

# **K-8 Science Frameworks**

Mapping K-8 Science Topics to:  
*Science Cognitive Demands*  
*Texas State Standards, Texas Essential Knowledge and Skills, TEKS*  
*Underlying Processes in TEKS assessed in*  
*Texas Assessment of Knowledge and Skills, TAKS*  
*National Science Education Standards*

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**El Paso Collaborative for Academic Excellence**

## **K-8 Science Frameworks**

A group of classroom K-16 science teachers, faculty, curriculum specialists, and department chairs met and developed a curriculum framework for K-8 Science, an important step in developing explicit and comprehensive goals for teachers in El Paso area schools. The framework is the product of the collective work of K-16 classroom teachers and faculty from El Paso area schools from urban and rural districts, El Paso Community College, and the University of Texas at El Paso. The K-8 Science and high school Physics frameworks are the two most current undertakings in the K-16 science alignment process. In previous years, the group developed frameworks for Chemistry.

In using curriculum frameworks, the Working Group hopes to assist teachers in providing students with challenging courses and curricula in K-12 science classrooms that will better align with the expectations of postsecondary institutions. An added hope is that students will benefit because of collective efforts from teachers K-16 who will embrace the next stage in this process: implementation with the added benefit of providing practical revision. With participation from every K-12 science teacher, these frameworks will become the standard in science coursework for every student in El Paso.

### **Background**

In 1998, the El Paso Collaborative Board identified continuing to focus on mathematics and to aligning the curriculum as its top priorities. A review of local data on mathematics achievement showed larger numbers of students enrolled in and completing college preparatory mathematics courses in high school. It also revealed a continuous increase in student achievement on TAAS. This higher student achievement however, did not reflect student readiness for college mathematics courses. Gaps also existed in high school science preparation for entering freshmen. Further review of data revealed that large numbers of high school students were placing and enrolling in remedial courses as well as large numbers of students not succeeding in the freshman science courses at El Paso Community College and the University of Texas at El Paso. While many factors contribute to the large number of students in remedial courses, one known factor is that there is little alignment between what K-12 teachers expect students to know and be able to do and the expectations of college and university faculty.

To deal with some of these issues, the Mathematics and Science Partnership, MSP, proposed and was funded to continue supporting alignment of K-16 mathematics and to initiate alignment of K-16 science. Providing students with challenging courses and curriculum in high school mathematics and science courses that prepare them to enroll in and successfully complete college level mathematics and science courses is a key feature in the goals of MSP.

### **Working Group**

Starting in Fall 2003, MSP convened a working group of K-16 classroom teachers and faculty to write frameworks for Chemistry, Physics, Biology and K-8 Science for teachers to use as curriculum guides. Included in the Working Group are K-12 classroom teachers from both urban and rural independent school districts; mathematics and science staff developers; specialists in science from both rural and urban school districts; and science faculty from El Paso Community College and the University of Texas at El Paso representing the College of Education and the College of Science. A complete list of participants in the Working Group is attached.

To prepare for writing curriculum framework for K-8 and high school science courses, the Group engaged in dialogue and discussion focused on science teaching and learning. Using whole and small group formatted discussions, the K-16 Science Working Group:

- analyzed and discussed student performance in science using data collected from state mandated assessments and performance in college freshman courses;
- examined textbooks, course requirements, outline format, state and national placement tools used to assess student knowledge of science;
- reviewed the Texas Essential Knowledge and Skills (TEKS) and National Science Education Standards, Atlas of Science Project 2061;
- discussed how concepts were connected and developed in grade levels and how they led to concepts incorporating higher cognitive demands in science;
- identified alternate ways of assessing student learning that provide for standards-based assessment;
- discussed models of teaching science; and
- reviewed and discussed science education literature.

Meeting bimonthly during the academic year and for several days in summer the Group wrote curriculum frameworks for Chemistry, Physics and K-8 Science. Content for the course was placed in text outline form as well as matrix form to map content topics to cognitive demands as well as to state (TEKS) and national science standards.

### **K-16 Leaders Group**

The Collaborative convened a leaders group that included district leaders and central office personnel from both urban and rural independent school districts and the Education Service Center for Region 19, the provost of the University, science and education deans and mathematics and science department chairs from both the University and Community College, and lead principals and teachers. As an advisory group, they engaged in focused dialogue around issues in science education. This group provided guidance and feedback in the development of the K-16 Mathematics and Science frameworks.

### **Needs**

What is needed now is assistance from high school principals and teachers to help review, revise and make practical use of the framework during the academic year. Ideally, the K-8 curriculum frameworks should be reviewed by every science teacher to help prioritize alignment of K-16 science curriculum, instruction, and assessment. In order to continue our work we need active participation from every science department in every school in the both urban and rural independent school districts and by postsecondary STEM instructors and STEM chairs.

Call 747-5778 for more information on how you can be involved in this important work of reviewing and revising these frameworks.

*Lucy H. Michal  
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El Paso Collaborative for Academic Excellence  
UTEP  
Education Building Rm. 413*

## K-16 SCIENCE ALIGNMENT WORKING GROUP Participants

Maria Luisa Arroyo	SISD	El Dorado HS	2004 – present
Socorro Arteaga, Ph.D.	EPCC	Chemistry	2003 – present
Karen Blaine	Region 19	MSP Staff Dev	2004 – present
Sally Blake, Ph.D.	UTEP	Science Education	2003 – 2006
Amy Canales	SISD	SISD Elem. Science Specialist	2003 – present
Evangelina Cantu	SISD	SISD Secondary Science Specialist	2004 – present
Deborah Caskey	EPCC	Geology	2004 – present
Karen Davis	Region 19	MSP Staff Dev	2003 – April 2004
Olga Delongchamps	YISD	Parkland HS	2003 – 2006
Sylvia Esparza	SISD	Socorro HS	2003 – 2005
Maritza Fernandez	YISD	Hacienda Heights ES	2004 – 2005
Sandy Garza	SISD	SISD Elem. Math Specialist	2003 – 2004
Jeannie Geske	EPISD	Bond ES Science Leader	2003 – present
Eric Hagedorn, Ph.D.	UTEP	Physics Education	2003 – 2005
Kastro M. Hamed, Ed.D.	UTEP	Physics	2003 – 2004, 2006
Terry Jimarez	UTEP	College of Science	2003 – 2004
Kathy Kraften	EPISD	MSP Staff Dev	2003 – present
Mary Liggett	SISD	Socorro MS	2003 – 2005
Jorge Lopez, Ph.D.	UTEP	Physics	2004 – April 2005
Victor Macias	SISD	El Dorado HS	2003 – Aug. 2004
Jose Maldonado	EPCC	Biology	2003 – present
Nancy Marcus, Ph.D.	UTEP	Mathematics	2003
Emil Michal	EPCC	Physics	2003 – present
Diana Noriega	YISD	Cadwallader ES	2003 – present
Gloria Ontiveros	YISD	Ranchland Hills MS	2003 – present
Myriam Sanchez	SISD	Sambrano ES	2003 – 2004
Luis Saez, Ph.D.	UTEP	Chemistry	2004 – April 2005
Cynthia Stone	SISD	Science Specialist ES	2003 – Aug. 2004
Virginia Tovar	EPISD	Jefferson HS	2003 – 2004
Enrique Villalobos	SISD	MSP Staff Dev	2003 – 2005
Diane Walker	YISD	MSP Staff Dev	2003 – present
Lucy H. Michal	K-16 Math Alignment Director		2000 – present
<a href="mailto:lmichal@utep.edu">lmichal@utep.edu</a>	MSP Director of Mathematics and Science		

## **MATRIX MAPPING KNOWLEDGE AND SKILLS TO COGNITIVE DEMANDS**

Attached is a matrix that matches K-5 science knowledge and skills to cognitive demands. The work on cognitive demands has been guided by the work of Andrew Porter, Norman Webb, and John Smithson of the University of Wisconsin at Madison. The cognitive demands identified by Porter, Webb, and Smithson were used as models and modified by the working group to fit our work in science. These identify thinking levels that incorporate five (5) levels of cognitive demands. They are listed in order on the matrix from higher to lower as you read from left to right. For some courses, frameworks also map textbook and materials used in major independent school districts, as well as state and national science standards.

Cognitive demands assist teachers in distinguishing what a student is expected to know and be able to do with science content and what level of thinking students must be engaged in while learning content. This mapping of topics to cognitive demands describes content knowledge that will not merely be stored but understood, represented, organized, connected, and structured in ways that facilitate retrieval and application of knowledge. With cognitive demands, teachers know how to get students to use, represent and connect pieces of content knowledge in coherent ways that will determine whether students understand knowledge deeply and can use it to solve new problems.

