.</b>					
<b>SC 7: Students will acquire the process of scientific inquiry.</b>					
6. Measure the mass, volume, dimensions and density of substances. *	1.3, 1.4, 3.5	Application	<ul style="list-style-type: none"> <li>• Density and Measurement Problem</li> <li>• Mass, Volume and Density Lab</li> <li>• Accuracy and Precision Lab</li> </ul>	<ul style="list-style-type: none"> <li>• AP-based Exam</li> <li>• Lab: Accuracy and Precision</li> </ul>	85%
<b>SC 1: Students will acquire a foundation in properties and principles of matter and energy.</b>					
<b>CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.</b>					
7. Explain and balance reduction and oxidation reactions and demonstrate their use in electrochemical cells (galvanic and voltaic) *	1.3, 1.10, 2.1	Comprehension Application	<ul style="list-style-type: none"> <li>• Lab: Reactivity of Cu, Zn and Pb</li> <li>• Lab: Two Electrolytic Cells and One Voltaic Cell</li> <li>• Lab: Voltaic Cells</li> <li>• Oxidation-Reduction Reaction Problems</li> <li>• Balancing Oxidation-Reduction Reactions</li> </ul>	<ul style="list-style-type: none"> <li>• AP-based Exam</li> <li>• Lab Competition: Vote for "Volts"</li> </ul>	75%
<b>SCIENCE/Honors Chemistry</b>					
<b>SC 1: Students will acquire a foundation in properties and principles of matter and energy.</b>					
<b>CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
8. Write, balance and identify types of	3.1, 3.6, 3.8	Comprehension Application	<ul style="list-style-type: none"> <li>• Write Nuclear Equations describing Radioactive</li> </ul>	<ul style="list-style-type: none"> <li>• AP-based Exam</li> <li>• Pro/con paper on safety of</li> </ul>	75%

\*Item is tracked for A+

radioactive decay and describe the applications of such decay in medicine, nuclear reactors, archaeology and environmental safety. *			Decay • Determine Half-life	radioactive substances	
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**Resources:**

Adopted Text: Introduction to Chemistry: A Foundation - Zumdahl 3<sup>rd</sup> Edition

Technology: General Chemistry Collection – JCE Software, 1997

[www.ChemPlace.com](http://www.ChemPlace.com) & [www.Chem4Kids.com](http://www.Chem4Kids.com)

Videos: The World of Chemistry series by Annenberg/CPB

## CONCEPTS OF EARTH AND THE UNIVERSE

### Course Rationale:

This course provides a review and extension of concepts delineated by the Missouri science frameworks. It is a part of a 4 semester course for 9<sup>th</sup> and 10<sup>th</sup> grade students with the objective to increase the student's level of achievement as measured by the MAP science test.

### Course Description:

This course is designed for students to master a basic understanding of the interdependence of the Earth's lithosphere, hydrosphere, atmosphere and biosphere and how man's activities alter them. Readings of societal decisions as they relate to the environmental issues will be critiqued. Students will be provided with a synopsis of and a scoring guide for each of the performance projects they are to complete. The course is self-paced and student will be required to reach a level of mastery in each of the objectives before moving to the next area of study. Homework will be dependent on the student's level of mastery. Students will be able to individualize their learning and apply their learning to everyday events.

<b>SCIENCE/Concepts of Earth &amp; the Universe</b>					
<b>SC 5: Students will acquire knowledge of the process (plate movement, water cycle, air flow) and interactions of earth's biosphere, atmosphere, lithosphere and hydrosphere.</b>					
<b>CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
1. Identify the processes that change minerals and rocks, their uses, and factors that affect the soil formation in an ecosystem. *	1.3	Application	<ul style="list-style-type: none"> <li>• "Rock Cycle" Activity</li> <li>• Mineral/Rock ID and Uses Lab</li> <li>• Soil Testing Lab</li> <li>• "Panning for Gold" Lab</li> </ul>	<ul style="list-style-type: none"> <li>• Mineral/Rock Lab Practical</li> <li>• Unit Test</li> <li>• Final Exam</li> </ul>	70%
2. Analyze the crustal plate movements that provide evidence of the geologic time	2.1	Analysis	<ul style="list-style-type: none"> <li>• "Mystery of the Far Flung Fossil" Lab</li> <li>• "Geologic Time Scale"</li> </ul>	<ul style="list-style-type: none"> <li>• Continental Drift Research Paper</li> <li>• Unit Test</li> <li>• Final Exam</li> </ul>	70%

\*Item is tracked for A+

<b>SC 5: Students will acquire knowledge of the process (plate movement, water cycle, air flow) and interactions of earth's biosphere, atmosphere, lithosphere and hydrosphere.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
2. (Continued) scale, and their effects on geologic activities still occurring. *			(Continued) • Activity: Tracking Earthquakes and Volcanic Eruptions		
<b>SC 5: Students will acquire knowledge of the process (plate movement, water cycle, air flow) and interactions of earth's biosphere, atmosphere, lithosphere and hydrosphere.</b>					
<b>SC 8: Students will acquire knowledge of the impact of science, technology and human activity on resources and the environment.</b>					
3. Identify technology that has enhanced our ability to detect & monitor patterns in the Earth's circulation of air and water, driven by the sun, causing regional weather and climate. *	2.7, 1.4	Application	<ul style="list-style-type: none"> <li>• "F.E.M.A. Furor" Lab</li> <li>• "El Nino" Lab</li> <li>• "Tracking Hurricanes" Lab</li> <li>• Activity: Weather Forecasting</li> </ul>	<ul style="list-style-type: none"> <li>• Weather Forecast (videotaped oral report)</li> <li>• Unit Test</li> <li>• Final Exam</li> </ul>	70%

\*Item is tracked for A+

**SC 4: Students will acquire knowledge of the changes in ecosystems and interactions of organisms with their environments.**  
**SC 5: Students will acquire knowledge of the process (plate movement, water cycle, air flow) and interactions of earth's biosphere, atmosphere, lithosphere and hydrosphere.**  
**CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
4. Analyze the normal cycles elements follow through ecosystems. Design a balanced aquatic ecosystem, so that overpopulation will not occur, leading to depletion of resources and elimination of species. *	1.2	Synthesis	<ul style="list-style-type: none"> <li>• "Water Cycle" Lab</li> <li>• Food Webs and Energy Flow Lab</li> <li>• "Nitrogen Cycle" Activity</li> <li>• "Water Quality Testing" Lab</li> </ul>	<ul style="list-style-type: none"> <li>• Aquarium Design/Journal</li> <li>• Unit Test</li> <li>• Final Exam</li> </ul>	70%

\*Item is tracked for A+

<b>SC 4: Students will acquire knowledge of the changes in ecosystems and interactions of organisms with their environments.</b> <b>SC 5: Students will acquire knowledge of the process (plate movement, water cycle, air flow) and interactions of earth's biosphere, atmosphere, lithosphere and hydrosphere.</b> <b>CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
5. Design a biosphere capable of supporting human life, including flora and fauna necessary to sustain it, protecting the biodiversity (and stability) or the ecosystem, and ensuring the resource needs of successive generations.	3.2, 4.3	Synthesis	<ul style="list-style-type: none"> <li>• Activity: "Demographic Changes"</li> <li>• Activity: "Population Dynamics"</li> <li>• Activity: "Food Production"</li> <li>• Lab: "Human Population Growth"</li> </ul>	<ul style="list-style-type: none"> <li>• Semester Final Exam – Multiple Choice portion and</li> <li>• Biosphere Performance Event</li> </ul>	70%

**Resources:**

Classroom Set of *Earth Science* by Heath  
 Classroom Set of *Environmental Science* by Scott Foresman -Addison Wesley  
[www.psd3.org](http://www.psd3.org) Science department web pages  
 Newspaper and Internet for weather data  
 Rock and mineral kits of Missouri

\*Item is tracked for A+

## CONCEPTS OF FORCE & MOTION

### Course Rationale:

This course provides a review and extension of concepts delineated by the Missouri science frameworks. It is a part of a 4-semester course for 9<sup>th</sup> and 10<sup>th</sup> grade students with the objective to increase the student's level of achievement as measured by the MAP science test.

### Course Description:

This course is designed for students to master a basic understanding of the types of motion and fundamental forces that exist in the universe. Students will be provided with a synopsis of and a scoring guide for each of the performance projects they are to complete. The course is self-paced and students will be required to reach a level of mastery in each of the objectives before moving to the next area of study. Homework will be dependent on the student's level of mastery. Students will be able to individualize their learning and apply their learning to everyday events.

<b>SCIENCE/Concepts of Force &amp; Motion</b>					
<b>SC 2: Students will acquire the properties and principles of force and motion</b>					
<b>CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
1. Represent motion in terms of velocity and acceleration. *	1.3, 1.4	Application	<ul style="list-style-type: none"> <li>• Lab: Create a Coaster</li> <li>• Ultimate Roller Coaster Ride Review</li> <li>• Speedy Journey</li> </ul>	<ul style="list-style-type: none"> <li>• Laboratory Write-up: Create a Coaster</li> <li>• Roller Coaster Review</li> <li>• Quiz</li> <li>• Unit Examination</li> <li>• Roller Coaster Design and Summary</li> </ul>	70%
2. Predict changes in linear motion by using Newton's Laws of Motion and show how these laws relate acceleration to the mass and force acting	1.6, 3.2	Application	<ul style="list-style-type: none"> <li>• Newton's Laws Activity</li> <li>• Lab: Newton's Laws</li> <li>• Bumper Car Ride Design</li> <li>• Amusement Park Safety</li> </ul>	<ul style="list-style-type: none"> <li>• Newton's Laws Laboratory Report</li> <li>• Quiz</li> <li>• Unit Examination</li> <li>• Bumper Car Ride Design</li> <li>• Safety Essay</li> </ul>	75%

\*Item is tracked for A+

<b>SC 2: Students will acquire the properties and principles of force and motion</b>					
<b>CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
2. (Continued) on an object. *					
3. Analyze and describe the relationship among work, power and energy. *	1.5, 4.1	Analysis	<ul style="list-style-type: none"> <li>• Work &amp; power activity</li> <li>• Lab: Egg Drop Ride</li> <li>• Design a Free Fall Ride</li> <li>• Science Detective Reading and Writing</li> </ul>	<ul style="list-style-type: none"> <li>• Laboratory Report for Egg Drop</li> <li>• Quiz</li> <li>• Unit Examination</li> <li>• Free Fall Ride Design</li> <li>• Science Detective Essay</li> </ul>	70%
4. Analyze and describe waves in terms of their relationship to energy, in terms of refraction and in terms of reflection. *	1.5, 3.8	Application	<ul style="list-style-type: none"> <li>• Design Wave Pool Ride</li> </ul>	<ul style="list-style-type: none"> <li>• Quiz</li> <li>• Unit Examination</li> <li>• Wave Ride Design</li> </ul>	70%
5. Evaluate information to determine the relationship between Newton's Laws in space and how they relate to phenomena like orbits of planets, moon phases, tides on Earth, seasons and eclipses. *	1.6, 2.4, 3.5	Evaluation	<ul style="list-style-type: none"> <li>• Lab: Universe Model</li> <li>• Design Solar System Ride</li> <li>• The Universe According to Newton Essay</li> </ul>	<ul style="list-style-type: none"> <li>• Newton's Essay</li> <li>• Laboratory Report for Universe Model</li> <li>• Quiz</li> <li>• Unit Examination</li> <li>• Universe Ride Design</li> </ul>	75%

\*Item is tracked for A+

## SCIENCE/Concepts of Force & Motion

### **Resources:**

Classroom set of *An Introduction to Physical Science* by Houghton Mifflin

[www.psd3.org](http://www.psd3.org) Science web pages for activities

[www.ultimaterollercoaster.com](http://www.ultimaterollercoaster.com)

[www.batesville.k12.in.us/physics/phyNet/mechanics/Newton1](http://www.batesville.k12.in.us/physics/phyNet/mechanics/Newton1)

Instructional Fair Reproducibles, Inc.

