

Activities	AAAS Standards <a href="http://www.project2061.org/tools/benchmarkintro.htm">http://www.project2061.org/tools/benchmarkintro.htm</a>	NSES <a href="http://books.nap.edu/html/nSES/html/index.html">http://books.nap.edu/html/nSES/html/index.html</a>	PA Science & Technology Standards(3.) <a href="http://www.pde.psu.edu/standard/science.pdf">http://www.pde.psu.edu/standard/science.pdf</a> PA Environment & Ecology Standards(4.) <a href="http://www.pde.psu.edu/standard/ecology.pdf">http://www.pde.psu.edu/standard/ecology.pdf</a>
Educator's Guide <a href="http://www.leo.lehigh.edu/envirosci/guide/index.html">http://www.leo.lehigh.edu/envirosci/guide/index.html</a>  Primary School Suggestions		<i>Teaching :</i> A2 Select science content and adapt and design curricula to meet the interests, knowledge, understanding, abilities, and experiences of students. A3 Select teaching and assessment strategies that support the development of student understanding and nurture a community of science learners. B1 Focus and support inquiries while interacting with students. B2 Orchestrate discourse among students about scientific ideas. B3 Challenge students to accept and share responsibility for their own learning. B4 Recognize and respond to student diversity and encourage all students to participate fully in science learning. B5 Encourage and model the skills of scientific inquiry, as well as the curiosity, openness to new ideas and data, and skepticism that characterize science. C1 Use multiple methods and systematically gather data about student understanding and ability. D5 Identify and use resources outside the school. E1 Display and demand respect for the diverse ideas, skills, and experiences of all students.	
		E2 Enable students to have significant voice in decisions about the content and context of their work and require students to take responsibility for the learning of all members of the community. E3 Nurture collaboration among students. E4 Structure and facilitate ongoing formal and informal discussion based on a shared understanding of rules of scientific discourse. E5 Model and emphasize the skills, attitudes, and values of scientific inquiry.	

<b>Elementary School Suggestions</b>			
Explore Lehigh River Photojournal and compare physical characteristics of different regions of the river.	K-2 1B Scientific Inquiry People can often learn about things around them by just observing carefully	E5 Model and emphasize the skills, attitudes, and values of scientific inquiry	Grade 4: <i>Unifying Themes</i> 3.1.4.C.1 Identify observable patterns
What things are "man made" in the watershed?	3-5 8B Materials & Manufacturing Through science and technology, a wide variety of materials that do not appear in nature at all have become available, ranging from steel to nylon to liquid crystals. Discarded products contribute to the problem of waste disposal.	K-4: E3 Abilities to distinguish between natural objects and objects made by humans	Grade 4: <i>Science, Technology &amp; Human Endeavors</i> 3.8.4.B.2 Identify and distinguish between natural and human-made resources.
Are man made things good for the environment or harmful?	3-5 3B Design and Systems The solution to one problem may create other problems. 8B Materials & Manufacturing Discarded products contribute to the problem of waste disposal.	K-4: C3 Organisms and environments F4 Changes in environments F5 Science and technology in local challenges	Grade 4: <i>Science, Technology &amp; Human Endeavors</i> 3.8.4.C.2 Identify and discuss examples of technological change in the community that have both positive and negative impacts. <i>Renewable &amp; Nonrenewable Resources</i> 4.2.4.D.1 Understand the waste stream <i>Environmental Health</i> 4.3.4.B.3 Identify litter and its effect on the environment. <i>Humans &amp; the Environment</i> 4.8.4.C.2 Identify examples of how human activities within a community affect the natural environment.
After the students have explored Phenomenal Weather Explorations, have them compare these unique natural phenomena. Have students write science journals that tell a story about living through a severe weather storm.		K-4: D3 Changes in earth and sky F1 Personal health Teaching: A2 Select science content and adapt and design curricula to meet the interests, knowledge, understanding, abilities, and experience of students.	

<p>Record daily climatic data in the school yard. Graph the data and analyze for patterns. Compare student data to weather station data.</p>	<p>K-2  4B The Earth  Some events in nature have a repeating pattern.  11C Constancy &amp; Change  Things change in some ways and stay the same in some ways.  Some small changes can be detected by taking measurements.  3-5  9B Symbolic Relationships  Tables and graphs can show how values of one quantity are related to values of another.  11C Constancy &amp; Change  Things change in steady, repetitive, or irregular ways-or sometimes in more than one way at the same time. Often the best way to tell which kinds of change are happening is to make a table or graph of measurements.  12A Values &amp; Attitudes  Keep records of their investigations and observations and not change the records later.  12C Manipulation &amp; Observation  Keep a notebook that describes observations made, carefully distinguishes actual observations from ideas and speculations about what was observed, and is understandable weeks or months later.</p>	<p>K-4:  A1 Abilities necessary to do scientific inquiry  B1 Properties of objects and materials  C3 Organisms and environments  D3 Changes in earth and sky  E2 Understanding about science and technology  F4 Changes in environments</p>	<p>Grade 4:  <i>Unifying Themes</i>  3.1.4.C.1 Identify observable patterns.</p>
<p>Compare geologic features in Geologic Explorations to those outside the classroom window.</p>		<p>K-4:  A1 Abilities necessary to do scientific inquiry</p>	
<p>Predict what types of animals you would expect in each location.</p>	<p>K-2  5A Diversity of Life  Plants and animals have different features that help them live in different environments.</p>	<p>K-4:  C1 Characteristics of organisms  C3 Organisms and environments</p>	<p>Grade 4:  <i>Environmental Health</i>  4.3.4.C.1 Identify some of the organisms that live together in an ecosystem.</p>