### **Science Cognitive Demands**

**Analyze Information** – classify and compare data; analyze data, recognize patterns; reason inductively or deductively draw conclusions; identify faulty arguments or misrepresentations of data; and spatial reasoning

**Apply Concepts/Make Connections** – apply and adapt science information to real-world situations; apply science ideas outside the context of science; build or revise theory/plan and design experiments; synthesize content and ideas from several sources; use and integrate science concepts

**Understand Concepts** – explain concepts; observe and explain teacher/student demonstrations; explain procedures and methods of science and inquiry; organize and display data in tables or charts; present science information; construct or use models to represent science ideas

**Perform Procedures/Conduct Investigations** – make observations, collect and record data; use appropriate tools, make measurements, do computations; organize and display data in tables or charts; execute procedures; generate questions, make predictions; conduct experiments; test effects of different variables; select and use appropriate tools

**Memorize Facts, Definitions, Formulas** - recite basic science facts; recall science terms and definitions; recall scientific formula

### **Format and Further Information on Matrix Structure**

1. Strands/topics in matrices overlap and may be integrated
2. Cognitive demands overlap and are not linear
3. TEKS are grouped in four strands:
  - a. Nature of Science
  - b. Systems
  - c. Properties, Patterns, and Models
  - d. Constancy and Change

4. Items in the matrix appearing in regular fonts are actual TEKS and are placed within a suggested cognitive demand.
5. Items in the matrix appearing in *italics*:
  - a. support teaching and learning of a topic at a higher level of cognitive demand that leads to conceptual understanding of a topic/concept; these may not have a referenced TEKS but are meant to support learning of TEKS with understanding
  - b. paraphrase TEKS to address different levels of cognitive demands; these will reference TEKS and are placed under multiple cognitive demands

K-8 Science Frameworks Mapping Knowledge and Skills to Cognitive Demands

Kindergarten	Cognitive Demands				
	Analyze/Evaluate Information	Apply Concepts/Make Connections	Understand Concepts	Perform Procedures/Conduct Investigations	Memorize
<p><b>Nature of Science</b></p> <p>Kb1 The student participates in classroom and field investigations following home and school safety procedures.</p> <p>Kb2 The student develops abilities necessary to do scientific inquiry in the field and in the classroom.</p> <p>Kb3 The student knows that information and critical thinking are used in making decisions.</p> <p>Kb4 The student uses age-appropriate tools and models to verify that organisms and objects and parts of organisms and objects can be observed, described, and measured.</p>	<p>K.2D Construct reasonable explanations using information</p> <p>K.3B <i>Justify the merits of decisions</i></p>	<p>K.1B Discuss how to use and conserve resources and materials</p> <p>K.2A Ask questions about organisms, objects, and events</p> <p>K.3A Make decisions using information</p> <p>K.3C <i>Propose a solution to a problem in his/her own words</i></p>	<p>K.2E Communicate findings about simple investigations</p> <p>K.3B <i>Discuss the merits of decisions</i></p> <p>K.3C <i>Explain a problem in his/her own words</i></p>	<p>K.1A Demonstrate safe practices during classroom and field investigations</p> <p>K.2B Plan (<i>Follow directions</i>) and conduct simple descriptive investigations</p> <p>K.2C Gather information (<i>and record</i>) using simple equipment and tools to extend the senses</p> <p>K.4A Identify and use senses as tools of observation</p> <p>K.4B Make observations using tools including hand lenses, balances, cups, bowls and computers</p>	Organisms
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				K-4 A Science as Inquiry , K-4 B Physical Science K-4 C Life Science, K-4 D Earth and Space Science K E Science and Technology K F Science and Social Perspectives K-4 G History and Nature of Science	

<b>Kindergarten</b>	<b>Cognitive Demands</b>				
	<b>Analyze Information</b>	<b>Apply Concepts/ Make Connections</b>	<b>Understand Concepts</b>	<b>Perform Procedures/ Conduct Investigations</b>	<b>Memorize</b>
<p><b>Systems</b></p> <p>Kb6 The student knows that systems have parts and are composed of organisms and objects.</p>		<p>K.6D Identify parts that, when separated from the whole, may result in the part or the whole not working, such as cars without wheels and plants without roots</p> <p>K.6E Manipulate parts of objects such as toys, vehicles, or construction sets that, when put together, can do things they cannot do by themselves</p>	<p>K.6A Sort organisms and objects into groups according to their parts and describe how the groups are formed</p>	<p>K.6B Record observations about parts of plants including leaves, roots, stems, and flowers</p> <p>K.6C Record observations about parts of animals including wings, feet, heads, and tails</p>	<p>Vocabulary: System Organism Life Cycle Sort</p>
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				<p>K-4 A Science as Inquiry , K-4 B Physical Science K-4 C Life Science, K-4 D Earth and Space Science K E Science and Technology K F Science and Social Perspectives K-4 G History and Nature of Science</p>	

<b>Kindergarten Knowledge and Skills</b>	<b>Cognitive Demands</b>				
	<b>Analyze Information</b>	<b>Apply Concepts/ Make Connections</b>	<b>Understand Concepts</b>	<b>Perform Procedures/ Conduct Investigations</b>	<b>Memorize</b>
<p><b>Patterns Properties Models</b></p> <p>Kb5 The student knows that organisms , objects, and events have properties and patterns.</p> <p>Kb8 The student knows the difference between living organisms and nonliving objects.</p> <p>Kb9 The student knows that living organisms have basic needs.</p> <p>Kb10 The student knows that the natural world included rocks, soil and water.</p>	<p>K.5B <i>Predict what happens next in a pattern being observed and identified</i></p>	<p>K.8B Group organisms and objects as living or nonliving</p> <p>K.9B Give examples of how living organisms depend on each other</p> <p>K.10B Give examples of ways that rocks, soil and water are useful</p>	<p>K.5A Describe properties of objects and characteristics of organisms</p> <p>K.8A Identify a particular organism or object as living or nonliving</p> <p>K.9A Identify basic needs of living organisms</p> <p>K.9C Identify ways that the Earth can provide resources for life</p>	<p>K.5B <i>Observe and identify patterns including seasons, growth, and day and night</i></p> <p>K.5C Recognize and copy patterns in charts and graphs</p> <p>K.10A Observe and describe properties of rocks, soil, and water</p>	<p>Vocabulary: Patterns Properties Living Nonliving</p>
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				K-4 A Science as Inquiry , K-4 B Physical Science K-4 C Life Science, K-4 D Earth and Space Science K E Science and Technology K F Science and Social Perspectives K-4 G History and Nature of Science	

Kindergarten Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Constancy and Change</b></p> <p>Kb7 The student knows that many types of change occur.</p> <p><b>June 2005</b></p>	<p>K.7B <i>Compare objects according to temperature</i></p>	<p>K.7B <i>Identify (observe) that heat causes change, such as ice melting or the Sun warming the air</i></p>		<p>K.7A Observe, describe, and record changes in size, mass, color, position, quantity, time, temperature, sounds, and movement</p> <p>K.7C Observe and record weather changes from day to day over seasons</p> <p>K.7D Observe and record stages in the life cycle of organisms in their natural environment</p>	<p>Vocabulary: Change Life Cycle Sort Predict Melting Seasons</p>
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				<p>K-4 A Science as Inquiry , K-4 B Physical Science                      K-4 C Life Science, K-4 D Earth and Space Science                      K E Science and Technology                      K F Science and Social Perspectives                      K-4 G History and Nature of Science</p>	

1 <sup>st</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Nature of Science</b></p> <p>1b1 The student conducts classroom and field investigations following home and school safety procedures.</p> <p>1b2 The student develops abilities necessary to do scientific inquiry in the field and classroom.</p> <p>1b3 The student knows that information and critical thinking are used in making decisions.</p> <p>1b4 The student uses age-appropriate tools and models to verify that organisms and objects and parts of organisms and objects can be observed, described, and measured.</p>	<p>1.2D Construct reasonable explanations and draw conclusions</p> <p>1.4B <i>Compare collected information</i></p> <p>1.3B Discuss and justify the merits of decisions</p> <p>1.2B Plan simple descriptive investigations</p>	<p>1.1B Learn how to use and conserve resources and materials</p> <p>1.2A Ask questions about organisms, objects, and events</p> <p>1.3A Make decisions using information</p>	<p>1.2E Communicate explanations about investigations</p> <p>1.3C Explain a problem in his/her own words and identify a task and solution related to the problem</p>	<p>1.1A Demonstrate safe practices during classroom and field investigations</p> <p>1.2B <i>Conduct simple descriptive investigations</i></p> <p>1.2C Gather information using simple equipment and tools to extend the senses</p> <p>1.4A Collect information using tools including hand lenses, clocks, computers, thermometers, and balances</p> <p>1.4B <i>Record collected information</i></p> <p>1.4C Measure organisms and objects and parts of organisms and objects, using non-standard units such as paper clips, hands, and pencils</p>	<p>Organism</p> <p>Object</p> <p>Event</p> <p>Lenses</p> <p>Clocks</p> <p>Computers</p> <p>Thermometers</p> <p>Balances</p>
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				<p>K-4 A Science as Inquiry, K-4 B Physical Science</p> <p>K-4 C Life Science, K-4 D Earth and Space Science</p> <p>K-4 E Science and Technology</p> <p>K-4 F Science and Social Perspectives</p> <p>K-4 G History and Nature of Science</p>	