Videos: Rollercoaster Physics

The Physics of Amusement Parks

## CONCEPTS OF LIVING SYSTEMS

### Course Rationale:

This course provides a review and extension of concepts delineated by the Missouri science frameworks. It is a part of a 4-semester course for 9<sup>th</sup> and 10<sup>th</sup> grade students with the objective to increase the student's level of achievement as measured by the MAP science test.

### Course Description:

This course is designed for students to master a basic understanding of the causes of diversity of living organisms, the interplay of an organism to its environment and how that has changed over time. Students will be provided with a synopsis of and a scoring guide for each of the performance projects they are to complete. The course is self-paced and students will be required to reach a level of mastery in each of the objectives before moving to the next area of study. Homework will be dependent on the student's level of mastery. Students will be able to individualize their learning and apply their learning to everyday events.

<b>SCIENCE/Concepts of Living Systems</b>					
<b>SC 3: Students will acquire characteristics and interactions of living organisms</b>					
<b>CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
1. Discuss how the variations of organisms within a species and diversity among species increases the likelihood that at least some organisms will survive in the face of large changes in the environment. *	1.6, 2.1	Analysis	<ul style="list-style-type: none"> <li>• Vocabulary Handout 1</li> <li>• Reading Roadmap 1</li> <li>• Adaptations worksheet</li> <li>• Reading Roadmap 2</li> <li>• Clam Activity</li> </ul>	<ul style="list-style-type: none"> <li>• (7-LS-E 1,3,4) (7-LS-C 2)-Evolution</li> <li>• Post-Test</li> <li>• Analysis Questions</li> </ul>	70%

\*Item is tracked for A+

**SCIENCE/Concepts of Living Systems**

**SC 3: Students will acquire characteristics and interactions of living organisms**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
2. Analyze the evidence for the nature and rate of evolution that can be found in anatomical and molecular characteristics of organisms and in the fossil record.	3.3	Analyze	<ul style="list-style-type: none"> <li>• Vocabulary Handout 1</li> <li>• Rock strata activity</li> </ul>	<ul style="list-style-type: none"> <li>• Analysis questions</li> <li>• Post-test</li> </ul>	75%
3. Conduct and analyze the results of a lab that provides information that the process of natural selection provides that some heritable variations arise from mutation and recombination gives individuals within a species some advantage over others for survival.	3.5	Synthesis	<ul style="list-style-type: none"> <li>• Reading Roadmap</li> <li>• Lab: Natural Selection</li> </ul>	<ul style="list-style-type: none"> <li>• Analysis paragraph</li> <li>• Post-test</li> </ul>	75%

**SCIENCE/Concepts of Living Systems**

**SC 3: Students will acquire characteristics and interactions of living organisms**

**CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
4. Explain how evolution does not proceed at the same rate in all organisms; nor does it progress in some set direction.	1.2	Comprehension	<ul style="list-style-type: none"> <li>• Reading Roadmap 1.2</li> <li>• Rock strata activity</li> <li>• Literacy worksheet</li> </ul>	<ul style="list-style-type: none"> <li>• Analysis questions</li> <li>• Post-test</li> </ul>	75%
5. Classify organisms into hierarchical groups and subgroups, based on their structural similarities and reflect about the possible evolutionary relationships. *	1.4	Analysis	<ul style="list-style-type: none"> <li>• Vocabulary Handout 1</li> <li>• Classification Packet</li> </ul>	<ul style="list-style-type: none"> <li>• Checkpoint Quiz</li> <li>• Post-test</li> <li>• 7-LS-A4</li> <li>• 7-LS-C1 - Classification</li> </ul>	70%
6. Determine the degree of kinship among organisms based on similarities in DNA and protein structure.	1.6	Analysis	<ul style="list-style-type: none"> <li>• Amino acid activity</li> </ul>	<ul style="list-style-type: none"> <li>• Checkpoint quiz</li> <li>• Post-test</li> </ul>	70%

**SCIENCE/Concepts of Living Systems**

**SC 3: Students will acquire characteristics and interactions of living organisms**

**CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.**

\*Item is tracked for A+

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
7. Predict the pattern of inheritance for traits using the principles of Mendelian genetics. *	1.6	Application	<ul style="list-style-type: none"> <li>Vocabulary Handout 1</li> <li>Reading Roadmap 1 &amp; 2</li> <li>Punnett Square Activity</li> <li>Lab: Predicting genetics</li> <li>Pedigree activity</li> </ul>	<ul style="list-style-type: none"> <li>7-LS-D 2 –Genetics</li> <li>Analysis Questions</li> <li>Post-test</li> </ul>	70%
8. Analyze how social and economic forces, such as patent laws, the federal budget regulations, media attention and economic competition can influence the direction of progress for science and technology.	4.1, 4.3	Application	<ul style="list-style-type: none"> <li>Genetic disorder research</li> </ul>	<ul style="list-style-type: none"> <li>Analysis questions on genetic research</li> <li>Post-test</li> </ul>	75%
9. Evaluate how DNA indirectly controls what cells do and when they do it by encoding information directing the cell's synthesis of protein molecules. *	1.5	Evaluation	<ul style="list-style-type: none"> <li>Vocabulary handout 1</li> <li>DNA Internet activity</li> <li>Activity: "What will the Baby Look Like?"</li> </ul>	<ul style="list-style-type: none"> <li>Analysis questions</li> <li>7-LS-D 2 – Genetics 1,3</li> <li>7-LSA 3 -RNA</li> <li>Post-test</li> </ul>	75%

**SCIENCE/Concepts of Living Systems**

<b>SC 3: Students will acquire characteristics and interactions of living organisms</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
10. Finish the	1.3	Comprehension	<ul style="list-style-type: none"> <li>Vocabulary handout 1</li> </ul>	<ul style="list-style-type: none"> <li>Analysis questions</li> </ul>	70%

\*Item is tracked for A+

construction of DNA segments and explain how the hereditary information is contained within the various combinations of the four subunits that encode the DNA molecule. *			<ul style="list-style-type: none"> <li>• DNA Internet activity</li> <li>• Lab: Candy DNA replication</li> </ul>	<ul style="list-style-type: none"> <li>• 7-LS-D 1,3 – DNA</li> <li>• 7-LS-A 3 - DNA</li> <li>• Post-test</li> </ul>	
11. Do error analysis of DNA subunits, and explain how these coding errors (mutations) can occur randomly during replication and can also be caused by heat and radiation.	1.6, 1.7	Application	<ul style="list-style-type: none"> <li>• Vocabulary handout 1</li> <li>• Mutations activity</li> </ul>	<ul style="list-style-type: none"> <li>• Checkpoint quiz 2</li> </ul>	70%

\*Item is tracked for A+

**SCIENCE/Concepts of Living Systems**

**SC 3: Students will acquire characteristics and interactions of living organisms**

**CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
12. Construct and explain characteristics of an organism produced through either asexual or sexual reproduction when given the parent DNA. *	2.1	Application	<ul style="list-style-type: none"> <li>• Vocabulary handout 1</li> <li>• Mitosis &amp; Meiosis differences activity</li> <li>• Literacy Reading</li> <li>• "Meibops" Activity</li> </ul>	<ul style="list-style-type: none"> <li>• Analysis questions</li> <li>• 7-LS-D 4 –Mitosis/Meiosis</li> <li>• Post-test</li> </ul>	70%
13. Create a model of a cell representing the organelles responsible for its survival and explain how these structures provide for chemical synthesis, energy conversion and material transport. *	1.8	Comprehension Synthesis	<ul style="list-style-type: none"> <li>• Cell Analogy Model</li> <li>• Nutrition Article</li> <li>• Labs: Use of microscope</li> </ul>	<ul style="list-style-type: none"> <li>• 7-LS-A 1, 2 –Cell Structure</li> <li>• Analysis questions</li> <li>• Post-test</li> </ul>	75%

\*Item is tracked for A+

**SCIENCE/Concepts of Living Systems**

**SC 3: Students will acquire characteristics and interactions of living organisms**

**CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
14. Analyze how optimum conditions are maintained in an organism as a result of the special functions performed at the cellular level. *	1.5	Analysis	<ul style="list-style-type: none"> <li>Cell "City Tour" activity</li> </ul>	<ul style="list-style-type: none"> <li>7-LS-A 1, 2 –Cell Structure</li> <li>Analysis questions</li> <li>Post-test</li> </ul>	70%

**Resources:**

*Biology: An Everyday Experience* by Glencoe classroom sets

[www.psd3.org](http://www.psd3.org) - Science department web pages

Current newspaper articles

\*Item is tracked for A+

## CONCEPTS OF MATTER & ENERGY

### Course Rationale:

This course provides a review and extension of concepts delineated by the Missouri science frameworks. It is a part of a 4-semester course for 9<sup>th</sup> and 10<sup>th</sup> grade students with the objective to increase the student's level of achievement as measured by the MAP science test.

### Course Description:

This course is designed for students to master a basic understanding of the types of matter and energy that exist in the universe. Students will be provided with a synopsis of and a scoring guide for each of the performance projects they are to complete. The course is self-paced and students will be required to reach a level of mastery in each of the objectives before moving to the next area of study. Homework will be dependent on the student's level of mastery. Students will be able to individualize their learning and apply their learning to everyday events.

<b>SCIENCE/Concepts of Matter &amp; Energy</b>					
<b>SC 1: Students will acquire a foundation in properties and principles of matter and energy</b>					
<b>CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
1. Demonstrate how the Periodic Table can be used to predict properties of elements and determine trends in these properties as they relate to the physical world. *	1.4, 1.6, 1.8	Comprehension Application	<ul style="list-style-type: none"> <li>• Understanding Vocabulary</li> <li>• Lab: Properties of the Periodic Table</li> <li>• Worksheets: How the Periodic Table is organized</li> <li>• Video: Reactivity of Alkali Metals</li> <li>• "Home Connection": What elements are found in your home?</li> </ul>	<ul style="list-style-type: none"> <li>• MC (Multiple Choice) and CR (Constructed Response) Test</li> <li>• SC1A1: Periodic Table Used to Predict</li> </ul>	70%
					75%

\*Item is tracked for A+

**SCIENCE/Concepts of Matter & Energy**

**SC 1: Students will acquire a foundation in properties and principles of matter and energy**  
**CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
2. Describe the molecular, atomic and ionic makeup of a variety of substances using appropriate formulas and explain how the arrangement and motion of molecules determine a variety of biological, chemical and physical phenomenon. *	1.5, 2.1	Comprehension Application	<ul style="list-style-type: none"> <li>• Understanding Vocabulary</li> <li>• Internet site for Introduction</li> <li>• Worksheets comparing elements, compounds and mixtures</li> <li>• Lab: "A Cereal Experience"</li> <li>• Lab: "Flame Tests"</li> <li>• Lab: "Covalent vs Ionic Bonds"</li> <li>• Concept Map on Bonding</li> <li>• "Home Connection": What elements/compounds/mixtures are found in your home?</li> <li>• Video: "Types of Bonding"</li> </ul>	<ul style="list-style-type: none"> <li>• MC Test</li> <li>• Analysis Questions - SC1A2: Models of Compounds, Elements, Ions</li> </ul>	70% 75%