Middle School Suggestions			
<p>Have students monitor the water quality of a nearby river or tributary over the course of the school year. Students can record data, analyze the water quality of their local watershed, and create a database of their information. Students can compare their water quality data with those in different regions of the Lehigh River watershed and other US watersheds.</p>	<p>6-8            1C The Science Enterprise            Computers have become invaluable in science because they speed up and extend people's ability to collect, store, compile, and analyze data, prepare research reports, and share data and ideas with investigators all over the world.            12C Manipulation &amp; Observation Use computers to store and retrieve information ...and create simple files of their own devising. Read analog and digital meters on instruments used to make direct measurements...and choose appropriate units for reporting various magnitudes.            12D Communication Skills            Organize information in simple tables and graphs and identify relationships they reveal. Locate information in reference books, back issues of newspapers and magazines, compact disks, and computer databases.</p>	<p>5-8:            A1 Abilities necessary to do scientific inquiry            B1 Properties and changes of properties in matter            D1 Structure of the earth system            F1 Personal health            F3 Natural hazards</p>	<p>Grade 7:  <i>Unifying Themes</i>            3.1.7.C.2 Identify repeating structure patterns.            3.1.7.C.3 Identify and describe patterns that occur in physical systems.  <i>Inquiry &amp; Design</i>            3.2.7.B.2 Describe relationships by making inferences and predictions.  <i>Physical Science, Chemistry &amp; Physics</i>            3.4.7.A.3 Describe and conduct experiments that identify chemical and physical properties.  <i>Technological Devices</i>            3.7.7.B.2 Apply knowledge of different measurement systems to measure and record objects' properties.            3.7.7.C.3 Demonstrate age appropriate keyboarding skills and techniques.            3.7.7.D.5 Apply intermediate skills in utilizing word processing, database and spreadsheet software.  <i>Watersheds &amp; Wetlands</i>            4.1.7.B.3 Explain factors that affect water quality and flow through a watershed.</p>
<p>Explore the Lehigh River Watershed Photojournal, finding similarities and differences in physical characteristics within the watershed areas using student created data chart.</p>	<p>6-8            12D Communication Skills            Organize information in simple tables and graphs and identify relationships they reveal. Read simple tables and graphs produced by others and describe in words what they show.</p>	<p>5-8:            A1 Abilities necessary to do scientific inquiry            C4 Populations and ecosystems            D1 Structure of the earth system            F2 Populations, resources, and environments</p>	<p>Grade 7:  <i>Unifying Themes</i>            3.1.7.C.2 Identify repeating structure patterns.  <i>Inquiry &amp; Design</i>            3.2.7.B.2 Describe relationships by making inferences and predictions.</p>
<p>Examine the flow rate patterns in the different areas of the Lehigh River Watershed using real-time and archived Lehigh Watershed USGS data.</p>	<p>6-8            11C Constancy &amp; Change            Cycles, such as the seasons or body temperature, can be described by their cycle length or frequency, what their highest and lowest values are, and when these values occur.</p>	<p>5-8:            A1 Abilities necessary to do scientific inquiry            D1 Structure of the earth system</p>	<p>Grade 7:  <i>Unifying Themes</i>            3.1.7.C.1 Identify different forms of patterns and use them to group and classify specific objects.</p>