<b>1<sup>st</sup> Grade Knowledge and Skills</b>	<b>Cognitive Demands</b>				
	<b>Analyze Information</b>	<b>Apply Concepts/ Make Connections</b>	<b>Understand Concepts</b>	<b>Perform Procedures/ Conduct Investigations</b>	<b>Memorize</b>
<p><b>Nature of Science</b></p> <p>1b1 The student conducts classroom and field investigations following home and school safety procedures.</p> <p>1b2 The student develops abilities necessary to do scientific inquiry in the field and classroom.</p> <p>1b3 The student knows that information and critical thinking are used in making decisions.</p> <p>1b4 The student uses age-appropriate tools and models to verify that organisms and objects and parts of organisms and objects can be observed, described, and measured.</p>	<p>1.2D Construct reasonable explanations and draw conclusions</p> <p>1.4B <i>Compare collected information</i></p> <p>1.3B Discuss and justify the merits of decisions</p> <p>1.2B Plan simple descriptive investigations</p>	<p>1.1B Learn how to use and conserve resources and materials</p> <p>1.2A Ask questions about organisms, objects, and events</p> <p>1.3A Make decisions using information</p>	<p>1.2E Communicate explanations about investigations</p> <p>1.3C Explain a problem in his/her own words and identify a task and solution related to the problem</p>	<p>1.1A Demonstrate safe practices during classroom and field investigations</p> <p>1.2B <i>Conduct simple descriptive investigations</i></p> <p>1.2C Gather information using simple equipment and tools to extend the senses</p> <p>1.4A Collect information using tools including hand lenses, clocks, computers, thermometers, and balances</p> <p>1.4B <i>Record collected information</i></p> <p>1.4C Measure organisms and objects and parts of organisms and objects, using non-standard units such as paper clips, hands, and pencils</p>	<p>Organism</p> <p>Object</p> <p>Event</p> <p>Lenses</p> <p>Clocks</p> <p>Computers</p> <p>Thermometers</p> <p>Balances</p>
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				<p>K-4 A Science as Inquiry, K-4 B Physical Science</p> <p>K-4 C Life Science, K-4 D Earth and Space Science</p> <p>K-4 E Science and Technology</p> <p>K-4 F Science and Social Perspectives</p> <p>K-4 G History and Nature of Science</p>	

1 <sup>st</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Patterns Properties and Models</b></p> <p>1b5 The student knows that organisms, objects, and events have properties and patterns.</p> <p>1b8 The student distinguishes between living organisms and nonliving objects.</p> <p>1b9 The student knows that living organisms have basic needs.</p> <p>1b10 The student knows that the natural world includes rocks, soil, and water.</p>	<p>1.5A Sort objects and events based on properties and patterns</p> <p>1.5B Identify, predict, and create patterns including those seen in charts, graphs, and numbers</p> <p>1.8B Compare living organisms and nonliving objects</p>	<p>1.8A Group living organisms and nonliving objects</p> <p>1.8B Compare (<i>properties of</i>) living organisms and nonliving objects</p> <p>1.9A Identify characteristics of living organisms that allow their basic needs to be met</p> <p>1.9B Compare and give examples of the ways living organisms depend on each other for their basic needs</p> <p>1.10C Identify how rocks, soil, and water are used and how they can be recycled</p>		<p>1.10A Identify and describe a variety of natural sources of water including streams, lakes and oceans</p> <p>1.10B Observe and describe differences in rocks and soil samples</p> <p>1.10B Observe and describe differences in rocks and soil samples</p>	<p>Natural world Sort Patterns Characteristics</p>
<b>Timeline</b>	<b>Textbooks and Materials</b>		<b>National Science Standards</b>		
			<p>K-4 A Science as Inquiry, K-4 B Physical Science                      K-4 C Life Science, K-4 D Earth and Space Science                      K-4 E Science and Technology                      K-4 F Science and Social Perspectives                      K-4 G History and Nature of Science</p>		

1 <sup>st</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Constancy and Change</b></p> <p>1b7 The student knows that many types of change occur.</p>			<p>1.7B <i>Identify ways that heat may cause change such as when ice melts</i></p>	<p>1.7A Observe, measure, and record changes in size, mass, color, position, quantity, sound, and movement</p> <p>1.7B <i>Test ways that heat may cause change such as when ice melts</i></p> <p>1.7C Observe and record changes in weather from day to day and over seasons</p> <p>1.7D Observe and record changes in the life cycle of organism</p>	<p>Change</p> <p>Heat</p> <p>Melt</p> <p>Weather</p> <p>Seasons</p> <p>Life cycle</p> <p>Organism</p> <p>Constant</p>
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				<p>K-4 A Science as Inquiry</p> <p>K-4 B Physical Science</p> <p>K-4 C Life Science</p> <p>K-4 D Earth and Space Science</p>	

Grade 2 Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Nature of Science</b></p> <p>2b1 The student conducts classroom and field investigations following home and school safety procedures.</p> <p>2b2 The student develops abilities necessary to do scientific inquiry in the field and classroom</p> <p>2b3 The student knows that information and critical thinking are used in making decisions.</p> <p>2b4 The student uses age-appropriate tools and models to verify that organisms and objects can be observed, described, and measured.</p>	<p>2.2C Compare results of investigations with what student and scientists know about their world</p> <p>2.3B Discuss and justify merits of decisions</p>	<p>2.1B Learn how to use and conserve resources and dispose of materials</p> <p>2.2E Construct reasonable explanations and draw conclusions using information and prior knowledge</p> <p>2.3A Make decisions using information</p> <p>2.3C Explain a problem in his/her own words and identify a task and solution related to the problem</p>	<p>2.2F Communicate explanations about investigations</p>	<p>2.1A Demonstrate safe practices during classroom and field investigations</p> <p>2.2A Ask questions about organisms, objects, and events</p> <p>2.2B Plan and conduct simple descriptive investigations</p> <p>2.2D Gather information using simple equipment and tools to extend the senses</p> <p>2.4A Collect information using tools including rulers, meter sticks, measuring cups, clocks, hand lenses, computers, thermometers, and balances</p> <p>2.4B Measure and compare organisms and objects and parts of organisms and objects, using standard and non-standard units</p>	<p>Resources</p> <p>Safe practices</p> <p>Organism</p> <p>Event</p> <p>Ruler</p> <p>Meter stick</p> <p>Thermometer</p> <p>Units</p> <p>Standard Units</p> <p>Nonstandard Units</p>
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				<p>K-4 A Science as Inquiry</p> <p>K-4 B Physical Science</p> <p>K-4 C Life Science</p> <p>K-4 D Earth and Space Science</p> <p>K-4 E Science and Technology</p> <p>K-5 F Science and Social Perspectives</p> <p>K-5 G History and Nature of Science</p>	

2 <sup>nd</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Systems</b></p> <p>2b6 The student knows that systems have parts and are composed of organisms and objects</p>		<p>2.6A <i>Predict parts that when separated from the whole, parts may result in the part of the whole not working, such as flashlights without batteries and plants without leaves</i></p> <p>2.6B <i>Predict, and identify parts that, when put together, can do things they cannot do by themselves, such as a guitar and guitar strings.</i></p>		<p>2.6A <i>Manipulate and identify parts that when separated from the whole, may result in the part or the whole not working, such as flashlights without batteries and plants without leaves</i></p> <p>2.6B <i>Manipulate and identify parts that, when put together, can do things they cannot do by themselves, such as a guitar and guitar strings</i></p> <p>2.6C Observe and record the functions of plant parts</p> <p>2.6D Observe and record the functions of animal parts</p>	System Function
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				K-4 A Science as Inquiry K-4 B Physical Science K-4 C Life Science K-4 E Science and Technology	

2 <sup>nd</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Properties, Patterns, and Models</b></p> <p>2b5 The student knows that organisms, objects, and events have properties and patterns.</p> <p>2b8The student distinguishes between living organisms and nonliving objects.</p> <p>2b9 The student knows that living organisms have basic needs.</p> <p>2b10 The student knows that the natural world includes rocks, soil, water and gases of the atmosphere.</p> <p><b>June 2005</b></p>	<p>2.5A Classify and sequence organisms, objects and events based on properties and patterns</p>	<p>2.9B Compare and give examples of the ways organisms depend on each other and on their environments</p> <p>2.10B Identify uses of natural resources</p>	<p>2.10A Describe and illustrate the water cycle</p> <p>2.5B Identify, predict, replicate and create patterns including those seen in charts, graphs, and numbers</p>	<p>2.9A Identify the external characteristics of different kinds of plants and animals that allow their needs to be met</p>	<p>2.8A Identify characteristics of living organisms</p> <p>2.8B Identify characteristics of nonliving objects</p> <p>Atmosphere Living Non-Living Sequence Gas Natural Resource Predict</p>
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				<p>K-4 A Science as Inquiry K-4 B Physical Science K-4 C Life Science K-4 D Earth and Space Science K-4 F Science and Social Perspectives</p>	