\*Item is tracked for A+

**SCIENCE/Concepts of Matter & Energy**

**SC 1: Students will acquire a foundation in properties and principles of matter and energy**

**CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
3. Analyze and discuss the types and concentration of solute or solvent that affect the rate of solubility, acidity or viscosity of the solution. *	1.3, 3.5	Analysis	<ul style="list-style-type: none"> <li>• Understanding Vocabulary</li> <li>• Internet - Introduction</li> <li>• Worksheets on types of solutions and acidity</li> <li>• Interpret a graph of solubility</li> <li>• Lab: Determining Acidity</li> <li>• Lab: Using Solubility to Solve a Mystery</li> <li>• "Home Connection" What solutions are in your home?</li> </ul>	<ul style="list-style-type: none"> <li>• MC Test</li> <li>• CR – Determine whether a mixture is a solution, colloid or suspension</li> <li>• Analysis Questions –SC1A3: Solutions – Concentrations, Properties, Solutes, Solvents</li> </ul>	<p>70%</p> <p>75%</p> <p>75%</p>
4. Describe the components of the modern model of an atom and how they are related. *	1.2	Comprehension	<ul style="list-style-type: none"> <li>• Understanding Vocabulary</li> <li>• Internet – Introduction</li> <li>• Video: "inside the Atom"</li> <li>• Activity: "Counting Atoms"</li> <li>• Chart: "Subatomic Particles"</li> <li>• Science Teaser: Mystery Guests</li> <li>• Lab: Balloons and Electron Charges</li> <li>• Home Connection</li> </ul>	<ul style="list-style-type: none"> <li>• CR Test</li> <li>• Analysis Questions – SC1A4: Modern Atomic Model</li> </ul>	<p>70%</p> <p>75%</p>

\*Item is tracked for A+

**SCIENCE/Concepts of Matter & Energy**

**SC 1: Students will acquire a foundation in properties and principles of matter and energy**  
**CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
5. Describe how energy is involved in chemical, physical and nuclear changes. *	1.2, 1.8	Comprehension Application	<ul style="list-style-type: none"> <li>• Understanding Vocabulary</li> <li>• Internet – Introduction</li> <li>• Worksheet: Compare and contrast nuclear and chemical energy</li> <li>• Activity: Conservation of Matter</li> <li>• Lab: Domino chain reaction</li> <li>• Home Connection: Identify the types of energy at home</li> </ul>	<ul style="list-style-type: none"> <li>• MC Test</li> <li>• Analysis Questions – SC1B1: Chemical and Nuclear Reactions for Today's Energy Needs</li> </ul>	70% 75%
6. Predict and explain phase changes as determined by the amount of heat required to change the temperature or state of a substance. *	1.3, 1.8, 2.1, 3.8,	Application Evaluation	<ul style="list-style-type: none"> <li>• Understanding Vocabulary</li> <li>• Internet – Introduction</li> <li>• Worksheets: How are Heat and Temperature Different?</li> <li>• Video: "Molecules in Motion"</li> <li>• Interpret graphing of phase changes</li> <li>• Worksheet: "What is a calorie?"</li> <li>• Activity: "How much does</li> </ul>	<ul style="list-style-type: none"> <li>• MC and CR Test</li> <li>• Analysis Questions – SC1B2: Heats Effect on Temperature and States of Matter (Calorie)</li> </ul>	70% 75%

**SCIENCE/Concepts of Matter & Energy**

**SC 1: Students will acquire a foundation in properties and principles of matter and energy**  
**CA 4: Students will acquire knowledge of and proficiency in writing formally and informally.**

\*Item is tracked for A+

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities/Resources	Assessments (including Performance-based)	Mastery
6. (Continued)			a cup of hot water cost?" <ul style="list-style-type: none"> <li>• Activity: "Calories: Knowing Your Nutrition"</li> <li>• Lab: Temperature change vs. Mass of water heated</li> <li>• Lab: Predicting the Temperature Change</li> <li>• Lab: Specific Heat of Metal</li> <li>• Home Connection: Cost of energy for your home</li> </ul>		
7. Distinguish the direction of thermal energy in natural processes such as airflow and ocean currents and investigate the relationship between heat and work. *	1.3, 1.10 3.8	Evaluation	<ul style="list-style-type: none"> <li>• Understanding Vocabulary</li> <li>• Internet – Introduction</li> <li>• Diagrams: Predicting the direction of heat flow through matter</li> <li>• Reading: "Thermal Pollution"</li> <li>• Lab: "What material will transfer the most heat?"</li> <li>• Lab: "Measuring the freezing and melting points"</li> <li>• Graphic: The Greenhouse effect</li> </ul>	<ul style="list-style-type: none"> <li>• MC and CR Test</li> <li>• Analysis Questions – SC1C2: Direction of Heat Flow (Thermal Energy, Work)</li> </ul>	70% 75%

**SCIENCE/Concepts of Matter & Energy**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
7. (Continued)			(Continued)		

\*Item is tracked for A+

			<ul style="list-style-type: none"> <li>• Activity: "Convection"</li> <li>• Lab: "What color is your spaceship?"</li> <li>• Lab: "Using water to tap into solar energy"</li> </ul> <p>Home Connection: Does the cost of solar panels make sense at home?</p>		
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**Resources:**

[www.psd3.org](http://www.psd3.org) - Science web pages

[www.scilinks.org](http://www.scilinks.org) -Variety of activities supported by National Science Teachers Association

[www.webelements.com](http://www.webelements.com) -Variety of activities related to periodic table and compounds

[www.eduplace.com](http://www.eduplace.com)

[www.homeworkhelp.about.com/cs/chemistry](http://www.homeworkhelp.about.com/cs/chemistry)

Videos from Cooperating School District

## FORENSIC SCIENCE I

### Course Rationale:

The Forensic Science class is designed around the idea that in the real world all learning is interrelated and interdependent. This class blends all of the sciences including biology, chemistry, physics and earth science. In addition, students will be asked to read, research, hypothesize, interview, compute and use deductive reasoning to propose possible crime solutions. Through forensic science, students become involved in many disciplines of study. They find value and relevance in what they study as they interact within the community at large.

### Course Description:

Forensic Science I is a laboratory class designed to improve a student's skills in deductive reasoning, critical thinking and evaluation through the use of forensic science and criminology. The class integrates all areas of science, including biology, chemistry, physics, and earth science. Psychological profiles, cultural factors, and historic development are also incorporated. First semester topics include DNA, Biology, Physical evidence and Document analysis. The final exam will include solving a mock crime scene.

<b>SCIENCE/Forensic Science I</b>					
<b>SC 3: Students will acquire characteristics and interactions of living organisms.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
1. Relate the structure and genetic uniqueness of DNA by applying it to an actual court case. *	1.6, 2.1	Application	<ul style="list-style-type: none"> <li>• Computer Simulation</li> <li>• RFLP Lab</li> <li>• PCR Lab</li> </ul>	<ul style="list-style-type: none"> <li>• Search for Innocence Scoring Guide</li> </ul>	70%

\*Item is tracked for A+

**SCIENCE/Forensic Science I**

**SC 7: Students will acquire the processes of scientific inquiry.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
2. Apply scientific laboratory processes and techniques to the solving of a crime. *	1.3, 3.5	Application	<ul style="list-style-type: none"> <li>• Background Info</li> <li>• Evidence Collection</li> <li>• Practice Crime Scene</li> </ul>	<ul style="list-style-type: none"> <li>• Crime Scene Evaluation</li> </ul>	80%
3. Determine and perform the most appropriate method of testing samples while obtaining the most accurate results. *	1.8	Evaluation	<ul style="list-style-type: none"> <li>• Sand Lab</li> <li>• Soil Lab</li> <li>• Class Lab</li> </ul>	<ul style="list-style-type: none"> <li>• Physical Evidence Scenarios</li> </ul>	70%
4. Predict and appropriately communicate the results of evidence collection and evaluation. *	3.1	Synthesis	<ul style="list-style-type: none"> <li>• Reading: Talking, Bones</li> <li>• Bone Labs</li> <li>• Internet Usage</li> </ul>	<ul style="list-style-type: none"> <li>• Forensic Biology Journal checklist</li> </ul>	70%
5. Evaluate the scientific accuracy of the various fields of forensic science. *	1.7, 4.1	Evaluation	<ul style="list-style-type: none"> <li>• Class Discussion</li> <li>• Compare/Contrast-Literacy project</li> <li>• Videos</li> </ul>	<ul style="list-style-type: none"> <li>• Search for Innocence Rubric</li> <li>• O.J. Simpson Trial Rubric</li> </ul>	90%

\*Item is tracked for A+

## **SCIENCE/Forensic Science I**

### **Resources:**

Adopted Text: Criminalistics – Saferstein, 6<sup>th</sup> Edition

Other Books: Crime Scene - Ragel,

Forensics Handbook – Kurland,

Talking Bones – Thomas

Technology: [www.phs.psd3.org/science/forensics/index.html](http://www.phs.psd3.org/science/forensics/index.html)

Videos: Autopsy, Dirty Deeds, Art of Forgery, Death Grip,

Hard Evidence, The House that Roared

Other: School Resource Officer,  
Microscopes (compound & stereoscopes),  
Microscopic Slides,  
Electrophoresis Equipment,  
Various bones and skulls,  
Laptop computers

## FORENSIC SCIENCE II

### Course Rationale:

The Forensic Science class is designed around the idea that in the real world all learning is interrelated and interdependent. This class blends all of the sciences including biology, chemistry, physics and earth science. In addition, students will be asked to read, research, hypothesize, interview, compute and use deductive reasoning to propose possible crime solutions. Through forensic science, students become involved in many disciplines of study. They find value and relevance in what they study as they interact within the community at large.

### Course Description:

Forensic Science II is laboratory class designed to improve a student's skills in deductive reasoning, critical thinking and evaluation through the use of forensic science and criminology. The class integrates all areas of science, including biology, chemistry, physics, and earth science. Psychological profiles, cultural factors, and historic development are also incorporated. Topics to be included in second semester include Prints, Serology, Hair and Fibers, and Toxicology. The final exam for each semester will include solving a mock crime scene.