<p>Students create their own questions about the Lehigh River watershed to investigate, exploring interactive GIS maps, hydroprobe, weather station, and seismic data.</p>	<p>6-8  1B Scientific Inquiry  Scientists differ greatly in what phenomena they study and how they go about their work. Although there is no fixed set of steps that all scientists follow, scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.  12D Communication Skills  Organize information in simple tables and graphs and identify relationships they reveal. Read simple tables and graphs produced by others and describe in words what they show.</p>	<p>5-8:  A1 Abilities necessary to do scientific inquiry  A2 Understandings about scientific inquiry  C4 Populations and ecosystems  G1 Science as a human endeavor  G2 Nature of science  Teaching:  A2 Select science content and adapt interests, knowledge, understanding, abilities, and experience of students.  B1 Focus and support inquiries while interacting with students.  B3 Challenge students to accept and share responsibility for their own learning.  E3 Nurture collaboration among students.  E4 Structure and facilitate ongoing formal and informal discussion based on a shared understanding of rules of scientific discourse.  E5 Model and emphasize the skills, attitudes, and values of scientific inquiry.</p>	<p>Grade 7:  <i>Inquiry &amp; Design</i>  3.2.7.B.2 Describe relationships by making inferences and predictions.  3.2.7.B.3 Communicate, use space/time relationships, define operationally, raise questions, formulate hypotheses, test and experiment.  3.2.7.B.5 Interpret data, formulate models, design models, and produce solutions.  3.2.7.C.1 Generate questions about objects, organisms and/or events that can be answered through scientific investigations.  3.2.7.C.3 Design an investigation with limited variables to investigate a question.  3.2.7.C.5 Judge the significance of experimental information in answering the question.  3.2.7.C.6 Communicate appropriate conclusions from the experiment.  <i>Technological Devices</i>  3.7.7.E.3 Apply basic on-line research techniques to solve a specific problem.</p>
<p>Explore the History of the Lehigh River Watershed and create a "day in the life" story that explores how science has influenced technological development in the watershed.</p>	<p>6-8  3B Design and Systems  All technologies have effects other than those intended by the design, some of which may have been predictable and some not. In either case, these side effects may turn out to be unacceptable to some of the population and therefore lead to conflict between groups.</p>	<p>5-8:  A1 Abilities necessary to do scientific inquiry  E2 Understandings about science and technology  F4 Risks and benefits  F5 Science and technology in society  Teaching:  A2 Select science content and adapt interests, knowledge, understanding, abilities, and experience of students.</p>	<p>Grade 7:  <i>Technological Devices</i>  3.7.7.E.3 Apply basic on-line research techniques to solve a specific problem.  Science, Technology &amp; Human Endeavors  3.8.7.A.2 Identify changes in society as a result of a technological development.  3.8.7.A.3 Identify and explain improvements in transportation, health, sanitation and communications as a result of advancements in science and technology and how they effect our lives.  <i>Environmental Health</i>  4.3.7.B.3 Identify residential and industrial sources of pollution and their effects on environmental health.  <i>Humans &amp; the Environment</i>  4.8.7.C.2 Explain how a particular human activity has changed the local area over the years.  4.8.7.D.1 Explain how human activities and natural events have affected ecosystems.</p>

<p>Compare the Lehigh River watershed with the Neuse River watershed. Compare man-made influences, describe how industrial development has changed these watersheds, and note other changes that have occurred over time.</p>	<p>6-8 3B Design &amp; Systems All technologies have effects other than those intended by the design, some of which may have been predictable and some not. In either case, these side effects may turn out to be unacceptable to some of the population and therefore lead to conflict between groups. 3C Issues in Technology New technologies increase some risks and decrease others. Some of the same technologies that have improved the length and quality of life for some people have also brought new risks.</p>	<p>5-8: A1 Abilities necessary to do scientific inquiry C4 Populations and ecosystems D1 Structure of the earth system E2 Understandings about science and technology F4 Risks and benefits F5 Science and technology in society</p>	<p>Grade 7: <i>Technological Devices</i> 3.7.7.E.3 Apply basic on-line research techniques to solve a specific problem. Science, Technology &amp; Human Endeavors 3.8.7.A.2 Identify changes in society as a result of a technological development. 3.8.7.A.3 Identify and explain improvements in transportation, health, sanitation and communications as a result of advancements in science and technology and how they effect our lives. <i>Environmental Health</i> 4.3.7.B.3 Identify residential and industrial sources of pollution and their effects on environmental health. <i>Humans &amp; the Environment</i> 4.8.7.B.2 Explain how natural resources have affected the development of civilizations. 4.8.7.C.2 Explain a particular human activity has changed the local area over the years. 4.8.7.D.1 Explain how human activities and natural events have affected ecosystems.</p>
			<p>Grade 10: <i>Humans &amp; the Environment</i> 4.8.10.C.1 Analyze and evaluate changes in the environment that are the result of human activities. 4.8.10.C.2 Compare and contrast the environmental effects of different industrial strategies. Grade 12: 4.8.12.C.2 Compare and contrast historical and current pollution levels at a given location.</p>
<p>Plot different physical features on a map using the digital images, QuickTime VR, and GPS positions provided in Geologic Explorations.</p>	<p>6-8 9B Symbolic Relationships Graphs can show a variety of possible relationships between two variables.</p>	<p>5-8: A1 Abilities necessary to do scientific inquiry A2 Understandings about scientific inquiry</p>	<p><i>Unifying Themes</i> 3.1.7.D.1 Apply various applications of size and dimensions of scale to scientific, mathematical, and technological applications.</p>

Upper Secondary School Suggestions			
<p>Students develop their own driving question to investigate a water quality parameter in their watershed area. Monitor the water quality in a nearby river or tributary for the school year. Record, analyze, and organize the data into a database.</p>	<p>9-12            9B Symbolic Relationships            Tables, graphs, and symbols are alternative ways of representing data and relationships that can be translated from one another.            12B Computation &amp; Estimation            Use computer spreadsheet, graphing, and database programs to assist in quantitative analysis.            12C Manipulation &amp; Observation            Use computers for producing tables and graphs and for making spreadsheet calculations.</p>	<p>9 to 12:            A1 Abilities necessary to do scientific inquiry            A2 Understandings about scientific inquiry            D2 Geochemical cycles            F3 Natural resources            F4 Environmental quality            F5 Natural and human-induced standards            F6 Science and technology in local, national, and global challenges            G2 Nature of scientific knowledge</p>	<p>Grade 10:  <i>Inquiry &amp; Design</i>            3.2.10.B.1 Describe materials using precise quantitative and qualitative skills based on observations.            3.2.10.C.1 Generate questions about objects, organism and/or events that can be answered through scientific explanations.            3.2.10.C.3 Design an investigation with adequate control and limited variables to investigate a question.            3.2.10.C.5 Organize experimental information using a variety of analytic methods.            3.2.10.C.6 Judge the significance of experimental information in answering the question.  <i>Earth Sciences</i>            3.5.10.D.3 Relate aquatic life to water conditions.  <i>Technological Devices</i>            3.7.10.B.1 Describe and use appropriate instruments to gather and analyze data.            3.7.10.D.4 Apply advanced word processing, database and spreadsheet skills.            Grade 12:  <i>Inquiry &amp; Design</i>            3.2.12.A.1 Know and use the ongoing scientific processes to continually improve and better understand how things work.            3.2.12.B.1 Evaluate experimental data correctly within experimental limits.</p>