2 <sup>nd</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Constancy and Change</b></p> <p>2b7 The student knows that many types of change occur.</p> <p><b>June 2005</b></p>	<p>2.7A <i>Analyze and predict recorded changes in size, mass, temperature, color, position, quantity, sound and movement</i></p>	<p>2.7B <i>Predict uses of heat to cause change such as melting and evaporation</i></p>	<p>2.7A <i>Illustrate changes in size, mass, temperature, color, position, quantity, sound, and movement</i></p>	<p>2.7A <i>Observe, measure, and record changes in size, mass, temperature, color, position, quantity, sound, and movement</i></p> <p>2.7B <i>Identify and test uses of heat to cause change such as melting and evaporation</i></p> <p>2.7C <i>Demonstrate a change in the motion of an object by giving the object a push or pull</i></p> <p>2.7D <i>Observe, measure, and record changes in weather, the night sky, and seasons</i></p>	<p>Quantity</p> <p>Evaporation</p> <p>Mass</p> <p>Temperature</p> <p>Motion</p>
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				<p>K-4 A Science as Inquiry</p> <p>K-4 B Physical Science</p> <p>K-4 D Earth and Space Science</p> <p>K-4 E Science and Technology</p> <p>K-4 G History and Nature of Science</p>	

3 <sup>rd</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Nature of Science</b></p> <p>3b1 The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical procedures.</p> <p>3b2 The student uses scientific inquiry methods during field and laboratory investigations.</p> <p>3b3 The student knows that information, critical thinking, and scientific problem solving are used in making decisions.</p> <p>3b4 The student knows how to use a variety of tools and methods to conduct science inquiry.</p> <p><b>June 2005</b></p>	<p>3.2C Analyze and interpret information to construct reasonable explanations from direct and indirect evidence</p> <p>3.2E <i>Construct simple graphs, tables, maps, and charts to organize, examine, and evaluate information</i></p> <p>3.3A Analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information</p> <p>3.3D Evaluate the impact of research on scientific thought, society, and the environment</p> <p>3.4A <i>Analyze information using various tools including calculators, microscopes, cameras, safety goggles, sound recorders, clocks, computers, thermometers, hand lenses, meter sticks rulers, balances, magnets, and compasses</i></p>	<p>3.3B Draw inferences based on information related to promotional materials for products and services</p> <p>3.3C Represent the natural world using models and identify their limitations</p> <p>3.3E Connect Grade 3 science concepts with the history of science and the contributions of scientists</p>	<p>3.1B Make wise choices in the use and conservation of resources and the disposal or recycling of materials</p> <p>3.2A <i>Plan descriptive investigations including asking well defined questions, formulating testable hypotheses, and selecting and using equipment and technology.</i></p> <p>3.2D Communicate valid conclusions</p> <p>3.4B Demonstrate that repeated investigations may increase the reliability of results</p>	<p>3.1A Demonstrate safe practices during field and laboratory investigations</p> <p>3.2A <i>Implement descriptive investigations including asking well defined questions, formulating testable hypotheses, and selecting and using equipment and technology.</i></p> <p>3.2B Collect information by observing and measuring</p> <p>3.2E <i>Construct simple graphs, tables, maps, and charts</i></p> <p>3.4A <i>Collect information using various tools including calculators, microscopes, cameras, safety goggles, sound recorders, clocks, computers, thermometers, hand lenses, meter sticks rulers, balances, magnets, and compasses</i></p>	<p>Hypothesis Theory Evidence</p>
<b>Timeline</b>	<b>Textbook and Materials</b>		<b>National Science Standards</b>		
			K - 4 A Science as Inquiry, K - 4 B Physical Science K - 4 C Life Science, K - 4 D Earth and Space Science K - 4 E Science and Technology K - 4 F Science and Social Perspectives K - 4 G History and Nature of Science		

3 <sup>rd</sup> Grade	Cognitive Demands				
Knowledge and Skills	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Systems</b></p> <p>3b5 The student knows that systems exist in the world.</p> <p><b>June 2005</b></p>			<p><i>3.5B Understand the role of various parts of a simple system such as a yo-yo and string</i></p>	<p>3.5A Observe and identify simple systems such as a sprouted seed and a wooden toy car</p> <p>3.5B Observe a simple system and describe the role of various parts such as a yo-yo and string</p>	<p>Simple system</p>
Timeline	Textbook and Materials			National Science Standards	
				<p>K - 4 A Science as Inquiry, K - 4 B Physical Science                      K - 4 C Life Science, K - 4 D Earth and Space Science                      K - 4 E Science and Technology                      K - 4 F Science and Social Perspectives                      K - 4 G History and Nature of Science</p>	

3 <sup>rd</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Properties, Patterns, and Models</b></p> <p>3b7 The student knows that matter has physical properties.</p> <p>3b8 The student knows that living organisms need food, water, light air, a way to dispose of waste and an environment in which to live.</p> <p>3b11 The student knows that the natural world includes earth materials and objects in the sky.</p> <p><b>June 2005</b></p>	<p>3.11A Classify earth materials including rocks, soil, water, and gases of the atmosphere in the local area as renewable, nonrenewable, or inexhaustible resources</p>	<p>3.7B Identify matter as liquid, solids, and gas based on physical properties</p> <p>3.8B Identify organisms with similar needs that compete with one another for resources such as oxygen, water, food or space</p> <p>3.8D Describe how living organisms modify their physical environment to meet their needs such as beavers building a dam or humans building a home</p>	<p>3.11A Describe the importance of earth materials including rocks, soil, water, and gases of the atmosphere in the local area</p>	<p>3.7A Gather information including temperature, magnetism, hardness, and mass using appropriate tools to identify physical properties of matter</p> <p>3.11B Identify and record properties of soil such as color and texture, capacity to retain water, and ability to support the growth of plants</p> <p>3.11D Describe the characteristics of the Sun</p>	<p>3b11C Identify the planets in our solar system and their position in relation to the Sun</p> <p>Vocabulary: liquid solid gas physical property earthquakes glaciers magnetism</p>
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>K - 4 A Science as Inquiry, K - 4 B Physical Science K - 4 C Life Science, K - 4 D Earth and Space Science K - 4 E Science and Technology K - 4 F Science and Social Perspectives K - 4 G History and Nature of Science</p>	

3 <sup>rd</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Constancy and Change</b></p> <p>3b6 The student knows that forces cause change 3b9 The student knows that species have different adaptations that help them survive and reproduce in their environment.</p> <p>3b9 The student knows that species have different adaptations that help them survive and reproduce in their environment</p> <p>3b10 The student knows that many likenesses between offspring and parents are inherited from the parents</p> <p><b>June 2005</b></p>	<p>3.6B Identify that the surface of the Earth can be changed by forces such as earthquakes and glaciers</p> <p>3.9B Analyze how adaptive characteristics help individuals within a species to survive and reproduce</p>	<p>3.9A <i>Identify characteristics among species that allow each to survive and reproduce</i></p>	<p>3.C Describe environmental changes in which some organisms would thrive, become ill, or perish</p>	<p>3.6A Measure and record changes in the position and direction of the motion of an object to which a force such as a push or pull has been applied</p> <p>3.8A Observe and describe the habitats of organisms within an ecosystem</p> <p>3.8B <i>Observe organisms with similar needs that compete with one another for resources such as oxygen, water, food or space</i></p> <p>3.9A <i>Observe characteristics among species that allow each to survive and reproduce</i></p>	<p>3b10A Identify some inherited traits of plants</p> <p>3b10B Identify some inherited traits of animals</p> <p>Vocabulary: Inherited traits Offspring Adaptation Environment</p>
<b>Timeline</b>	<b>Textbook and Materials</b>		<b>National Science Standards</b>		
			K - 4 A Science as Inquiry, K - 4 B Physical Science K - 4 C Life Science, K - 4 D Earth and Space Science K - 4 E Science and Technology K - 4 F Science and Social Perspectives K - 4 G History and Nature of Science		