<b>SCIENCE/Forensic Science II</b>					
<b>SC 7: Students will acquire the processes of scientific inquiry.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
1. Apply scientific laboratory process and techniques to the solving of a crime. *	1.3, 3.5	Application	<ul style="list-style-type: none"> <li>• Background Info</li> <li>• Evidence Collection</li> <li>• Practice Crime Scene</li> </ul>	<ul style="list-style-type: none"> <li>• Crime Scene Evaluation Scoring Guide</li> </ul>	80%

\*Item is tracked for A+

**SCIENCE/Forensic Science II**

**SC 7: Students will acquire the processes of scientific inquiry.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
2. Determine and perform the most appropriate method of testing samples while obtaining the most accurate results. *	1.8	Analysis	<ul style="list-style-type: none"> <li>• Drug Field Testing</li> <li>• Demo and Lab</li> <li>• Using a PDR</li> <li>• Chromatography Lab</li> </ul>	<ul style="list-style-type: none"> <li>• Toxicology Test</li> </ul>	70%
3. Predict and appropriately communicate the results of evidence collection and evaluation. *	3.1	Evaluation	<ul style="list-style-type: none"> <li>• Poison Lab</li> <li>• Urine Analysis Lab</li> <li>• Research and Internet Access</li> <li>• Pick your poison</li> </ul>	<ul style="list-style-type: none"> <li>• Scoring Guide</li> </ul>	80%
4. Determine and properly communicate how the study of blood types, stains and patterns could lead to a conviction. *	1.6	Evaluation	<ul style="list-style-type: none"> <li>• Blood Typing</li> <li>• Book Genetics</li> <li>• Blood Stain Patterns</li> </ul>	<ul style="list-style-type: none"> <li>• Blood Analysis Scoring Guide</li> </ul>	70%

\*Item is tracked for A+

**SCIENCE/Forensic Science II**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
5. Produce, lift, identify and distinguish between various prints. *	1.2, 1.4, 2.1	Comprehension	<ul style="list-style-type: none"> <li>• Making Print Lab</li> <li>• Lifting Print Lab</li> <li>• Other Print Lab</li> <li>• Print Portfolio</li> </ul>	<ul style="list-style-type: none"> <li>• Print Portfolio Rubric</li> </ul>	70%
6. Evaluate the scientific accuracy of the various fields of forensic science. *	1.7, 4.1	Evaluation	<ul style="list-style-type: none"> <li>• Articles</li> <li>• Video</li> <li>• Argumentation-Literacy Project</li> <li>• Sam Sheppard Case (serology)</li> <li>• Wayne William Trial (trace evidence)</li> </ul>	<ul style="list-style-type: none"> <li>• Sam Sheppard Case Scoring Guide</li> <li>• Wayne William Trial Scoring Guide</li> </ul>	90%

**Resources:**

Adopted Text: Criminalistics – Saferstein, 6<sup>th</sup> Edition  
 Other Books: Crime Scene - Ragel,  
Forensics Handbook – Kurland,  
Talking Bones – Thomas  
 Technology: [www.phs.psd3.org/science/forensics/index.html](http://www.phs.psd3.org/science/forensics/index.html)  
 Videos: Autopsy, Dirty Deeds, Art of Forgery, Death Grip,  
 Hard Evidence, The House that Roared

Other: School Resource Officer,  
 Microscopes (compound & stereoscopes),  
 Microscopic Slides,  
 Electrophoresis Equipment,  
 Various bones and skulls,  
 Laptop computers

\*Item is tracked for A+

## GEOLOGY/METEOROLOGY AND ASTRONOMY

**Course Rationale:** Geology, Meteorology and Astronomy allow 11<sup>th</sup> and 12<sup>th</sup> grade students a more in-depth knowledge and hands-on laboratory experience of the Earth and the Universe. The interrelationships between the principles, process, and forces of the Earth and the Universe effect people's lives. Geoscience and meteorology crosses disciplines to explore the planet Earth as a container, a finite body where decisions must be made regarding the future welfare of our planet. Astronomy studies the laws and principles of the universe, the relationship of the earth to the universe and earth's present and future explorations in space.

**Course Description:** Geology, Meteorology and Astronomy is a higher level Earth Science course. It is a two semester class with an emphasis in Geology and Meteorology first semester and Astronomy second semester. It emphasizes laboratory activities and field experiences utilizing higher order critical thinking skills. Second semester, two field trips and two nighttime viewing at the Pattonville Observatory are required. Students should have successfully completed two years of science.

<b>SCIENCE/Geology and Meteorology</b>						
SC 5: Students will acquire a solid foundation which includes knowledge of the processes (such as plate movement, water cycle, air flow) and interactions of Earth's biosphere, atmosphere, lithosphere and hydrosphere.						
Measurable Learner Objective	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
The student will be able to:						
1. Analyze minerals, rocks, soil, and fossils distinguishing their type, classifications and uses for society.	1.3, 1.6, 1.8, SC7	5.1A, 5.2C	An	<ul style="list-style-type: none"> <li>• Labs:                             <ul style="list-style-type: none"> <li>○ 1. Classification of Minerals and Rocks</li> <li>○ 2. Classification of Minerals and Rocks of MO</li> <li>○ 3. Classification of Fossils</li> </ul> </li> <li>• Diagram of the rock cycle</li> <li>• Diagram of soil profiles</li> <li>• Reading: Biogeography of Missouri</li> <li>• Rock and Mineral Production in U.S. – Map Activity</li> </ul>	Chart of Rocks and Minerals of Missouri  Lab Test: Rocks and Minerals of Missouri  Biogeography of Missouri Assessment	80%  80%  80%
2. Interpret crustal plate movements that affect Earth's topography.*	1.6, 3.4, SC5, CA4	5.2B	Ap An	<ul style="list-style-type: none"> <li>• Lectures: Types of plate movement, volcanoes and earthquakes waves</li> <li>• Diagrams: Plate movement, types of volcanic mountains, and faults</li> <li>• Readings: Effects of Volcanoes on Climate New Madrid Earthquake Zone and video</li> <li>• Labs: Finding the Epicenter of and Earthquake</li> <li>• Richter Scale and Mercalli Scale Activity</li> </ul>	Unit Assessment: Landforms are the Result of Various Forces on Earth	80%

\*Item is tracked for A+

**SCIENCE/Geology and Meteorology**

SC 5: Students will acquire a solid foundation which includes knowledge of the processes (such as plate movement, water cycle, air flow) and interactions of Earth's biosphere, atmosphere, lithosphere and hydrosphere.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
3. Identify landforms affected by weathering and erosion and describe the geological processes that form them. Supporting evidence of a geological time scale. *	1.6, 1.8, 3.1, 3.8, SC8, CA4	5.2A, 5.1B	C An	<ul style="list-style-type: none"> <li>Lecture: Weathering and Erosion notes with slide presentation on landforms</li> <li>Labs: Weathering of Rock Materials</li> <li>Soil Chemistry</li> <li>Glacier and Sea Level Change</li> <li>River Systems of the US</li> <li>Activities: Geologic Time Crossword Stratification and Geologic Time</li> </ul>	Lab Performance: Landform performance assessment  Unit Assessment	80%  80%
4. Compare and Contrast earth's resources and show how they are affected by human activity.*	1.6, 1.8, 3.1, 3.8, SC8, CA4	5.3A, 5.1B	An E	<ul style="list-style-type: none"> <li>Discussion: Renewable and Nonrenewable resources</li> <li>Chart: Advantages and disadvantages of energy resources</li> <li>Missouri Department of Natural Resources: Cave Packet</li> </ul>	Resource Chart  Evaluation Paper: Energy Resource of the Future  Water and Cave Quiz	80%  80%  80%
5. Analyze factors that affect climate and weather patterns in a region.	1.6, 1.7, SC5	5.1D, 5.2G	C An	<ul style="list-style-type: none"> <li>Directed Reading: Chapters 22-25</li> <li>Worksheets: Air and Water Circulation, Clouds, Air Masses, Fronts</li> <li>Diagram of the Layers of the Atmosphere</li> <li>Video Series: The Atmosphere</li> <li>Lab: Energy Absorption and Reflection</li> </ul>	Unit Assessment: The Atmosphere  Map Activity: Climates of the World, Annual Precipitation of the U.S.  Lab: Relative Humidity	80%  80%  80%
6. Identify natural atmospheric disasters and man made problems and how they impact the environment.	1.3, 1.6, SC5, SC8	5.2F, 5.2G	Ap S	<ul style="list-style-type: none"> <li>Discussion: How technology helps predict weather and natural disasters.</li> <li>Directed Reading: Chapter 22-25</li> <li>Identify causes and consequences of weather and climate change.</li> <li>Video Series: Disasters</li> <li>Map Activity: Weather Related Disasters</li> </ul>	Unit Assessment: Weather	80%
7. Record, summarize, and evaluate patterns or weather at a particular location.*	1.4, 1.6, SC5, SC8	5.2F, 7.1E	Ap E	<ul style="list-style-type: none"> <li>Discover and evaluate weather patterns with the use of weather equipment.</li> <li>Lab: Interpret weather maps</li> <li>Diagrams and Charts of Air masses, fronts, and weather symbols</li> </ul>	Weather Journal  Performance Assessment: Forecasting the Weather	80%  80%

\*Item is tracked for A+

**SCIENCE/Astronomy**

SC 6: Student will acquire a solid foundation which includes knowledge of composition and structure of the universe and the motions of the objects within it.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
7. Identify and analyze stars characteristics, positions, and life cycles.*	1.6, 3.5 SC6, MA3	6.1C	An	<ul style="list-style-type: none"> <li>• Maps: Life of Star Concept Map, Constellation Maps</li> <li>• Lab: H&amp;R Diagram</li> <li>• Electromagnetic Spectrum worksheet</li> <li>• Field Trips: Pattonville Heights Observatory and Planetarium</li> <li>• Video: Life of a Star</li> </ul>	Properties of Star Assessment  Identification of Constellations Assessment	80%  80%
8. Apply the unit of measurement for objects in our solar system and universe.*	1.6, 1.8, 3.2, SC6	7.1B	Ap	<ul style="list-style-type: none"> <li>• Lab: Estimating Size and Distance</li> <li>• Celestial Coordinates Problems</li> </ul>	Unit of Measurement Assessment  Estimating Size and Distance Lab	80%  80%
9. Distinguish between Kepler's and Newton's Laws and apply them to occurrences on the Earth and in the Universe.*	1.6, SC6, CA4,	6.2C, 6.2D, 7.1D	Ap An	<ul style="list-style-type: none"> <li>• Readings: Kepler, Newton, and Einstein Laws</li> <li>• Labs: Ellipses, Retrograde Motion, Phases of the Moon, Earth and Sun Motion</li> <li>• Worksheets: Tides, Eclipse, Seasons</li> <li>• Videos: Star Finder Series, Seasons</li> </ul>	Kepler's, Newton's, and Einstein's Laws Unit Assessment  Phases of the Moon and Tides Unit Assessment	80%  80%
10. Describe, discuss, compare and contrast the relationship of properties and features of the members of the solar system. *	1.6, SC6, CA4, CA6	6.1A	Ap An	<ul style="list-style-type: none"> <li>• Discussion on organized arguments on scientific theories of the formation of the universe</li> <li>• Labs: Dimensions of the Solar System, Jupiter's moons, Planet Webquest</li> <li>• Videos: Star Finder Series, Sun</li> <li>• Field Trip: Pattonville Heights Observatory</li> </ul>	Dimensions of the Solar System Lab  Unit Assessment	80%  80%
11. Identify and examine the costs and benefits that society has incurred from the space program.	2.1, 3.8, SC8, CA3, CA4, CA6	7.1E	Ap An	<ul style="list-style-type: none"> <li>• Direct Instruction on the costs and benefits of the space program.</li> <li>• Individual research</li> </ul>	Research paper on a product from the space program that is now used for everyday life and presentation.	80%

\*Item is tracked for A+

## HUMAN ANATOMY/ENGLISH

**Course Rationale:**

This course assists students who may have difficulty with the type and amount of studying required for anatomy. The English teacher provides additional study skills and assistance with scientific reading, research and technical writing as it applies to science.

**Course Description:**

This anatomy class has the same content as the one preceding except it is teamed with an English teacher. Students must sign up for the two-hour block and will receive one unit in science and one in English upon the successful completion of the block. Students in this integrated course will benefit from the connections to anatomy found in the literature. The books chosen complement the units studied in anatomy. In addition, study skills, organizational skills, critical thinking and research skills will be stressed. Students who otherwise may not have attempted Anatomy, will benefit from the extra support given through these skills.