			<p>3.2.12.B.2 Judge that conclusions are consistent and logical with experimental conditions.</p> <p>3.2.12.C.1 Generate questions about objects, organisms and/or events that can be answered through scientific investigations.</p> <p>3.2.12.C.3 Design an investigation with adequate control and limited variables to investigate a question.</p> <p>3.2.12.C.4 Organize experimental information using analytic and descriptive techniques.</p> <p>3.2.12.C.5 Evaluate the significance of experimental information in answering the question.</p> <p><i>Watersheds &amp; Wetlands</i></p> <p>4.1.12.C.1 Interpret physical, chemical and biological data as a means of assessing the environmental quality of a watershed.</p> <p>4.1.12.C.2 Apply appropriate techniques in the analysis of a watershed.</p> <p><i>Ecosystems &amp; their Interactions</i></p> <p>4.6.12.C.1 Analyze the effects of substances that move through natural cycles.</p> <p>4.6.12.C.2 Analyze the effects of natural occurrences and their effects on ecosystems.</p> <p>4.6.12.C.3 Analyze the effects of human action on an ecosystem.</p>
<p>Compare student data to different regions of the Lehigh River watershed in Water Quality Data Links.</p>	<p>9-12 11C Constancy &amp; Change Things can change in detail but remain the same in general</p>	<p>9-12 A1 Abilities necessary to do scientific inquiry A2 Understandings about scientific inquiry G2 Nature of scientific knowledge</p>	<p>Grade 10: <i>Unifying Themes</i> 3.1.10.C.1 Examine and describe recurring patterns that form the basis of biological classification, chemical periodicity, geological order and astronomical order.</p>

<p>Explore the Lehigh River Watershed Photojournal, finding similarities and differences in physical characteristics within the watershed areas using student created data chart.</p>	<p>9-12 9B Symbolic Relationships Tables, graphs, and symbols are alternative ways of representing data and relationships that can be translated from one to another.</p>	<p>9 to 12: A1 Abilities necessary to do scientific inquiry F4 Environmental quality F5 Natural and human-induced hazards</p>	<p>Grade 10: <i>Inquiry &amp; Design</i> 3.2.10.B.3 Use process skills to make inferences and predictions using collected information and to communicate, using space/time relationships, defining operationally. 3.2.10.C.5 Organize experimental information using a variety of analytic methods. <i>Watersheds &amp; Wetlands</i> 4.1.10.A.2 Describe changes by tracing a specific river's origin back to its headwaters including its major tributaries. 4.1.10.B.1 Analyze a stream's physical characteristics. 4.1.10.B.2 Describe how topography influences streams. Grade 12: 4.1.12.A.3 Compare and contrast the physical differences found in the stream continuum from headwater to mouth.</p>
<p>Examine the flow rate patterns in the different areas of the Lehigh River Watershed using real-time and archived Lehigh Watershed USGS data.</p>		<p>9 to 12: A1 Abilities necessary to do scientific inquiry F4 Environmental quality F5 Natural and human-induced hazards</p>	<p>Grade 10: <i>Watersheds &amp; Wetlands</i> 4.1.10.E.1 Describe how natural events affect a watershed. 4.1.10.E.2 Describe the effects of humans and human events on watersheds.</p>