4 <sup>th</sup> Grade Knowledge & Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Nature of Science</b></p> <p>4b1 The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices.</p> <p>4b2 The student uses scientific inquiry methods during field and laboratory investigations.</p> <p>4b3 The student uses critical thinking and scientific problem solving to make informed decisions.</p> <p>4b4 The student knows how to use a variety of tools and methods to conduct science inquiry.</p> <p><b>June 2005</b></p>	<p>4.2C Analyze and interpret information to construct reasonable explanations from direct and indirect evidence</p> <p>4.3A Analyze , review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information</p> <p>4.3B Draw inferences based on information related to promotional materials for products and services</p> <p>4.4A <i>Analyze information using tools including calculators, microscopes, cameras, safety goggles, sound recorders, clocks, computers, thermometers, hand lenses, meter sticks, rulers, balances, magnets, &amp; compasses</i></p> <p>4.2E Construct simple graphs, tables, maps, and charts to organize, examine, and evaluate information</p>	<p>4.2A <i>Plan descriptive investigations including asking well-defined questions, formulate hypotheses, select and use equipment and technology</i></p> <p>4.3E Connect grade 4 science concepts with the history of science and contributions of scientists</p> <p>4.3D Evaluate the impact of research on scientific thought, society, and the environment</p>	<p>4.1B Make wise choices in the use and conservation of resources and the disposal or recycling of materials</p> <p>4.2D Communicate valid conclusions</p> <p>4.3C Represent the natural world using models and identify their limitations</p>	<p>4.1A Demonstrate safe practices during field and laboratory investigations</p> <p>4.2A <i>Implement descriptive investigations including asking well-defined questions, formulate hypotheses, select and use equipment and technology</i></p> <p>4.2B Collect information by observing and measuring</p> <p>4.4A <i>Collect information using tools...</i></p> <p>4.4B Demonstrate that repeated investigations may increase the reliability of results</p>	<p>Direct Evidence</p> <p>Indirect evidence</p> <p>Inference</p>
<b>Timeline</b>	<b>Textbook and Materials</b>		<b>National Science Standards</b>		
			K - 4 A Science as Inquiry, K - 4 B Physical Science K - 4 C Life Science, K - 4 D Earth and Space Science K - 4 E Science and Technology K - 4 F Science and Social Perspectives K - 4 G History and Nature of Science		

4 <sup>th</sup> Grade Knowledge & Skills Science Concepts	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Systems</b></p> <p>4b5 The student knows that complex systems may not work if some parts are removed.</p> <p><b>June 2005</b></p>	<p>4.5B Predict and draw conclusions about what happened when part of a system is removed</p>		<p>4.5A Identify and describe the roles of some organisms in living systems such as plants in a schoolyard, and parts in nonliving systems such as a light bulb in a circuit</p>		<p>Complex system</p>
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>K - 4 A Science as Inquiry, K - 4 B Physical Science                      K - 4 C Life Science, K - 4 D Earth and Space Science                      K - 4 E Science and Technology                      K - 4 F Science and Social Perspectives                      K - 4 G History and Nature of Science</p>	

4 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Properties, Patterns, and Models</b></p> <p>4b7 The student knows that matter has physical properties.</p> <p>4b11 The student knows that the natural world includes earth materials and objects in the sky.</p> <p><b>June 2005</b></p>	<p>4.7B Compare data about physical properties of matter including states of matter, conduction, density, and buoyancy</p>	<p>4.7B Draw conclusions from data about physical properties of matter including states of matter, conduction, density and buoyancy</p> <p>4.11B Summarize the effects of the oceans on land</p>	<p>4.11C Identify the sun as the major source of energy for the earth and understand it's role in the growth of plants, in the creation of winds, and in the water cycle</p>	<p>4.7A Observe and record changes in the states of matter caused by the addition or reduction of heat</p> <p>4.7B Conduct tests about physical properties of matter including states of matter, conduction, density and buoyancy</p>	<p>States of matter Conduction Density Buoyancy Physical properties</p>
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>K - 4 A Science as Inquiry, K - 4 B Physical Science K - 4 C Life Science, K - 4 D Earth and Space Science K - 4 E Science and Technology K - 4 F Science and Social Perspectives K - 4 G History and Nature of Science</p>	

4 <sup>th</sup> Grade Knowledge & Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Constancy and Change</b></p> <p>4b6 The student knows that change can create recognizable patterns.</p> <p>4b8 The student knows that adaptations may increase the survival of members of a species.</p> <p>4b9 The student knows that many likenesses between offspring and parents are inherited or learned.</p> <p>4b10 The student knows that certain past events affect present and future events.</p>	<p>4.6A Identify patterns of change such as in weather, metamorphosis and objects in the sky</p> <p>4.8A Identify characteristics that allow members within a species to survive and reproduce</p> <p>4.10B Draw conclusions about “what happened before” using fossils or charts and tables</p>	<p>4.8B Compare adaptive characteristics of various species</p> <p>4.8C Identify the kinds of species that lived in the past and compare them to existing species</p> <p>4.9A Distinguish between inherited traits and learned characteristics</p>	<p>4.9B Identify and provide examples of inherited traits and learned characteristics</p>	<p>4.6C Use reflections to verify that a natural object has symmetry</p> <p>4.10A Identify and observe effects of events that require time for changes to be noticeable including growth, erosion, dissolving, weathering, and flow</p> <p>4.11A Test properties of soils including texture, capacity to retain water, and ability to support life</p>	<p>Identify species</p> <p>Fossil</p> <p>Extinction</p> <p>Erosion</p> <p>Weathering</p> <p>Dissolving</p> <p>Flow</p> <p>Traits</p> <p>Inheritance</p> <p>Metamorphosis</p> <p>Reflection</p> <p>Symmetry</p> <p>Translation</p> <p>Rotation</p>
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>K - 4 A Science as Inquiry, K - 4 B Physical Science                      K - 4 C Life Science, K - 4 D Earth and Space Science                      K - 4 E Science and Technology                      K - 4 F Science and Social Perspectives                      K - 4 G History and Nature of Science</p>	

5 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Nature of Science</b></p> <p>5b1 The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices.</p> <p>5b2 The student uses scientific methods during field and laboratory investigations.</p> <p>5b3 The student uses critical thinking and scientific problem solving to make informed decisions.</p> <p>5b4 The student knows how to use a variety of tools and methods to conduct science inquiry.</p> <p><b>June 2005</b></p>	<p>5.2C Analyze and interpret information to construct reasonable explanations from direct and indirect evidence</p> <p>5.2D Communicate valid conclusions</p> <p>5.3A Analyze, review and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information</p> <p>5.3B Draw inferences based on information related to promotional materials for products and services</p>	<p>5.2A <i>Plan descriptive and simple experimental investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology</i></p> <p>5.3C Represent the natural world using models and identify their limitations</p> <p>5.3D Evaluate the impact of research on scientific thought, society, and the environment</p>	<p>5.1A Demonstrate safe practices during field and laboratory investigations</p> <p>5.1B Make wise choices in the use and conservation of resources and the disposal or recycling of materials</p> <p>5.3E Connect grade 5 science concepts with the history of science and contributions of scientists</p> <p>5.4B Demonstrate that repeated investigations may increase the reliability of results</p>	<p>5.2A <i>Implement descriptive and simple investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology</i></p> <p>5.2B Collect information by observing and measuring</p> <p>5.2E Construct simple graphs, tables, maps, and charts using tools including computers to organize, examine, and evaluate information</p> <p>5.4A Collect and analyze information using tools including calculators, microscopes, cameras, sound recorders, computers, hand lenses, rulers, thermometers, compasses, balances, hot plates, meter sticks, timing devices, magnets, collecting nets, and safety goggles</p>	<p>Scientific method</p>
<b>Timeline</b>	<b>Textbook and Materials</b>		<b>National Science Standards</b>		
			<p>5 - 8 A Science as Inquiry, 5 - 8 B Physical Science                      5 - 8 C Life Science, 5 - 8 D Earth and Space Science                      5 - 8 E Science and Technology                      5 - 8 F Science in Personal and Social Perspectives                      5 - 8 G History and Nature of Science</p>		

5 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Systems</b></p> <p>5b5 The student knows that a system is a collection of cycles, structures and processes that interact..</p> <p>5b8 The student knows that energy occurs in many forms.</p>	<p>5.8D Verify that vibrating an object can produce sound</p>	<p>5.8B Identify and demonstrate everyday examples of how light is reflected such as from tinted windows and refracted such as in cameras, telescopes, and eyeglasses</p> <p>5.8A Differentiate among forms of energy including light, heat, electrical, and solar energy</p>	<p>5.5A Describe some cycles, structures and processes that are found in a simple system</p> <p>5.5B Describe some interactions that occur in a simple system</p>	<p>5.8C Demonstrate that electricity can flow in a circuit and can produce heat, light, sound, and magnetic effects</p>	<p>Insulate Conduction Vibration Reflection Refraction Circuit</p>
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>5 - 8 A Science as Inquiry, 5 - 8 B Physical Science 5 - 8 C Life Science, 5 - 8 D Earth and Space Science 5 - 8 E Science and Technology 5 - 8 F Science in Personal and Social Perspectives 5 - 8 G History and Nature of Science</p>	