<b>SCIENCE/Human Anatomy/English</b>					
<b>CA 3: Students will read and evaluate nonfiction works and material.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
1. Use physical and written evidence to diagnose and justify medical conditions. *	1.5, 3.1	Application	<ul style="list-style-type: none"> <li>• Research Techniques</li> <li>• Support or justify decisions</li> <li>• Video-background</li> <li>• Elephant Man project</li> <li>• Current book analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Elephant Man Project Rubric</li> <li>• Current Book Analysis Rubric</li> </ul>	70%

\*Item is tracked for A+

**SCIENCE/Human Anatomy/English**

**CA 3: Students will read and evaluate nonfiction works and material.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
2. Apply anatomical concepts to creative writing and to establish the connectiveness between areas of study. *	2.5, 3.3	Application	<ul style="list-style-type: none"> <li>• Chapter and AIDS discussion</li> <li>• Read "Hot Zone" excerpts</li> <li>• Video: "Deadly Viruses"</li> <li>• Immune Story</li> </ul>	<ul style="list-style-type: none"> <li>• Immune Story Rubric</li> </ul>	70%

**CA 4: Students will acquire foundations for writing formally and informally.**

3. Assess their health in order to predict their health future. *	1.2, 1.6	Evaluation	<ul style="list-style-type: none"> <li>• Documentation</li> <li>• Resume'</li> <li>• Abstracts</li> <li>• Health Portfolio</li> </ul>	<ul style="list-style-type: none"> <li>• Health Portfolio Rubric</li> </ul>	70%
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**CA 4: Students will acquire foundations for writing formally and informally.**

**CA 6: Students will participate in formal and informal presentations and discussions of issues and ideas.**

4. Compare and contrast medical advances in the reproductive field to determine ethical implications. *	2.3, 2.4, 3.6	Evaluation	<ul style="list-style-type: none"> <li>• Laser Disc Activities</li> <li>• Background Info and discussion</li> <li>• Diagrams and diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Bioethics Rubric</li> </ul>	70%
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\*Item is tracked for A+

**SCIENCE/Anatomy/English**

**CA 4: Students will acquire foundations for writing formally and informally.**  
**CA 6: Students will participate in formal and informal presentations and discussions of issues and ideas.**  
**SC 7: Students will acquire the processes of scientific inquiry.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
5. Develop an anatomical problem, research a possible solution, put the solution into practice, draw conclusions and apply it to life and the future. *	1.3, 1.8, 1.10	Applications	<ul style="list-style-type: none"> <li>• Daily requirements</li> <li>• Body Fat Lab</li> <li>• Vitamin and Mineral Chart</li> <li>• Nutrition Portfolio</li> </ul>	<ul style="list-style-type: none"> <li>• Nutrition Portfolio Rubric</li> </ul>	70%
<p><b>CA 4: Students will acquire foundations for writing formally and informally.</b>  <b>SC 8: Students will acquire the impact of science, technology and human activity on resources.</b></p>					
6. Investigate, develop criteria, and then determine and research in detail medical discoveries, procedures and/or technologies. *	1.1, 1.4, 4.1	Synthesis	<ul style="list-style-type: none"> <li>• Research procedures</li> <li>• Compare/Contrast</li> <li>• Discussion-Literacy project</li> <li>• Criteria selection</li> <li>• Millennium project</li> </ul>	<ul style="list-style-type: none"> <li>• Millennium Project Rubric</li> </ul>	70%

\*Item is tracked for A+

## **SCIENCE/Anatomy/English**

### **Resources:**

Adopted Text: The Human Body in Health and Disease – Mosby

Science website: [phs.psd3.org/science/index.html](http://phs.psd3.org/science/index.html)

CD's: ADAM CD, Mosby's Anatomical Chart CD, Nine-Month Miracle CD,  
35 mm slides, EKG software,

Internet: Nutrition

Videos: The Incredible Machine, A Normal Face, Ear Implant Laser Disk, AIDS Laser Disk,

Other: Articulated Skeletons,

Muscle Torsos, Leg and Arm Models,

Sheep Brain, Pig Hearts,

Transplant Specialist from DePaul Hospital

## HUMAN ANATOMY

### Course Rationale:

The Human Anatomy class is an elective class designed for students interested in medically related fields or who are interested in extending their practical knowledge about the body in which they live. Through the study of the human body, students develop an understanding of who they are, what makes their bodies work, and what happens when their bodies malfunction. Decision-making and responsibility are stressed. By learning about themselves, students develop an understanding of the effects of their choices and decisions. Students are directed toward making positive choices and decisions about their bodies through authentic life activities and assessments.

### Course Description:

This laboratory course is for serious students with average or better abilities who are interested in learning about the various parts of the human body and their functions. Nine major body systems will be systematically studied. Lab activities will include examination and/or dissection of animal organs that are similar to human organs. A strong emphasis will be placed on study skills techniques.

<b>SCIENCE/Human Anatomy</b>					
<b>SC 3: Students will acquire characteristics and interactions of living organisms.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
1. Use anatomical terms of body regions, planes, and directions. *	1.5, 2.1	Application	<ul style="list-style-type: none"> <li>• Notes</li> <li>• Flash cards</li> <li>• Labeling</li> </ul>	<ul style="list-style-type: none"> <li>• Sports Assessment</li> </ul>	80%

\*Item is tracked for A+

**SCIENCE/Human Anatomy**

**SC 3: Students will acquire characteristics and interactions of living organisms.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
2. Use the microscope, locate, draw and identify cellular and tissue structures. *	1.4, 1.6, 1.8	Application	<ul style="list-style-type: none"> <li>• Notes</li> <li>• Labeling worksheets</li> <li>• Slides/overheads</li> </ul>	<ul style="list-style-type: none"> <li>• Lab Practical; Cell, Histology</li> </ul>	80%
3. Identify structures and functions of the human body using a variety of resources. *	1.4, 1.5	Comprehension	<ul style="list-style-type: none"> <li>• Notes</li> <li>• Labeling/color worksheets</li> <li>• Function charts</li> <li>• Highlight charts of bones/muscles</li> <li>• Practice sessions of using human models</li> <li>• Practice sessions using human models</li> <li>• Practice sessions using 35 mm slides</li> </ul>	<ul style="list-style-type: none"> <li>• Lab Practical; tissues, bones, muscles, brain, heart</li> </ul>	85%
4. Perform investigations involving body systems and evaluate the results as they apply to human physiology. *	1.2, 1.5, 3.1, 3.5	Application	<ul style="list-style-type: none"> <li>• Notes</li> <li>• Labeling/color worksheets</li> <li>• Computer modeling</li> <li>• Tracing blood pathway</li> <li>• Library: Disease research</li> </ul>	<ul style="list-style-type: none"> <li>• Labs Practical: cardiovascular, respiratory</li> </ul>	75%

\*Item is tracked for A+

**SCIENCE/Human Anatomy**

**SC 7: Students will acquire the processes of scientific inquiry.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
5. Formulate a problem, a solutions, write a hypotheses, prove or disprove the hypotheses and draw conclusions concerning nutrition and its importance to the body and life itself. *	1.2, 1.3, 1.6, 1.8, 2.1, 4.5	Synthesis	<ul style="list-style-type: none"> <li>• Nutrition Notes</li> <li>• Library Research</li> <li>• Computer (research, graphics, word-processing and data collection),</li> <li>• Nutrition Diet Charts</li> </ul>	<ul style="list-style-type: none"> <li>• Nutrition Portfolio Rubric</li> </ul>	75%

**Resources:**

Adopted Text: The Human Body in Health and Disease – Mosby

Science website: [phs.pedr3.org/science/index.html](http://phs.pedr3.org/science/index.html)

CD's: ADAM CD, Mosby's Anatomical Chart CD, Nine-Month Miracle CD,

35 mm slides, EKG software,

Internet: Nutrition

Videos: The Incredible Machine, A Normal Face, Ear Implant Laser Disk, AIDS Laser Disk,

Other: Articulated Skeletons,

Muscle Torsos, Leg and Arm Models,

Sheep Brain, Pig Hearts,

Transplant Specialist from DePaul Hospital

\*Item is tracked for A+

## PHYSICS I

**Course Rationale:** This course is designed for students interested in the study of the physical processes of the world or who desire a college-preparatory class in physics. In Physics I, an understanding of major physical concepts is developed. Those concepts include, but are not limited to, mechanics, forces, motion, and energy. A working knowledge and appreciation of physics provides a basis for problem solving. Students also gain insight into opportunities in scientific and technological careers.

**Course Description:** Physics I is an experimental science dealing with the physical concepts of our environment. These concepts are introduced by direct definition, by derivation from simpler concepts, or by inquiry methods. The first semester will concentrate on mechanics, or the study of the interaction of forces on matter, which consists of vectors, forces, motion, power, work, energy, and momentum. In the second semester, the branches of physics to be covered are heat, sound, wave motion, fluid motion, and the nature of light. Experiments are performed to introduce, extend, and verify physics concepts.

SCIENCE/Physics I						
Fluid Energy						
Standard 1: Students will acquire a foundation that includes knowledge of the properties and principles of matter and energy.						
A. Atomic Theory of Matter						
Objects and materials have various properties.						
Measurable Learner Objective	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
The student will be able to:						
1. Predict the motion of a fluid using the characteristics and principles of fluid movement.	S1, S2 1.6	1.1.A	S	<ul style="list-style-type: none"> <li>• Class Notes</li> <li>• Bernoulli's Principle Lab</li> <li>• Pressure at a Depth Lab</li> <li>• Pressure Lab</li> <li>• Archimedes' Principle Lab</li> </ul>	Bernoulli's Principle Lab Report Fluids Written Objective Test	80%
Heat Energy						
Standard 1: Students will acquire a foundation that includes knowledge of the properties and principles of matter and energy.						
A. Atomic Theory of Matter						
Kinetic Theory of Matter						
Measurable Learner Objective	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
The student will be able to:						
1. Describe the changes that occur in a substance when heat is being absorbed or released.*	S1, CA4, 1.4, 1.6	1.1.B	C	<ul style="list-style-type: none"> <li>• Class Notes</li> <li>• Change of State Lab</li> <li>• Specific Heat Lab</li> <li>• Heat-related Homework Problems</li> </ul>	Bimetallic Strip Lab	80%

\*Item is tracked for A+

SCIENCE/Physics I						
Mechanical Energy, Heat Energy, Fluid Energy, Sound Energy, and Light Energy						
Standard 1: Students will acquire a foundation that includes knowledge of the properties and principles of matter and energy.						
B. Energy as a Source						
Forms of energy have a source, a means of transfer, and a receiver.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Classify examples of heat transfer.	S1	1.2.A	C	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Heat Transfer Demonstrations</li> </ul>	Heat Energy Written Objective Test	80%
2. Apply the law of conservation of energy to explain the motion of heat.	S1, S2	1.2.F	Ap	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Heat-related Homework Problems</li> <li>Specific Heat Lab</li> </ul>	Specific Heat Lab Report Heat Energy Written Objective Test	80%
3. Predict the motion of light using the laws of reflection and refraction.	S1, S2 1.6	1.2.A	S	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Lens and Mirror Homework Problems</li> <li>Index of Refraction of Water Lab</li> <li>Curved Mirror Lab</li> <li>Thin Lens Lab</li> </ul>	Lab Reports Light Energy Written Objective Test	85%
4. Identify the type of wave used to transfer energy.*	S1, S2, 1.6	1.2.C	C	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Superposition Video</li> </ul>	Sound Energy Written Objective Test Wave Transmission & Superposition Lab Report	85%
5. Describe how sound energy moves through various media.*	S1, S2, CA4, 3.1	1.2.A	C	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Echo Lab</li> <li>Resonance Demonstration Videos</li> <li>Doppler Effect Video</li> </ul>	Musical Instrument Lab Report	85%
Light Energy						
Standard 1: Students will acquire a foundation that includes knowledge of the properties and principles of matter and energy.						
B. Energy as a Source						
Electromagnetic energy from the sun is a major source of energy on Earth.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Identify the various parts and uses of the electromagnetic spectrum.	S1, 1.4	1.2.C	K	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Electromagnetic Spectrum Internet Lab</li> <li>Electromagnetic Spectrum Homework Problems</li> </ul>	Light Energy Written Objective Test	85%