<p>Use the Internet to locate photos of other watershed areas in the world and compare these to the Lehigh River watershed. Focus on the presence and absence of man made structures. How do these impact the environment?</p>	<p>9-12  1C Mathematical Inquiry  Scientists can bring information, insights, and analytical skills to bear on matters of public concern.  5D Interdependence of Life  Human beings are part of the earth's ecosystems. Human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems.</p>	<p>9 to 12:  A1 Abilities necessary to do scientific inquiry  A2 Understandings about scientific inquiry  C4 The interdependence of organisms  F4 Environmental quality  F5 Natural and human-induced hazards  F6 Science and technology in local, national, and global challenges</p>	<p>Grade 7:  <i>Technological Devices</i>  3.7.7.E.3 Apply basic on-line research techniques to solve a specific problem.  <i>Science, Technology &amp; Human Endeavors</i>  3.8.7.A.3 Identify and explain improvements in transportation, health, sanitation and communications as a result of advancements in science and technology and how they effect our lives.  <i>Watersheds &amp; Wetlands</i>  4.1.7.B.3 Explain factors that affect water quality and flow through a watershed.  <i>Environmental Health</i>  4.3.7.B.1 Identify land use practices and their relation to environmental health.  <i>Humans &amp; the Environment</i>  4.8.7 D.1 Explain how human activities and natural events have affected ecosystems.  Grade 10:  <i>Technological Devices</i>  3.7.10.E.5 Identify, describe and complete advanced on-line research.  <i>Science, Technology &amp; Human Endeavors</i>  3.8.10.A.2 Compare technologies that are applied and accepted differently in various cultures.  <i>Watersheds &amp; Wetlands</i>  4.1.10.B.1 Analyze a stream's physical characteristics.  4.1.10.B.2 Describe how topography influences streams.  4.1.10.E.2 Identify the effects of humans and human events on watersheds.</p>
			<p><i>Humans &amp; the Environment</i>  4.8.10.C.1 Analyze and evaluate changes in the environment that are the result of human activities.  Grade 12:  <i>Watersheds &amp; Wetlands</i>  4.1.12.E.2 Evaluate the effects of human activities on watersheds and wetlands.  <i>Environmental Health</i>  4.3.12.C.2 Explain how man-made systems may affect the environment.  <i>Ecosystems &amp; their Interactions</i>  4.6.12.A.5 Analyze the positive or negative impacts of outside influences on an ecosystem.</p>

<p>Explore current research in earth and environmental science through LEO Data Collection Activities in the areas of water quality, seismology, and meteorology.</p>		<p>9 to 12:  A1 Abilities necessary to do scientific inquiry  A2 Understandings about scientific inquiry  E2 Understandings about science and technology</p>	
<p>Which Way is North?  <a href="http://www.leo.lehigh.edu/enviros/ci/geology/www/index.html">http://www.leo.lehigh.edu/enviros/ci/geology/www/index.html</a>  Pay attention to differences in the topography to determine which way is north.</p>		<p>5 to 8:  A1 Abilities necessary to do scientific inquiry  A2 Understandings about scientific inquiry  C4 Populations and ecosystems  D1 Structure of the earth system</p>	<p>Grade 10:  <i>Inquiry &amp; Design</i>  3.2.10.B.3 Use process skills to make inferences and predictions using collected information and to communicate, using space/time relationships, defining operationally.</p>
<p>Geologic Explorations  <a href="http://www.leo.lehigh.edu/enviros/ci/geology/geo/index.html">http://www.leo.lehigh.edu/enviros/ci/geology/geo/index.html</a>  Pay attention to unique geologic features. How is the topography different at each location? How is it similar? What types of physical features do you notice?</p>			<p>Grade 10:  <i>Unifying Themes</i>  3.1.10.C.1 Examine and describe recurring patterns that form the basis of biological classification, chemical periodicity, geological order and astronomical order.</p>
<p>Dino Inquiry  <a href="http://www.leo.lehigh.edu/enviros/ci/geology/dino/index.html">http://www.leo.lehigh.edu/enviros/ci/geology/dino/index.html</a>  Examine the characteristics of the dinosaur fossils.  Predict a bone's function based on your structural observations.  What similarities and differences do you notice?</p>	<p>K-2  5A Diversity of Life  Some animals and plants are alike in the way they look and in the things they do, and others are very different from one another.  3-5  5F Evolution of Life  Fossils can be compared to one another and to living organisms according to their similarities and differences.</p>	<p>K-4:  A1 Abilities necessary to do scientific inquiry  A2 Understandings about scientific inquiry  C1 The characteristics of organisms  5-8:  A1 Abilities necessary to do scientific inquiry  A2 Understandings about scientific inquiry  C1 Structure and function of living systems  D2 Earth's history</p>	<p>Grade 4:  <i>Biological Sciences</i>  3.3.4.B.2 Determine how different parts of a living thing work together to make the organism function.  Grade 7:  3.3.7.A.1 Describe how the structures of living things help them function in unique ways.  Grade 12:  3.3.12.B.3 Evaluate relationships between structure and functions of different anatomical parts given their structure.</p>
<p>Minerals Activity 1  <a href="http://www.leo.lehigh.edu/enviros/ci/geology/rocks/minerals5.html">http://www.leo.lehigh.edu/enviros/ci/geology/rocks/minerals5.html</a>  Classify the minerals you just observed according to color, streak, hardness, luster, cleavage, and fracture.</p>		<p>5 to 8:  A1 Abilities necessary to do scientific inquiry</p>	<p>Grade 7:  <i>Unifying Themes</i>  3.1.7.C.1 Identify different forms of patterns and use them to group and classify specific objects.  Grade 10:  <i>Unifying Themes</i>  3.1.10.C.1 Examine and describe recurring patterns that form the basis of biological classification, chemical periodicity, geological order and astronomical order.  <i>Earth Sciences</i>  3.5.10.A.7 Describe and identify major types of rocks and minerals.</p>