5 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Properties, Patterns, and Models</b></p> <p>5b7 The student knows that matter has physical properties.</p> <p>5b12 The student knows that the natural world includes earth materials and objects in the sky.</p> <p><b>June 2005</b></p>	<p>5.7A Classify matter based on its physical properties including magnetism, physical state, and the ability to conduct or insulate heat, electricity, and sound</p> <p>5.7C Identify changes that occur in the physical properties of the ingredients of solutions such as dissolving sugar in water</p> <p>5.12A Interpret how land forms are the result of a combination of constructive and destructive forces such as deposition of sediment and weathering</p>	<p>5.12C <i>Compare the physical characteristics of the earth to the physical characteristics of the moon</i></p> <p>5.12D Identify gravity as the force that keeps planets in orbit around the Sun and the moon in orbit around the earth</p>	<p>5.7B Demonstrate that some mixtures maintain the physical properties of their ingredients</p> <p>5.12B Describe processes responsible for the formation of coal, oil, gas, and minerals</p>	<p>5.7D <i>Observe and measure characteristic properties of substances such as boiling points and melting points</i></p> <p>5.12C <i>Identify the physical characteristics of the Earth</i></p>	<p>Insulate Conduction Vibration Reflection Refraction Circuit Sediment Weathering Mineral</p>
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				5 - 8 A Science as Inquiry, 5 - 8 B Physical Science 5 - 8 C Life Science, 5 - 8 D Earth and Space Science 5 - 8 E Science and Technology 5 - 8 F Science in Personal and Social Perspectives 5 - 8 G History and Nature of Science	

Grade 5 Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Constancy and Change</b></p> <p>5b6 The student knows that some change occurs in cycles.</p> <p>5b9 The student knows that adaptations may increase the survival of members of a species.</p> <p>5b10 The student knows that likenesses between offspring and parents can be inherited or learned.</p> <p>5b11 The student knows that certain past events affect present and future events</p> <p><b>June 2005</b></p>	<p>5.9B <i>Analyze adaptive characteristics that result in an organism's unique niche in an ecosystem</i></p> <p>5.11B Draw conclusions about "what happened before" using data such as from tree-growth rings and sedimentary rock sequences</p>	<p>5.6A Identify events and describe changes that occur on a regular basis such as in daily, weekly, lunar, and seasonal cycles</p> <p>5.9A Compare the adaptive characteristics of species that improve their ability to survive and reproduce in an ecosystem</p> <p>5.9C Predict some adaptive characteristics required for survival and reproduction by an organism in an ecosystem</p>	<p>5.6B Identify the significance of the water, carbon and nitrogen cycles</p> <p>5.6C Describe and compare life cycles of plants and animals</p> <p>5.10A Identify traits that are inherited from parent to offspring in plants and animals</p> <p>5.10B Give examples of learned characteristics that result from the influence of the environment</p> <p>5.11C Identify past events that lead to the formation of the Earth's renewable, non-renewable, and inexhaustible resources</p>	<p>5.9B <i>Describe adaptive characteristics that result in an organism's unique niche in an ecosystem</i></p> <p>5.11A Identify and observe actions that require time for changes to be measurable including growth, erosion, dissolving, weathering, and flow</p>	<p>Vocabulary: Adaptation Survival Ecosystem</p>
<b>Timeline</b>	<b>Textbook and Materials</b>		<b>National Science Standards</b>		
			5 - 8 A Science as Inquiry, 5 - 8 B Physical Science 5 - 8 C Life Science, 5 - 8 D Earth and Space Science 5 - 8 E Science and Technology 5 - 8 F Science in Personal and Social Perspectives 5 - 8 G History and Nature of Science		

6 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Nature of Science</b></p> <p>6b1 The student conducts field and laboratory investigations using safe environmentally appropriate and ethical practices.</p> <p>6b2 The student uses scientific inquiry methods during field and laboratory investigations.</p> <p><b>June 2005</b></p>	<p>6.2C Analyze and interpret information to construct reasonable explanations from direct and indirect evidence</p> <p>6.2D Communicate valid conclusions</p> <p>6.2E Construct graphs, tables, maps, and charts using tools including computers to organize, examine, and evaluate data</p>	<p>6.1B Make wise choices in the use and conservation of resources and the disposal or recycling of materials</p> <p>6.2A <i>Plan investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology</i></p>		<p>6.1A Demonstrate safe practices during field and laboratory investigations</p> <p>6.2A <i>Implement investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology</i></p> <p>6.2B Collect data by observing and measuring</p>	
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>5-8 A Science as Inquiry                      5-8 E Science and Technology                      5-8 G History and Nature of Science</p>	

Grade 6 Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Nature of Science</b></p> <p>6b3 The student uses critical thinking and scientific problem solving to make informed decisions.</p> <p>6b4 The student knows how to use a variety of tools and methods to conduct science inquiry.</p> <p><b>June 2005</b></p>	<p>6.3A Analyze, review and critique scientific explanations, including hypotheses and theories as to their strengths and weaknesses using scientific evidence and information</p> <p>6.3D Evaluate the impact of research on scientific thought, society and the environment</p> <p>6.4A <i>Analyze information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, timing devices, hot plates, test tubes, safety goggles, spring scales, magnets, balances, microscopes, telescopes, thermometers, calculators, field equipment, compasses, computers and computer probes</i></p>	<p>6.3B Draw inferences based on data related to promotional materials for products and services</p> <p>6.3C Represent the natural world using models and identify their limitations</p> <p>6.3D Evaluate the impact of research on scientific thought, society and the environment</p> <p>6.3E Connect grade 6 science concepts with the history of science and contributions of scientists</p> <p>6.4B Identify patterns in collected information using percent, average, range and frequency</p>		<p>6.4A <i>Collect and record information using tools including beakers, Petri dishes, meter sticks, graduated cylinders, weather instruments, timing devices, hot plates, test tubes, safety goggles, spring scales, magnets, balances, microscopes, telescopes, thermometers, calculators, field equipment, compasses, computers and computer probes</i></p>	
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>5-8 A Science as Inquiry                      5-8 E Science and Technology                      5-8 G History and Nature of Science</p>	

6 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Systems</b></p> <p>6b5 The student knows that systems may combine with other systems to form a larger system.</p> <p>6b8 The student knows that complex interactions occur between matter and energy.</p> <p>6b9 The student knows that obtaining, transforming, and distributing energy affects the environment.</p>	<p>6.9B Compare methods used for transforming energy in devices such as water heaters, cooling systems, or hydroelectric and wind power plants</p>	<p>6.5A Identify and describe a system that results from the combination of two or more systems such as in the solar system</p> <p>6.5B Describe how the properties of a system are different from the properties of its parts</p> <p>6.9A Identify energy transformations occurring during the production of energy for human use such as electrical energy to heat energy or heat energy to electrical energy</p> <p>6.9C Research and describe energy types from their source to their use and determine if the type is renewable, non-renewable, or inexhaustible</p>	<p>6.8B Explain and illustrate the interactions between matter and energy in the water cycle and in the decay of biomass such as in a compost bin</p> <p>6.8C Describe energy flow in living systems including food chains and food webs</p>		<p>6.8A Define matter and energy</p>
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>5-8 A Science as Inquiry                      5-8 B Physical Science                      5-8 C Life Science                      5-8 D Earth and Space Science</p>	

<b>6<sup>th</sup> Grade Knowledge and Skills</b>	<b>Cognitive Demands</b>				
	<b>Analyze Information</b>	<b>Apply Concepts/ Make Connections</b>	<b>Understand Concepts</b>	<b>Perform Procedures/ Conduct Investigations</b>	<b>Memorize</b>
<p><b>Properties, Patterns, and Models</b></p> <p>6b7 The student knows that substances have physical and chemical properties.</p> <p>6b10 The student knows the relationship between structure and function in living systems.</p> <p>6b12 The student knows that the responses of organisms are caused by internal or external stimuli.</p> <p>6b13 The student knows components of our solar system.</p> <p>6b14 The student knows the structures and functions of Earth systems.</p>	<p>6.10A Differentiate between structure and function</p>	<p>6.7A Demonstrate that new substances can be made when two or more substances are chemically combined and compare the properties of new substances to the original substances</p> <p>6.7B Classify substances by their physical and chemical properties</p> <p>6.10C Identify how structure complements function at different levels of organization including organs, organ systems, organisms, and populations</p> <p>6.13B Describe types of equipment and transportation needed for space travel</p> <p>6.14B Identify relationships between groundwater and surface water in a watershed</p> <p>6.14C Describe components of the atmosphere, including oxygen, nitrogen, and water vapor, and identify the role of atmospheric movement in weather change</p>	<p>6.10B Determine that all organisms are composed of cells that carry on functions to sustain life</p> <p>6.12C Identify components of an ecosystem to which organisms may respond</p> <p>6.14A Summarize the rock cycle</p>	<p>6.12A Identify responses in organisms to internal stimuli such as hunger or thirst</p> <p>6.12B Identify responses in organisms to external stimuli such as the presence or absence of heat or light</p>	<p>6.13A Identify characteristics of objects in our solar system including the Sun, planets, meteorites, comets, asteroids, and moons</p>
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>5-8 A Science as Inquiry                      5-8 B Physical Science                      5-8 C Life Science                      5-8 D Earth and Space Science                      5-8 F Science in Personal and Social Perspectives</p>	