\*Item is tracked for A+

SCIENCE/Physics I						
Mechanical Energy and Heat Energy						
Standard 1: Students will acquire a foundation that includes knowledge of the properties and principles of matter and energy.						
B. Energy as a Source						
Energy can change from one form to another but the total amount remains the same.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Calculate an object's potential and kinetic energies.	S1 M2	1.2.B	Ap	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Mechanical Energy Homework Problems</li> </ul>	Roller Coaster Lab Report Mechanical Energy Written Objective Test	85%
2. Apply the law of conservation of energy to describe an object's motion.	S2, 1.6	1.2.F	Ap	<ul style="list-style-type: none"> <li>Mechanical Energy Homework Problems</li> <li>Bowling Ball Demonstration</li> </ul>	Roller Coaster Lab Report Mechanical Energy Written Objective Test	85%
3. Predict the change in an object's motion and position using the work-energy theorem.	S2	2.2.D	S	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Work and Power Homework Problems</li> </ul>	Mechanical Energy Written Objective Test	85%
4. Calculate the power exerted by an object.	S1, M1	2.2.D	Ap	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Work and Power Homework Problems</li> <li>Human Horsepower Lab</li> </ul>	Efficiency of a Motor Lab Report	85%
5. Explain the factors affecting the efficiency of a machine.	S1	2.2.D	C	<ul style="list-style-type: none"> <li>Machines Demonstrations</li> </ul>	Efficiency of Motor Lab Report Mechanical Energy Written Objective Test	85%
Simple Motion and Accelerated Motion						
Standard 2: Students will acquire a foundation that includes knowledge of the properties and principles of force and motion.						
B. Motion of an Object						
The motion of an object can be described as a change in position, direction, and speed relative to another object.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Interpret the motion of an object from various kinematics graphs.*	S2, M6, 1.6, 1.4	2.1.A	An	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Kinematics Homework Problems</li> </ul>	Velocity of a Car Lab Report Simple Motion Written Objective Test	80%
2. Calculate the speed of an object.	S2, M1	2.1.A	C	<ul style="list-style-type: none"> <li>Kinematics Homework Problems</li> <li>Student Speed Lab</li> </ul>	Simple Motion Written Objective Test	80%

\*Item is tracked for A+

**SCIENCE/Physics I**

**Accelerated Motion**

**Standard 2: Students will acquire a foundation that includes knowledge of the properties and principles of force and motion.**

**A. Motion of an Object**

**An object that is accelerating is speeding up, slowing down, or changing direction.**

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Analyze an object's motion in terms of velocity and acceleration.	S2	2.1.B 2.2.A 2.2.C	An	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Kinematics Homework Problems</li> <li>Accelerometer Lab</li> </ul>	Ticker Timer Lab Report	85%
2. Calculate the acceleration of an object.	S2, M1	2.1.B	C	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Acceleration Down an Incline Lab</li> </ul>	Accelerated Motion Written Objective Test	85%
3. Calculate the motion of a projectile.*	S2, M1	2.2.A	C, S	<ul style="list-style-type: none"> <li>Projectile Motion Homework Problems</li> <li>Projectile Motion Demonstrations</li> <li>Softball Throw Lab</li> <li>Projectile Motion Video</li> </ul>	Cliffdiving Lab Report Accelerated Motion Written Objective Test	80%
4. Describe the forces that keep an object in a circular path.	S2	2.2.A	C	<ul style="list-style-type: none"> <li>Accelerometer Lab</li> <li>Satellite Motion Internet Lab</li> </ul>	Centripetal Force Lab Report Rotational Forces Written Objective Test	80%

**Momentum and Impulse**

**Standard 2: Students will acquire a foundation that includes knowledge of the properties and principles of force and motion.**

**A. Motion of an Object**

**Momentum depends on the mass and velocity of an object.**

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Calculate an object's momentum.	S2 M1	2.1.C	C	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Momentum and Impulse Homework Problems</li> </ul>	Momentum Written Objective Test	80%
2. Apply the law of conservation of momentum to describe the change in an object's motion.	S2	2.1.C	Ap	<ul style="list-style-type: none"> <li>Explosion Lab</li> <li>Tailgated by a Dart Lab</li> </ul>	Egg Airbag Lab Report	80%

\*Item is tracked for A+

**SCIENCE/Physics I**

**Forces**

**Standard 2: Students will acquire a foundation that includes knowledge of the properties and principles of force and motion.**

**B. Forces Affect Motion**

**Newton's Laws of Motion**

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Describe the characteristics of a force.	S2	2.2.B	K	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Forces Homework Problems</li> <li>Friction Lab</li> </ul>	Forces Written Objective Test	80%
2. Identify various forces acting on an object.	S2	2.2.B 2.2.C	C	<ul style="list-style-type: none"> <li>Freebody Diagram Worksheet</li> <li>Inclined Plane Lab</li> </ul>	Forces Written Objective Test	80%
3. Predict the path of an object when various forces are acting.	S2	2.2.A	S	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Forces Homework Problems</li> </ul>	Galileo's Thought Experiment Lab Report	80%
4. Apply Newton's Laws of Motion to describe an object's motion.	S2	2.2.A	Ap	<ul style="list-style-type: none"> <li>Newton's Laws Demonstrations</li> <li>Starship Pattonville Paragraph</li> </ul>	Forces Written Objective Test	80%

**Forces**

**Standard 2: Students will acquire a foundation that includes knowledge of the properties and principles of force and motion.**

**B. Forces Affect Motion**

**Every object exerts a gravitational force on every other object.**

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Describe the effects of a gravitational force acting on an object.*	S2 CA4	2.2.B 2.2.C	C	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Freefall Homework Problems</li> <li>Gravity Concept Attainment Lab</li> <li>Acceleration due To Gravity Lab</li> </ul>	Revenge Lab Report	80%
2. Compare and calculate the gravitational force acting between objects.	S2 M1	2.2.C	An	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Forces Homework Problems</li> <li>Satellite Motion Internet Lab</li> </ul>	Forces Written Objective Test	80%

\*Item is tracked for A+

SCIENCE/Physics I						
Scientific Inquiry						
Standard 7: Students will acquire a foundation of the processes of scientific inquiry.						
Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.						
Scientific inquiry includes formulating a testable question, gathering data, forming explanations, and communicating the results.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Gather qualitative and quantitative data from observations to form explanations.	S7 1.6	7.1.B 1.4 1.8	Ap	<ul style="list-style-type: none"> <li>Each unit has investigations that require the collecting of various types of data.</li> </ul>	Lab Report Scoring Guides	85%
2. Communicate the results of a lab investigation using tables, graphs, and written responses.	S7 CA4 CA6	7.1.D 7.1.E	S E	<ul style="list-style-type: none"> <li>Each unit has investigations that require the graphing of data and answering conclusion questions about the results.</li> </ul>	Lab Report Scoring Guides Constructed Response Scoring Guides	85%
3. Design, test, and evaluate experimental variables to test a hypothesis.	S7	7.1.A	An E	<ul style="list-style-type: none"> <li>Revenge Lab</li> <li>Gravity Concept Attainment Lab</li> <li>Galileo Thought Experiment Lab</li> <li>Musical Instrument Lab</li> <li>Egg Airdrop Lab</li> </ul>	Lab Report Scoring Guides	85%
Science and Technology						
Standard 8: Students will acquire a knowledge of the impact of science, technology, and human activity.						
Science and technology affect, and are affected by, society.						
Social, political, economic, ethical, and environmental factors strongly influence, and are strongly influenced by, the direction of progress of science and technology.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Identify and evaluate the advantages and disadvantages of solutions to a given problem.	S8 CA4 3.1, 3.5, 3.8	8.1.B	Ap E	<ul style="list-style-type: none"> <li>Musical Instrument Lab</li> <li>Egg Airdrop Lab</li> </ul>	Lab Report Scoring Guide	85%
2. Describe how the scientific explanations of physical phenomena have changed over time.	S8 1.6	8.2.A	K An	<ul style="list-style-type: none"> <li>Newton Internet Lab</li> <li>Galileo Internet Lab</li> </ul>	Constructed Response Scoring Guide	85%
3. Analyze a source for scientific credibility.	S8, CA3, CA4, 1.7	8.3.D	An E	<ul style="list-style-type: none"> <li>Newton Internet Lab</li> <li>Galileo Internet Lab</li> </ul>	Constructed Response Scoring Guide	85%

\*Item is tracked for A+

## PHYSICAL SCIENCE

**Course Rationale:** Physical Science demonstrates the integration of chemistry, physics, earth and space sciences. By doing so, the course stresses the importance of each component, but also the realization that the physical world does not work independent of the components.

**Course Description:** Physical Science allows students to “see” their physical world through the lens of an integrated class before specializing in one single area. The concepts are linked to life experiences. It is also an appropriate class for students who desire an overview of many different fields but lack the time in their schedule to take full year classes in each field.

SCIENCE/Physical Science						
Atoms/Compounds and the Periodic Table						
Standard 1: Students will acquire a foundation which includes knowledge of the properties and principles of matter and energy						
A. Characteristics, Forms and Sources of Energy						
The periodic table organizes the elements according to their atomic structure and chemical reactivity.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Describe the components of the modern model of an atom.*	S1 CA4	1.1.E	K	<ul style="list-style-type: none"> <li>• Class notes</li> <li>• Isotope Lab</li> <li>• Periodic Table Web Activity</li> </ul>	Unit Assessment: Atoms, Elements and the Periodic Table Each unit assessment follows the same format: <ul style="list-style-type: none"> <li>➤ Matching of key vocabulary</li> <li>➤ Multiple Choice over concepts</li> <li>➤ Compare/Contrast writing</li> <li>➤ Performance task analyzing lab investigations from the unit</li> </ul>	80%
2. Demonstrate how the Periodic Table can be used to predict the properties of elements and determine trends in these properties.*	S1 1.6	1.1.F	C A	<ul style="list-style-type: none"> <li>• Chem4Kids web site-Periodic Table</li> <li>• On-line textbook resources</li> <li>• Question Set: Question sets contain no more than 5 thought questions. They range from compare/contrast, to deductive reasoning to analysis.</li> </ul>	Unit Assessment: Atoms, Elements and the Periodic Table Question Set: Scoring guide based on 3 to 0 point scale. Literacy and understanding are scored.	80%
3. Identify a substance as ionic or covalent and provide support for the answer.*	S1 CA4	1.1.H	Ap	<ul style="list-style-type: none"> <li>• Review of graphic organizers</li> <li>• Literacy writing: Compare/Contrast the Types of Bonds</li> <li>• Demonstration of ionic and covalent household substances</li> </ul>	Unit Assessment: Atoms, Elements and the Periodic Table Ionic & Covalent Lab Report	80%