<p>Minerals Activity 2  <a href="http://www.leo.lehigh.edu/envirosci/geology/rocks/minerals6.html">http://www.leo.lehigh.edu/envirosci/geology/rocks/minerals6.html</a>          What are the common purposes of minerals you observed?          Where can be find minerals in our homes, schools, etc?</p>		<p>5 to 8:          A1 Abilities necessary to do scientific inquiry</p>	<p>Grade 7:  <i>Earth Sciences</i>          3.5.7.B.3 Explain the value and uses of different earth resources.</p>
<p>What are rocks  <a href="http://www.leo.lehigh.edu/envirosci/geology/rocks/rocks1.html">http://www.leo.lehigh.edu/envirosci/geology/rocks/rocks1.html</a>          What do you notice about the rock?          What is it made of?</p>	<p>3-5          4C Processes That Shape the Earth          Rock is composed of different combinations of minerals.          6-8          4C Sedimentary rock buried deep enough may be reformed by pressure and heat... Rock bears evidence of the minerals, temperatures, and forces that created it.</p>	<p>5 to 8:          A1 Abilities necessary to do scientific inquiry</p>	<p>Grade 7:  <i>Unifying Themes</i>          3.1.7.C.1 Identify different forms of patterns and use them to group and classify specific objects.          Grade 10:          3.1.10.C.1 Examine and describe recurring patterns that form the basis of biological classification, chemical periodicity, geological order and astronomical order.</p>
<p>Rocks: Major Categories  <a href="http://www.leo.lehigh.edu/envirosci/geology/rocks/rocks2.html">http://www.leo.lehigh.edu/envirosci/geology/rocks/rocks2.html</a>          Use the following Websites to observe, identify and classify sedimentary, igneous and metamorphic rocks. Where are they found? Give common examples of each type. What are the common minerals found in each type?</p>	<p>6-8          4C Processes That Shape the Earth Sediments of sand and smaller particles are gradually buried and are cemented together by dissolved minerals to form solid rock again. Sedimentary rock buried deep enough may be reformed by pressure and heat, perhaps melting and recrystallizing into different kinds of rock.</p>	<p>5 to 8:          A1 Abilities necessary to do scientific inquiry          D1 Structure of the earth system</p>	<p>Grade 7:  <i>Earth Sciences</i>          3.5.7.A.2 Describe the processes involved in the creation of geologic features and that these processes seen today are similar to those in the past.          Grade 10:  <i>Unifying Themes</i>          3.1.10.C.1 Examine and describe recurring patterns that form the basis of biological classification, chemical periodicity, geological order and astronomical order.  <i>Earth Sciences</i>          3.5.10.A.7 Describe and identify major types of rocks and minerals.</p>
<p>Rocks: Classifying Activity  <a href="http://www.leo.lehigh.edu/envirosci/geology/rocks/rocks3.html">http://www.leo.lehigh.edu/envirosci/geology/rocks/rocks3.html</a>          Make notes on color, minerals, type, and other features.</p>	<p>3-5          4C Processes That Shape the Earth          Rock is composed of different combinations of minerals.</p>	<p>5 to 8:          A1 Abilities necessary to do scientific inquiry          D1 Structure of the earth system</p>	<p>Grade 7:  <i>Inquiry &amp; Design</i>          3.2.7.B.3 Communicate, use space/time relationships, define operationally, raise questions, formulate hypotheses, test and experiment.          Grade 10:  <i>Earth Sciences</i>          3.5.10.A.7 Describe and identify major types of rocks and minerals.</p>

<p>Rocks: Are they all related?  <a href="http://www.leo.lehigh.edu/envirosci/geology/rocks4.html">http://www.leo.lehigh.edu/envirosci/geology/rocks4.html</a>          Are igneous, metamorphic and sedimentary rock all related?          Write your hypothesis and provide a two sentence explanation for it.</p>	<p>6-8          4C Processes That Shape the Earth          Sediments of sand and smaller particles are gradually buried and are cemented together by dissolved minerals to form solid rock again. Sedimentary rock buried deep enough may be reformed by pressure and heat, perhaps melting and recrystallizing into different kinds of rock.</p>	<p>5 to 8:          A1 Abilities necessary to do scientific inquiry</p>	<p>Grade 7:  <i>Earth Sciences</i>          3.5.7.A.4 Explain how the rock cycle affected rock formations in the state of PA.          Grade 10:          3.5.10.A.7 Describe and identify major types of rocks and minerals.</p>
<p>Rock Cycle  <a href="http://www.leo.lehigh.edu/envirosci/geology/rocks/rocks5.html">http://www.leo.lehigh.edu/envirosci/geology/rocks/rocks5.html</a>          Choose two activities to make sense of the rock cycle.</p>	<p>3-5          4C Processes That Shape the Earth          Waves, wind, water, and ice shape and reshape the earth's land surface by eroding rock and soil in some area and depositing them in other areas, sometimes in seasonal layers.</p>		<p>Grade 7:  <i>Earth Sciences</i>          3.5.7.A.4 Explain how the rock cycle affected rock formations in the state of PA.</p>
<p>Lehigh River Photojournal          Headwaters to Lehigh Gorge  <a href="http://www.leo.lehigh.edu/envirosci/watershed/pjournal/section1/6/index.html">http://www.leo.lehigh.edu/envirosci/watershed/pjournal/section1/6/index.html</a>          How do depth and width of the river change as it flows throughout the watershed?</p>	<p>3-5          11C Constancy &amp; Change          Some features of things may stay the same even when other features change. Things change in steady, repetitive, or irregular ways - or sometimes in more than one way at the same time. Often the best way to tell which kinds of change are happening is to make a table or graph of measurements.</p>	<p>5 to 8:          A1 Abilities necessary to do scientific inquiry</p>	<p>Grade 10:  <i>Watersheds &amp; Wetlands</i>          4.1.10.A.2 Describe changes by tracing a specific river's origin back to its headwaters including its major tributaries.          4.1.10.B.1 Analyze a stream's physical characteristics.          Grade 12:          4.1.12.A.3 Compare and contrast the physical differences found in the stream continuum from headwater to mouth.</p>
<p>Lehigh River Photojournal          Jim Thorpe to Walnutport  <a href="http://www.leo.lehigh.edu/envirosci/watershed/pjournal/section1/7/index.html">http://www.leo.lehigh.edu/envirosci/watershed/pjournal/section1/7/index.html</a>          In what other areas of the Lehigh River watershed would you expect to find similar wildlife? How is this area similar to or different from other watershed areas in PA?</p>	<p>3-5          5D Interdependence of Life          For any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.          6-8          ...In any particular environment, the growth and survival of organisms depend on the physical conditions.</p>	<p>5 to 8:          A1 Abilities necessary to do scientific inquiry          C4 Populations and ecosystems          9 to 12:          A1 Abilities necessary to do scientific inquiry          C4 The independence of organisms</p>	<p>Grade 7:  <i>Watersheds &amp; Wetlands</i>          4.1.7.C.2 Explain how the physical components of aquatic systems influence the organisms that live there in terms of size, shape and physical adaptations.          Grade 10:          4.1.10.C.1 Describe and explain the physical factors that affect a stream and the organisms living there.          4.1.10.C.2 Identify terrestrial and aquatic organisms that live in a watershed.          4.1.10.C.4 Identify the types of organisms that would live in a stream based on the stream's physical characteristics.</p>