<b>6<sup>th</sup> Grade Knowledge and Skills</b>	<b>Cognitive Demands</b>				
	<b>Analyze Information</b>	<b>Apply Concepts/ Make Connections</b>	<b>Understand Concepts</b>	<b>Perform Procedures/ Conduct Investigations</b>	<b>Memorize</b>
<p><b>Constancy and Change</b></p> <p>6b6 The student knows that there is a relationship between force and motion.</p> <p>6b11 The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms.</p> <p><b>June 2005</b></p>		<p>6.6B Demonstrate that changes in motion can be measured and graphically represented</p> <p>6.11C Interpret the role of genes in inheritance</p>	<p>6.6A Identify and describe the changes in position, direction of motion, and speed of an object when acted upon by force</p> <p>6.6C Identify forces that shape features of the Earth including uplifting, movement of water, and volcanic activity</p> <p>6.11A Identify some changes in traits that can occur over several generations through natural occurrence and selective breeding</p>		<p>6b11B Identify cells as structures containing genetic material</p>
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>5-8 A Science as Inquiry                      5-8 B Physical Science                      5-8 C Life Science                      5-8 D Earth and Space Science                      5-8 F Science in Personal and Social Perspectives</p>	

7 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Nature of Science</b></p> <p>7b1 The student conducts field and laboratory investigations using safe environmentally appropriate and ethical practices.</p> <p>7b2 The student uses scientific inquiry methods during field and laboratory investigations.</p> <p><b>June 2005</b></p>	<p>7.2C Organize, analyze, make inferences and predict trends from direct and indirect evidence</p> <p>7.2D Communicate valid conclusions</p>	<p>7.1B Make wise choices in the use and conservation of resources and the disposal or recycling of materials</p> <p>7.2A Plan and implement investigative procedures including asking questions, formulating testable hypotheses, selecting and using equipment and technology to investigate procedures</p>	<p>7.2 E <i>Use tools including computers to organize, examine &amp; evaluate data from constructed graphs, tables, maps</i></p>	<p>7.1A Demonstrate safe practices during field and laboratory investigations</p> <p>7.1B <i>Investigate the use and conservation of resources and the disposal or recycling of materials</i></p> <p>7.2 B Collect data by observing and measuring</p> <p>7.2 E <i>Construct graphs, tables, maps and charts using tools including computers</i></p> <p>7.2A Select and use equipment and technology to investigate procedures</p>	
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>5-8 A Science as Inquiry                      5-8 E Science and Technology                      5-8 G History and Nature of Science</p>	

7 <sup>th</sup> Grade	Cognitive Demands				
Knowledge and Skills	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Nature of Science</b></p> <p>7b.3 The student uses critical thinking and scientific problem solving to make informed decisions.</p> <p>7b4 The student knows how to use tools and methods to conduct science inquiry.</p> <p><b>June 2005</b></p>	<p>7.3A Analyze, review and critique scientific explanations, including hypotheses and theories as to their strengths and weaknesses using scientific evidence and information</p> <p>7.3D Evaluate the impact of research on scientific thought, society and the environment</p> <p><i>7.4A Analyze information using tools including beakers, Petri dishes, meter sticks, graduated cylinders, weather instruments, timing devices, hot plates, test tubes, safety goggles, spring scales, magnets, balances, microscopes, telescopes, thermometers, dissecting equipment calculators, field equipment, compasses, computers and computer probes</i></p> <p><i>7.4B Analyze information to recognize patterns such as rates of change</i></p>	<p><i>7.3A Review &amp; critique scientific explanations, including hypotheses and theories as to their strengths and weaknesses using scientific evidence and information</i></p> <p>7.3B Draw inferences based on data related to promotional materials for products and services</p> <p>7.3C Represent the natural world using models and identify their limitations</p> <p>7.3D Evaluate the impact of research on scientific thought, society and the environment</p> <p>7.3F Connect grade 7 science concepts with the history of science and contributions of scientists</p>	<p>7.3A (analyze, review, &amp; critique)</p> <p>7.3D Evaluate the impact of research on scientific thought, society and the environment</p>	<p><i>7.4A Collect &amp; record information using tools including beakers, Petri dishes, meter sticks, graduated cylinders, weather instruments, timing devices, hot plates, test tubes, safety goggles, spring scales, magnets, balances, microscopes, telescopes, thermometers, calculators, field equipment, compasses, computers, computer probes and dissecting equipment</i></p> <p><i>7.4B Collect information to recognize patterns such as rates of change</i></p>	<p>Critique Phenomenon</p>
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>5-8 A Science as Inquiry                      5-8 E Science and Technology                      5-8 G History and Nature of Science</p>	

7 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Systems</b></p> <p>7b5 The student knows that an equilibrium of a system may change</p> <p>7b8 The student knows that complex interactions occur between matter and energy.</p> <p>7b11 The student knows that the responses of organisms are caused by internal or external stimuli.</p> <p><b>June 2005</b></p>	<p>7.11A Analyze changes in organisms such as a fever or vomiting that may result from internal stimuli</p>	<p>7.5A Describe how systems may reach an equilibrium such as when a volcano erupts</p> <p>7.8A Illustrate examples of potential and kinetic energy in everyday life such as objects at rest, movement of geologic faults, and falling water</p>	<p>7.5B <i>Describe the role of ecological succession in maintaining an equilibrium in an ecosystem</i></p> <p>7.8B Identify that radiant energy from the sun is transferred into chemical energy through the process of photosynthesis</p> <p>7.11B Identify responses in organisms to external stimuli found in the environment such as the presence or absence of light</p>	<p>7.5B <i>Observe the role of ecological succession in maintaining an equilibrium in an ecosystem</i></p>	
<b>Timeline</b>	<b>Textbook and Materials</b>		<b>National Science Standards</b>		
			<p>5-8 A Science as Inquiry                      5-8 B Physical Science                      5-8 C Life Science                      5-8 D Earth and Space Science                      5-8 F Science in Personal and Social Perspectives</p>		

7 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Properties, Patterns, and Models</b></p> <p>7b7 The student knows that substances have physical and chemical properties.</p> <p>7b9 The student knows the relationship between structure and function in living systems.</p> <p>7b12 The student knows that there is a relationship between organisms and the environment.</p> <p><b>June 2005</b></p>		<p>7.7B Describe physical properties of elements and identify how they are used to position an element on the periodic table</p> <p>7.12B Observe and describe how organisms including producers, consumers, and decomposers live together in an environment and use existing resources</p> <p>7.12D Observe and describe the role of ecological succession and ecosystems</p>	<p>7.7A Identify everyday examples of chemical phenomena such as rusting and tarnishing of metals and burning of wood</p> <p>7.7C Recognize that compounds are composed of elements</p> <p>7.9B Describe how organisms maintain stable internal conditions while living in changing external environments</p>	<p>7.7A Demonstrate everyday examples of chemical phenomena such as rusting and tarnishing of metals and burning of wood</p> <p>7.12C Describe how different environments support different varieties of organisms</p>	<p>7.7B <i>Identify physical properties of elements from the periodic table</i></p> <p>7.9A Identify the systems of the human organism and describe their functions</p> <p>7.12A Identify components of an ecosystem</p>
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>5-8 A Science as Inquiry                      5-8 B Physical Science                      5-8 C Life Science                      5-8 D Earth and Space Science                      5-8 F Science in Personal and Social Perspectives</p>	

7 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Properties, Patterns, and Models</b></p> <p>7b13 The student knows components of our solar system</p> <p>7b14 The student knows that natural events and human activity can alter Earth systems.</p> <p><b>June 2005</b></p>	<p>7.14B Analyze effects of regional erosion deposition and weathering</p> <p>7.14C Make inferences and draw conclusions about effects of human activity on Earths renewable, non-renewable, and inexhaustible resources</p>	<p>7.13A Identify and illustrate how the tilt of the Earth on its axis as it rotates and revolves around the Sun causes changes in seasons and the length of a day</p> <p>7.13B Relate the Earth’s movement and the moon’s orbit to the observed cyclical phases of the moon</p> <p>7.14A Describe and predict the impact of different catastrophic events on the Earth</p>	<p>7.13A <i>Illustrate how the tilt of the Earth on its axis as it rotates and revolves around the Sun causes changes in seasons and the length of a day</i></p>		
<b>Timeline</b>	<b>Textbook and Materials</b>			<b>National Science Standards</b>	
				<p>5-8 A Science as Inquiry</p> <p>5-8 D Earth and Space Science</p> <p>5-8 F Science in Personal and Social Perspectives</p> <p>5-8 G History and Nature of Science</p>	