\*Item is tracked for A+

SCIENCE/Physical Science						
Classification of Matter						
Standard 1: Students will acquire a foundation which includes knowledge of the properties and principles of matter and energy						
B. Characteristics, Forms and Sources of Energy						
Objects, and the materials they are made of, have properties that can be used to describe and classify them						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Classify and justify materials on the basis of their properties.*	S1, S7 2.1	1.1.A	Ap	<ul style="list-style-type: none"> <li>Class notes</li> <li>Baking lab: How is baking a cookie analogous to types of mixtures?</li> <li>Colloid Lab: What do we do with substances that don't appear to be in either category?</li> <li>Literacy Writing: Compare/Contrast Homogeneous vs Heterogeneous Materials</li> </ul>	Unit Assessment: Classifications of Matter	80%
2. Using the Kinetic Theory, create and explain diagrams depicting changes that occur as materials are heated and/or cooled.*	S1, S7 2.1	1.1.D	Ap An	<ul style="list-style-type: none"> <li>Literacy Writing: Concept Definition--Phases of Matter</li> <li>Review of Graphing Techniques</li> <li>Change of State Lab</li> <li>Common Household chemical lab: pH lab</li> </ul>	Unit Assessment: Classifications of Matter	80%
3. Summarize an article about the impact of science/technology and evaluate the source for its scientific credibility.	S8 CA3 CA4 1.7 2.4	8.3.D	S E	<ul style="list-style-type: none"> <li>Current Event Planner</li> <li>Model a sample reading and student work</li> <li>Scoring Guide</li> </ul>	Current Event Scoring Guide	80%

\*Item is tracked for A+

SCIENCE/Physical Science						
Composition of the Earth						
Standard 5: Students will acquire a foundation which includes knowledge of the processes and interactions of the Earth's biosphere						
Earth's Systems (geosphere, atmosphere and hydrosphere) interact with one another as they undergo change by common processes.						
External and internal processes have changed Earth's materials and features.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Explain the processes of weathering, erosion and deposition of sediments as they relate to a rock cycle diagram.*	S5, S7 1.6	5.2.A 5.2.B 5.2.D	K S	<ul style="list-style-type: none"> <li>Class notes</li> <li>Rock Exploration lab: What properties distinguish groups of rocks?</li> <li>Mineral Exploration lab: What properties distinguish groups of minerals?</li> <li>Rock Cycle Diagram: How are rocks and minerals formed and transformed?</li> </ul>	Unit Assessment: Composition of the Earth	80%
2. Explain how relative and real dating techniques are used to infer geologic history.*	S5, S7	5.2.E	C Ap	<ul style="list-style-type: none"> <li>Understanding Half-Life Lab</li> <li>Geologic Dating Methods</li> </ul>	Unit Assessment: Composition of the Earth	80%
3. Describe evidence of the Plate Tectonics Theory including the uneven heating of the mantle due to radioactive decay, movement of materials via convection currents, movement of plates along diverging, converging or transform plate boundaries and the correlation of rock sequences, landforms and fossils.*	S5 1.6	5.2.B	C Ap	<ul style="list-style-type: none"> <li>Class notes and discussion</li> <li>Video: Rings of Fire</li> <li>Earthquake, Tsunami and Volcano Web Activity</li> <li>Question Set: Composition of the Earth</li> </ul>	Unit Assessment: Composition of the Earth	80%
4. Select one of 3 types of mining, describe it and identify the economic, political, social and ethical constraints associated with the use of that resource.  See Standard 8 (Science, Technology and Human Impact)	S8 CA3, CA4 3.1, 3.5, 3.8	5.3.A	K S E	<ul style="list-style-type: none"> <li>Computer search of mineral resources in Missouri</li> <li>Role play or brainstorm the benefits and risks to a community regarding this resource: What benefits/risks would a large industry, such as mining, bring to a community?</li> <li>Mining Minerals and Resource Project</li> </ul>	Mining Project Scoring Guide	80%

\*Item is tracked for A+

SCIENCE/Physical Science

The Atmosphere

Standard 5: Students will acquire a foundation which includes knowledge of the processes and interactions of Earth's systems (Geosphere, Atmosphere, and Hydrosphere)

Earth's systems (geosphere, atmosphere, and hydrosphere have common components that interact with one another as they undergo change.

Constantly changing properties of the atmosphere occur in patterns which are described as weather.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Record, summarize, and evaluate patterns of weather at a particular location.*	S5, S7 1.6	5.2.F	K Ap E	<ul style="list-style-type: none"> <li>Diagram of the water cycle</li> <li>Practice reading weather maps using newspaper, weather channel or the web</li> <li>Weather web activity</li> <li>Cloud Lab: What conditions must be present for the formation of clouds?</li> <li>Question Sets: Explain / interpret information</li> </ul>	Unit Assessment: The Atmosphere  Weather Journal Scoring Guide	80%
2. Explain how climate and weather patterns in a particular region are affected by factors, such as proximity to large bodies of water or ice/ocean currents, latitude, altitude, prevailing winds and solar radiation.*	S5, S7 CA4 2.1	5.1.D 5.2.G	C	<ul style="list-style-type: none"> <li>Discussion of: Effects of uneven heating of the landmasses, oceans and air by the Sun due to latitude and surface materials.</li> <li>Defining Weather Patterns Activity: Design a fictitious landmass that contains certain geologic features and then identify the wind patterns.</li> <li>Weather Journal Activity: Using a reputable source collect information as outlined on the instructions regarding the local weather for a defined period.</li> </ul>	Unit Assessment: The Atmosphere  Weather Journal Scoring Guide	80%
3. Identify natural atmospheric disasters and man-made problems and how they impact the environment.*	S5, S7	5.1.C 5.2.B	Ap S	<ul style="list-style-type: none"> <li>Diagram the layers of the atmosphere and the gases/temperatures that are considered normal</li> <li>Explain how ozone is formed</li> <li>Identify causes and consequences of observed and predicted changes in the ozone layer</li> <li>Identify causes and consequences of natural weather disasters</li> <li>Discussion feasibility of technology ever allowing us to correctly predict time/location of natural disasters.</li> </ul>	Unit Assessment: The Atmosphere	80%

\*Item is tracked for A+

SCIENCE/Physical Science

Exploration of the Universe

Standard 6: Students will acquire a foundation which includes knowledge of the composition and structure of the universe and the motions of the objects within it

The universe has predictable motions that may be described and explained as a result of gravitational forces.

The regular and predictable motions of a planet and moon relative to the Sun explain natural phenomena.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Describe and relate the positions and motions of the Sun-Earth (and other planets) solar system, and the relationship of those to the Milky Way galaxy and other galaxies in the universe.*	S6 1.6	6.1.A	K Ap	<ul style="list-style-type: none"> <li>Universe Concept Drawings</li> <li>Interpreting an H-R Diagram</li> <li>Solar System Video: overview</li> <li>Literacy Writing: Compare/Contrast revolution and rotation</li> </ul>	Unit Assessment: Exploration of the Universe	80%
2. Explain seasonal phenomena (weather, length of day, temperature, intensity of light) as a consequence of a planet's axial tilt as it rotates and a planet's orbital position as it revolves around the Sun.*	S6 1.6 3.5	6.2.C	S	<ul style="list-style-type: none"> <li>Seasons video</li> <li>Models of Earth revolving around Sun</li> <li>Question Set: revolving/rotation/seasons</li> <li>Concept map of key terms related to motion of Earth in respect to the sun and universe</li> <li>Modeling Motions in Our Solar System Activity</li> </ul>	Unit Assessment: Exploration of the Universe	80%
3. Identify information that the electromagnetic spectrum provides about the stars and the universe and the advantage of using this information.*	S6 1.6	6.1.C	K Ap	<ul style="list-style-type: none"> <li>Blue Shift vs. Red Shift</li> <li>Diagram/Discussion of Electromagnetic Chart</li> <li>Literacy Writing: Compare/Contrast Red Shift to Blue Shift</li> </ul>	Unit Assessment: Exploration of the Universe	80%
4. Predict phases of the moon, and eclipses when given the relative positions of the moon, planet and Sun.*	S6, S7 3.5	6.2.C	An	<ul style="list-style-type: none"> <li>Modeling Motions in Our Solar System Activity</li> </ul>	Unit Assessment: Exploration of the Universe	80%

\*Item is tracked for A+

SCIENCE/Physical Science

Force and Motion

Standard 2: Students will acquire a foundation which includes knowledge of the properties and principles of force and energy

Forces affect motion.

Newton's Laws of Motion explain the interaction of mass and forces, and are used to predict changes in motion.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Measure, graph and analyze an object's motion in terms of speed, velocity and acceleration.*	S2, S7 1.3 1.6 3.5	2.1.A 2.1.B 2.2.B	Ap An	<ul style="list-style-type: none"> <li>Class Notes</li> <li>Airplane lab: How do differences in design allow for greater distance and/or speed?</li> <li>Interpretation of Speed Diagrams</li> <li>Question Set on Speed</li> <li>Free Fall Lab: Does an object fall at the same rate?</li> <li>Rollercoaster Lab: Build, test, revise, and calculate values and analyze the results</li> </ul>	Unit Assessment: Force and Motion	80%
					Roller Coaster Scoring Guide	80%
2. Compare the momentum of two objects in terms of mass and velocity.*	S2, S7 1.3 3.5	2.1.C	K C	<ul style="list-style-type: none"> <li>Investigating the velocity of a sinking marble</li> <li>Water Bottle Motion Lab: How does the incline of a plane affect acceleration and the distance that a can will be pushed?</li> <li>Table Hockey Lab: How does mass of a coin affect the movement of other coins that it hits?</li> </ul>	Unit Assessment: Force and Motion	80%
3. Using Newton's 3 laws of motion, predict how the movement of one object affects another.*	S2, S7 1.6 3.5	2.2.D	An	<ul style="list-style-type: none"> <li>Newton's 3 Laws Investigation</li> <li>Class Notes</li> <li>Question Set on Newton's Laws</li> <li>Investigating a Balloon Jet: Use Newton's 2<sup>nd</sup> and 3<sup>rd</sup> Laws to explain the motion of the balloon</li> <li>Table Hockey Lab: How does mass of a coin affect the movement of other coins that it hits?</li> <li>Reading and Writing Connection: How do crash dummies demonstrate Newton's Laws?</li> </ul>	Unit Assessment: Force and Motion	80%

\*Item is tracked for A+



SCIENCE/Physical Science

Waves

Standard 1: Students will acquire a foundation which includes knowledge of the properties and principles of matter and energy

Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.

Electromagnetic energy from the Sun (solar radiation) is a major source of energy on Earth.

Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Describe the types of waves and the relationship among wavelength, energy and frequency.*	S2, S7		K C	<ul style="list-style-type: none"> <li>Class notes on mechanical waves and their characteristics</li> <li>Pictures of waves: Compare/contrast wavelength, frequency and amplitude</li> <li>Question Set: Waves</li> <li>Lab: Observing Wave Properties of a Slinky</li> <li>Literacy Writing: Compare/Contrast Longitudinal to Transverse Waves</li> </ul>	Unit Assessment: Waves	80%
2. Identify information that the electromagnetic spectrum provides about the universe.*	S2		Ap	<ul style="list-style-type: none"> <li>Class notes on Electromagnetic waves</li> <li>Video: Waves</li> <li>Wave WebQuest</li> <li>How is Doppler Effect used on Earth and in the Universe?</li> </ul>	Unit Assessment: Waves	80%

\*Item is tracked for A+

SCIENCE/Physical Science						
Science, Technology and Human Impact						
Standard 8: Impact of Science, Technology and Human Activity						
Science and technology affect, and are affected by, society.						
Social, political, economic, ethical and environmental factors strongly influence, and are influenced by, the direction of progress of science and technology.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Identify and evaluate the drawbacks and benefits of solutions to a given problem.	S8 CA4 3.1, 3.5, 3.8		Ap E	<ul style="list-style-type: none"> <li>Mining Minerals and Resource Project: What are the benefits/risks to our economy and environment, of a mining industry moving into the Maryland Heights area?</li> <li>Nonrenewable and Renewable Energy Resource Brochure: Why are renewable resources not as well accepted for energy?</li> </ul>	Scoring Guide for Mining Letter  Scoring Guide for Brochure	80%  80%
2. Identify and describe how explanations of scientific phenomena have changed over time.*	S8 1.6		K An	<ul style="list-style-type: none"> <li>Solar System and Big Bang Theories: How have theories changed as new information emerges to challenge older theories?</li> </ul>	Unit Assessment: Exploration of the Universe	80%
3. Identify sources as to credibility for scientific accuracy; read and report on the information from that source about a current science problem/ discovery/ solution.	S8 CA3, CA4, CA6 1.7	8.3.D	An E	<ul style="list-style-type: none"> <li>Current Event Projects (journal, TV, and web-based)</li> <li>Presentation to class</li> </ul>	Current Event Scoring Guide	80%

\*Item is tracked for A+

SCIENCE/Physical Science						
Laboratory/Activity Expectations						
Standard 7: Scientific Inquiry						
Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.						
Scientific inquiry includes formulating a testable question, gathering qualitative or quantitative data, formulating explanations and then communicating those results.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
1. Gather data from qualitative and quantitative observations in order to formulate explanations.	S7	7.1.B 7.1.C	Ap	<ul style="list-style-type: none"> <li>Each unit has investigations that require the collecting of data and graphing of the data</li> </ul>	Scoring Guide for Data/Graphs 1. Table includes all necessary data 2. All labels correctly identified 3. All variables correctly identified. 4. Correct type of graph used 5. Explanations can be drawn from the collected data.	80%
2. Explain and communicate the results of laboratory investigations, including data tables, graphs and identification of variables.	S7	7.1.E	S E	<ul style="list-style-type: none"> <li>Each unit has investigations that require collecting of data, graphing of the data and then answering a set of questions about the results.</li> </ul>	Laboratory Reports  Question Set Scoring Guides: Paragraph answers are graded using a modified "process explanation" scoring guide.	80%  2 out of 3 on scoring guide
3. Design, test, evaluate and retest experimental variables that answer a formulated hypothesis.	S7	7.1.A	An E	<ul style="list-style-type: none"> <li>Sample Investigations include:</li> <li>Airplane speed Lab</li> <li>Egg Drop Lab</li> <li>Rollercoaster Lab</li> <li>Power Pentathlon Lab</li> </ul>	See Scoring Guides in the appropriate units above.	80%

Resources: Physical Science Concepts in Action by Prentice Hall (Both student and teacher version)

Easy Planner, Lab Manual student and teacher, guided reading and study workbook with math support, computer test bank with exam view CD-ROM, test prep black line masters, test prep workbook, transparencies plus, iText, discovery channel video clips, teacher express CD-ROM, PHSchool.com

Resources:

Physics 2nd edition by James S. Walker.

There is a companion website at [http://wps.prenhall.com/esm\\_walker\\_physics\\_2](http://wps.prenhall.com/esm_walker_physics_2)  
Instructor's Resource CD-ROM

## ADVANCED PLACEMENT PHYSICS

### Course Rationale:

Students who are continuing physics at the college level will work in depth on motion, electricity and particle physics. They will intensify lab skills, enhance critical thinking, examine college and career opportunities, and ultimately sit for the advanced placement test in the spring. Students will devote considerable time to the study of physics and the development of higher-level skills.

### Course Description:

This course is a continuation of Physics I but in greater depth. Subject matter includes mechanics, heat, and thermodynamics, sound and wave motion. Approximately two days per week are spent in the laboratory. Concepts included second semester are DC and AC electricity and light and atomic physics. Approximately two days per week are spent in the laboratory performing experiments that will prepare students of the AP test. College credit depends upon the test score and college of choice.

<b>SCIENCE/Advanced Placement Physics</b>					
<b>SC 1: Students will acquire a foundation in properties and principles of matter and energy.</b>					
Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
1. Explain characteristics of radiant energy using the concepts of polarization, interference and diffraction. *	1.3, 3.2, 3.3, 3.5	Comprehension	<ul style="list-style-type: none"> <li>• Lab: "Interference"</li> <li>• Compare and Contrast Paragraph: "Polarization, Interference, Diffraction"</li> </ul>	<ul style="list-style-type: none"> <li>• Written Objective Test</li> <li>• Lab Write-ups</li> <li>• Compare/Contrast Rubric</li> </ul>	75%

\*Item is tracked for A+

**SCIENCE/Advanced Placement Physics**

**SC 1: Students will acquire a foundation in properties and principles of matter and energy.**

Measurable Learner Objectives	Assessed Show-Me Goals	Level of Bloom's Taxonomy	Instructional Strategies/Student Activities Resources	Assessments (including Performance-based)	Mastery
2. Analyze and solve various electromagnetic problems and circuit designs. *	1.3, 3.2, 3.3, 3.5	Analysis	<ul style="list-style-type: none"> <li>• Lab: "Ohm's Law"</li> <li>• Lab: "Kirchoff's Laws"</li> <li>• Lab: "Resistors in Series and Parallel Circuits"</li> </ul>	<ul style="list-style-type: none"> <li>• Written Objective Test</li> <li>• Lab Write-ups</li> </ul>	75%

**SC 2: Students will acquire the properties and principles of force and motion.**

3. Apply the concepts of rotational dynamics to explain how and why rotational motion occurs. *	1.3, 1.6, 2.1, 3.1	Application	<ul style="list-style-type: none"> <li>• Lab: "Conservation of Angular Momentum"</li> <li>• Lab: "Torques"</li> <li>• Lab: "Center of Gravity"</li> </ul>	<ul style="list-style-type: none"> <li>• Lab Report Assessment: 'Bridge Building'</li> <li>• Lab Write-ups</li> </ul>	85%
4. Apply the theories of relativity to explain how motion, mass and time changes near the speed of light. *	1.6, 2.1, 3.2, 3.5	Application	<ul style="list-style-type: none"> <li>• Direct Instruction: "Two Postulates of Special Relativity"</li> <li>• Video: "Michelson-Morley Experiment"</li> <li>• Guided Practice: "Time Dilation Problems"</li> </ul>	<ul style="list-style-type: none"> <li>• Written Objective Test</li> <li>• Lab Write-ups</li> </ul>	75%
5. Apply various quantum mechanical concepts to explain the motion of atomic and subatomic particles. *	1.6, 3.2, 3.5	Application	<ul style="list-style-type: none"> <li>• Direct Instruction: "Standard Model"</li> <li>• Video: "Photoelectric Effect"</li> <li>• Lab: "Rutherford Experiment"</li> <li>• Spectrum Lab</li> </ul>	<ul style="list-style-type: none"> <li>• Written Objective Test</li> <li>• Lab write-ups</li> </ul>	75%

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## **SCIENCE/Advanced Placement Physics**

### **Resources:**

Adopted Text: Physics: Algebra/Trig. – 2<sup>nd</sup> ed/ITP  
Others: Hands-On Physics Activities – Cunningham & Herr,  
75 Easy Physics Demonstrations – Kardos,  
Science in Seconds With Toys –Potter,  
Fantastic Voyages – Dubeck & Hoshier & Boss,  
Electric & Magnetic Interactions – Chabay & Sherwood  
Videos: Physics Cinema Classics –Laserdisc,  
Mechanical Universe  
Technology: Computers with Science Workshop (software),  
Science Workshop (sensors),  
Various Lab Equipment

## ADVANCED PLACEMENT ENVIRONMENTAL SCIENCE

Course Rationale: To be responsible citizens of the 21st century, Pattonville students must understand that the earth is one interconnected system that provides humans with a multitude of natural resources and services. The increased demands on this system due to population growth and development of technologies are accelerating the impact on the environment, and its ability to recover. Human survival depends on educated citizens who understand the necessity of both conservation and sustainable use of these resources.

Course Description: AP Environmental Science is a course for students interested in identifying and analyzing environmental problems, their risks and possible solutions. It is an interdisciplinary science class which incorporates principles from biology, chemistry and earth sciences. The course is designed to meet the content and goal requirements set by the College Board.

Advanced Placement Environmental Science						
1. Matter and energy flow through the ecosystem.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
Recommend and justify a renewable energy source, including the laws of thermodynamics in the justification.*	1.2, 1.7, 2.1 CA 1, CA 4	1.2A 1.2E 1.2F 4.2A	E	Research renewable and non-renewable sources of energy and write a report which includes a recommendation for an alternative energy source that would best fit the St. Louis region.	Report on renewable energy sources assessed with scoring guide.	85%
Explain how matter is recycled through biogeochemical cycles.	1.6	4.2B 5.1C 5.2A 5.2B 5.2D	An	Field trip to waste water treatment plant. Nitrogen cycling lab	Unit test Lab analysis	80% 80%
2. Biological diversity is important for a healthy ecosystem.						
Predict the effect of reduced biodiversity on a stream ecosystem and discuss ways to preserve the biodiversity.*	1.4, 1.5, 2.1	4.1A 4.1D 4.3A 4.3B 4.3C	An E	Biological monitoring of a creek and analysis of the health of the creek ecosystem. Presentation of monitoring results and recommendations for preserving the biodiversity of the creek.	Data submissions from monitoring event. Presentation scoring guide	85% 80%

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Advanced Placement Environmental Science

3. Human activity is dependent upon and affects Earth's resources and systems.						
Measurable Learner Objective The student will be able to:	Assessed Show-Me Goals	GLE Code	BT	Instructional Strategies/ Student Activities/ Resources	Assessments (including Performance-based)	Mastery Min. %
Identify ways that organisms are interdependent with one another and their environment*	1.5, 1.6	4.1B 4.1C 4.1D 5.1C 5.1D 6.2C	An S	Create complex food webs Design ecosystems with multiple interdependent relationships represented	Unit test	80%
Identify and evaluate technologies as to their problems, their unintended consequences and possible solutions to the problems.*	1.2, 1.4, 2.1 CA 1, CA 4	5.3A 8.1C 8.3B	An	Research a global ecological issue, such as global warming, ozone depletion, etc., and prepare a PowerPoint presentation	PowerPoint presentation of Global ecological issue assessed with scoring guide	90%
4. The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs.						
Analyze and discuss the roles of science and society in determining technological developments.	1.7, 1.10, 2.3, 4.3	5.3A 8.1C 8.2B 8.3B	An E	Readings from current newspapers and periodicals Socratic Seminars	Journal entries assessed through scoring guide Participation in seminars	80% 90%
Design experiments that increase understanding through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.*	Goals 1.1, 1.2, 1.3, 1.4 CA 1, CA 4	7.1A 7.1B 7.1C 7.1D 7.1E	S	Soil composition lab Air pollution lab Population dynamics lab	Lab Analysis Reports assessed with scoring guide	85%

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# Appendix A

## Show-Me Standards

<http://www.dese.state.mo.us/divimprove/curriculum/frameworks/science.html>

## Appendix B

# Missouri's Frameworks For Curriculum Development

## Science 9-12

<http://www.dese.state.mo.us/divimprove/curriculum/frameworks/science.html>