<p>Lehigh River Photojournal  Treichler's to Allentown  <a href="http://www.leo.lehigh.edu/enviros/ci/watershed/pjournal/section1/2/index.html">http://www.leo.lehigh.edu/enviros/ci/watershed/pjournal/section1/2/index.html</a>  If the dam breaks what would happen?</p>	<p>6-8  3B Design &amp; Systems  All technologies have effects other than those intended by the design, some of which may have been predictable and some not. In either case, these side effects may turn out to be unacceptable to some of the population and therefore lead to conflict between groups.  3C Issues in Technology  New technologies increase some risks and decrease others. Some of the same technologies that have improved the length and quality of life for some people have also brought new risks.  9-12  5D Interdependence of Life  Ecosystems can be reasonably stable over hundreds or thousands of years. ... If a disaster such as flood or fire occurs, the damaged ecosystem is likely to recover in stages that eventually result in a system similar to the original one.</p>	<p>5 to 8:  A1 Abilities necessary to do scientific inquiry  B3 Transfer of energy  E2 Understandings about science and technology  F4 Risks and benefits  F5 Science and technology in society  9 to 12:  A1 Abilities necessary to do scientific inquiry  E2 Understandings about science and technology  F5 Natural and human-induced hazards  F6 Science and technology in local, national, and global challenges</p>	<p>Grade 7:  <i>Inquiry &amp; Design</i>  3.2.7.2 Answer "What if" questions based on observation, inference or prior knowledge or experience.  <i>Environmental Health</i>  4.3.7.B.2 Describe how natural disasters affect environmental health.  Grade 10:  <i>Inquiry &amp; Design</i>  3.2.10.B.3 Use process skills to make inferences and predictions using collected information and to communicate, using space/time relationships, defining operationally.  <i>Watersheds &amp; Wetlands</i>  4.1.10.E.2 Identify the effects of humans and human events on watersheds.  4.6.10.A.9 Identify a specific environmental impact and predict what change may take place to affect homeostasis.  Grade 12:  <i>Watersheds &amp; Wetlands</i>  4.1.12.E.2 Evaluate the effects of human activities on watersheds and wetlands.</p>
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<p>Fish Kills  <a href="http://www.leo.lehigh.edu/envirosci/watershed/riverexp/fishkills.html">http://www.leo.lehigh.edu/envirosci/watershed/riverexp/fishkills.html</a>          What would happen if a fish kill happened in your watershed area?</p>	<p>6-8          1B Scientific Inquiry          Scientists differ greatly in what phenomena they study and how they go about their work. Although there is no fixed set of steps that all scientists follow, scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.          12E Critical-Response Skills          Be aware that there may be more than one good way to interpret a given set of findings.          9-12          E4 Insist that the critical assumption behind any line of reasoning be made explicit so that the validity of the position being taken-whether one's own or that of others-can be judged.</p>	<p>5 to 8:          A1 Abilities necessary to do scientific inquiry          A2 Understandings about scientific inquiry          C4 Populations and ecosystems          F2 Populations, resources, and environments          F3 Natural hazards          G1 Science as a human endeavor          G2 Nature of science</p>	<p>Grade 7:  <i>Unifying Themes</i>          3.1.7.E.3 Describe the effect of making a change in one part of a system on the system as a whole.  <i>Inquiry &amp; Design</i>          3.2.7.A.2 Answer "What if" questions based on observation, inference or prior knowledge or experience.          3.2.7.B.2 Describe relationships by making inferences and predictions.          3.2.7.D.2 Define all aspects of the problem, necessary information and questions that must be answered.          3.2.7.D.3 Propose the best solution.          3.2.7.D.6 Explain the results, present improvements, identify and infer the impacts of the solution.  <i>Earth Sciences</i>          3.5.7.D.5 Identify ocean and shoreline features.  <i>Technological Devices</i>          3.7.7.E.3 Apply basic on-line research techniques to solve a specific problem.  <i>Science, Technology &amp; Human Endeavors</i>          3.8.7.B.2 Identify and describe the resources necessary to solve a selected problem in a community and improve the quality of life.  <i>Threatened, Endangered &amp; Extinct Species</i>          4.7.7.C.1 Identify natural or human impacts that cause habitat loss.</p>
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		<p>Grade 12:</p> <p><i>Science, Technology &amp; Human Endeavors</i></p> <p>3.8.12.C.1 Propose solutions to specific scientific and technological applications, identifying possible financial considerations</p> <p>3.8.12.C.2 Analyze scientific and technological solutions through the use of risk/benefit analysis.</p> <p><i>Ecosystems &amp; Their Interactions</i></p> <p>4.6.12.A.5 Analyze the positive and negative impacts of outside influences on an ecosystem.</p> <p>4.6.12.C.3 Analyze effects of human action on an ecosystem.</p> <p><i>Environmental Laws &amp; Regulations</i></p> <p>4.9.12.A.1 Analyze and explain how issues led to environmental law or regulation.</p> <p>4.9.12.A.2 Compare and contrast environmental laws and regulations that may have a positive or negative impact on the environment and the economy.</p>