7 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures /Conduct Investigations	Memorize
<p><b>Constancy and Change</b></p> <p>7b6 The student knows that there is a relationship between force and motion.</p> <p>7b10 The student knows that species can change through generations and that the instructions for traits are contained in the genetic material of the organisms.</p> <p><b>June 2005</b></p>		<p>7.6A Demonstrate basic relationships between force and motion using simple machines including pulleys and levers</p> <p>7.6C Relate forces to basic processes in living organism including the flow of blood and ht emergence of seedlings</p> <p>7.10B Compare traits of organisms of different species that enhance their survival and reproduction</p> <p>7.10C Distinguish between dominant and recessive traits and recognize that inherited traits of an individual are contained in genetic material</p>		<p>7.6A Demonstrate basic relationships between force ad motion using simple machines including pulleys and levers.</p> <p>7.6B Demonstrate that an object will remain at rest or move at a constant speed and in a straight line if it is not being subjected to an unbalanced force</p>	<p>7.10A Identify that sexual reproduction results in more diverse offspring and asexual reproduction results in more uniform offspring</p>
<b>Timeline</b>	<b>Textbook and Materials</b>		<b>National Science Standards</b>		
			<p>5-8 A Science as Inquiry                      5-8 B Physical Science                      5-8 C Life Science                      5-8 F Science in Personal and Social Perspectives</p>		

8 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Nature of Science</b></p> <p>8b1 The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.</p> <p>8b2 The student uses scientific inquiry methods during field and laboratory investigations.</p> <p>8b3. The student uses critical thinking and scientific problem solving to make informed decisions.</p> <p>8b4 The student knows how to use a variety of tools and methods to conduct science inquiry</p> <p>8b5 The student knows relationships exist between science and technology.</p> <p><b>June 2005</b></p>	<p>8.2C Organize, analyze, evaluate, make inferences, and predict trends from direct and indirect evidence</p> <p>8.2D Communicate valid conclusions</p> <p>8.2E Construct graphs, tables, maps and charts using tools including computers to organize, examine, and evaluate data</p> <p>8.3A Analyze, review , and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information</p> <p>8.3B Draw inferences based on data related to promotional materials for products and services</p> <p>8.4A <i>Analyze information using tools including beakers, Petri dishes, meter sticks, graduated cylinders, weather instruments, hot plates, dissecting equipment, test tubes, safety goggles, spring scales, balances, microscopes, telescopes, thermometers, calculators, field equipment, computers, computer probes, water test kits and timing devices</i></p> <p>8.5A Identify a design problem and propose a solution</p>	<p>8.1B Make wise choices in the use and conservation of resources and the disposal or recycling of materials.</p> <p>8.2A <i>Plan investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology</i></p> <p>8.3D Evaluate the impact of research on scientific thought, society, and environment</p> <p>8.3E Connect Grade 8 science concepts with the history of science and contributions of scientists.</p> <p>8.4B Extrapolate from collected information to make predictions</p> <p>8.5B Design and test a model to solve the problem</p>	<p>8.3C Represent the natural world using models and identify their limitations</p> <p>8.5C Evaluate the model and make recommendations for improving the model</p>	<p>8.1A Demonstrate safe practices during field and laboratory investigations</p> <p>8.2A <i>Implement investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology</i></p> <p>8.2B Collect data by observing and measuring</p> <p>8.4A <i>Collect, record, and information using tools including beakers, Petri dishes, meter sticks, graduated cylinders, weather instruments, hot plates, dissecting equipment, test tubes, safety goggles, spring scales, balances, microscopes, telescopes, thermometers, calculators, field equipment, computers, computer probes, water test kits and timing devices</i></p>	<p>Inference</p> <p>Direct evidence</p> <p>Indirect evidence</p> <p>Extrapolate</p>
<b>Timeline</b>	<b>Textbooks and Materials</b>			<b>National Science Standards</b>	
				<p>5-8 A Science as Inquiry</p> <p>5-8 E Science and Technology</p> <p>5-8 G History and Nature of Science</p>	

<b>8<sup>th</sup> Grade</b>	<b>Cognitive Demands</b>				
	<b>Analyze Information</b>	<b>Apply Concepts/ Make Connections</b>	<b>Understand Concepts</b>	<b>Perform Procedures/ Conduct Investigations</b>	<b>Memorize</b>
<p><b>Systems</b></p> <p>8b6 The student knows that interdependence occurs among living systems.</p> <p>8b10 The student knows that complex interactions occur between matter and energy.</p> <p><b>June 2005</b></p>		<p>8.6C Describe interactions with ecosystems</p> <p>8.10B Describe interactions among solar, weather, and ocean systems</p>	<p>8.6A Describe interactions among systems in the human organism</p> <p>8.6B Identify feedback mechanisms that maintain equilibrium of systems such as body temperature, turgor pressure, and chemical reactions</p> <p>8.10A Illustrate interaction between matter and energy including specific heat</p>	<p>8.10C Identify and demonstrate that loss or gain of heat energy occurs during exothermic and endothermic chemical reactions</p>	<p>Exothermic</p> <p>Endothermic</p> <p>Feedback mechanism</p> <p>Turgor pressure</p> <p>Specific heat</p>
<b>Timeline</b>	<b>Textbook and Materials</b>		<b>National Science Standards</b>		
			<p>5-8 A Science as Inquiry</p> <p>5-8 B Physical Science</p> <p>5-8 C Life Science</p> <p>5-8 D Earth and Space Science</p>		

8 <sup>th</sup> Grade	Cognitive Demands				
Knowledge and Skills	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Properties, Patterns, and Models</b></p> <p>8b8 The student knows that matter is composed of atoms.</p> <p>8b9 The student knows that substances have chemical and physical properties.</p> <p>8b12 The student knows that cycles exist in earth systems.</p> <p>8b13 The student knows that characteristics of the universe.</p> <p>8b14 The student knows that natural events and human activities can alter Earth systems.</p> <p><b>June 2005</b></p>	<p>8.12A Analyze and predict the sequence of events in the lunar and rock cycles</p> <p>8.14B Analyze how natural or human events may have contributed to the extinction of some species</p>	<p>8.9B Interpret information on the periodic table to understand that physical properties are used to group elements</p> <p>8.9C Recognize the importance of formulas and equations to express what happens in a chemical reaction</p> <p>8.9D Identify that physical and chemical properties influence development and application of everyday materials such as cooking surfaces, insulation, adhesives, and plastics</p> <p>8.12B Relate the role of oceans to climatic changes</p> <p>8.12C Predict the results of modifying the Earth’s nitrogen, water, and carbon cycles</p> <p>8.14A Predict land features resulting from gradual changes such as mountain building, beach erosion, land subsidence, and continental drift</p> <p>8.14C Describe how human activities have modified soil, water, and air quality</p>	<p>8.8B Identify the properties of an atom including mass and electrical charge</p> <p>8.13B Explain the use of light years to describe distances in the universe</p> <p>8.13C Research and describe historical scientific theories of the origin of the universe</p>	<p>8.9A Demonstrate that substances may react chemically to form new substances</p> <p>8.13A Describe characteristics of the universe such as stars and galaxies</p>	<p>8.8A Describe the structure and parts of an atom</p> <p>Lunar cycle Rock cycle Extinction Light year Galaxy</p>
<b>Timeline</b>	<b>Textbook and Materials</b>		<b>National Science Standards</b>		
			<p>5-8 A Science as Inquiry, 5-8 B Physical Science 5-8 D Earth and Space Science 5-8 F Science in Personal and Social Perspectives 5-8 G History and Nature of Science</p>		

8 <sup>th</sup> Grade Knowledge and Skills	Cognitive Demands				
	Analyze Information	Apply Concepts/ Make Connections	Understand Concepts	Perform Procedures/ Conduct Investigations	Memorize
<p><b>Constancy and Change</b></p> <p>8b7 The student knows that there is a relationship between force and motion</p> <p>8b11 The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms.</p> <p><b>June 2005</b></p>		<p>8.11C Make predictions about possible outcomes of various genetic combinations of inherited characteristics</p>	<p>8.7B Recognize that waves are generated and can travel through different media.</p> <p>8.11A Identify that change in environmental conditions can affect the survival of individuals and species</p> <p>8.11B Distinguish between inherited traits and other characteristics that result from interactions with the environment</p>	<p>8.7A Demonstrate how unbalanced forces cause changes in the speed or direction of an object's motion</p>	
<b>Timeline</b>	<b>Textbook and Materials</b>		<b>National Science Standards</b>		
			<p>5-8 A Science as Inquiry                      5-8 B Physical Science                      5-9 C Life Science                      5-8 F Science in Personal and Social Perspectives</p>		