<p>Introduction and Purpose  <a href="http://www.leo.lehigh.edu/envirosci/weather/bitsofbiomes/introduction_and_purpose.htm">http://www.leo.lehigh.edu/envirosci/weather/bitsofbiomes/introduction_and_purpose.htm</a>  Do selected cities really exhibit the characteristic climatic conditions of their defined biome?</p>	<p>6-8  4C Processes that Shape the Earth  Human activities, such as reducing the amount of forest cover, increasing the amount and variety of chemicals released into the atmosphere, and intensive farming, have changed the earth's land, oceans, and atmosphere. Some of these changes have decreased the capacity of the environment to support some life forms.  5D Interdependence of Life  In any particular environment, the growth and survival of organisms depend on the physical conditions.  11A Systems  A system can include processes as well as things.  Thinking about things as systems means looking for how every part relates to others. The output from one part of a system can become the input to other parts. Such feedback can serve to control what goes on in the system as a whole.  9-12  5D Interdependence of Life  Human beings are part of the earth's ecosystems. Human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems.</p>	<p>5 to 8:  A1 Abilities necessary to do scientific inquiry  A2 Understandings about scientific inquiry  C3 Regulation and behavior  C4 Populations and ecosystems  E2 Understandings about science and technology  F2 Populations, resources, and environments  F4 Risks and benefits  F5 Science and technology in society</p>	<p>Grade 7:  <i>Inquiry &amp; Design</i>  3.2.7.B.2 Describe relationships by making inferences and predictions.  3.2.7.B.3 Communicate, use space/time relationships, define operationally, raise questions, formulate hypotheses, test and experiment.  <i>Ecosystems &amp; Their Interactions</i>  4.6.7.A.2 Describe and explain the adaptations of plants and animals to their environment.  4.6.7.A.3 Demonstrate the dependency of living components in the ecosystem on the nonliving components.  4.6.7.A.9 Identify the major characteristics of a biome.  Grade 10:  <i>Inquiry &amp; Design</i>  3.2.10.B.3 Use process skills to make inferences and predictions using collected information and to communicate, using space/time relationships, defining operationally.</p>
	<p>5E Flow of Matter &amp; Energy  The amount of life any environment can support is limited by the available energy, water, oxygen, and minerals, and by the ability of the ecosystems to recycle the residue of dead organic materials. Human activities and technology can change the flow and reduce the fertility of the land.  11A1 Systems  A system usually has some properties that are different from those of its parts, but appear because of the interaction of those parts.  11A2 Understanding how things work and designing solutions to problems of almost any kind can be facilitated by systems analysis.</p>		

<p>Middle School Student Web Activity  <a href="http://www.leo.lehigh.edu/envirosci/weather/bitsofbiomes/middle_school_web_activity.htm">http://www.leo.lehigh.edu/envirosci/weather/bitsofbiomes/middle_school_web_activity.htm</a>  Collect temp, rain &amp;/or snow, humidity, wind dir &amp; speed, barom pressure, and climate description data per week, per yr.  Record data in Excel spreadsheets.  Use Excel data to create graphs.  Analyze data. Look for patterns.</p>	<p>6-8  1C The Science Enterprise  No matter who does science and mathematics or invents things, or when they do it, the knowledge and technology that result can eventually become available to everyone in the world.  Computers have become invaluable in science because they speed up and extend people's ability to collect, store, compile, and analyze data, prepare research reports, and share data and ideas with investigators all over the world.  11C Constancy &amp; Change  Things that change in cycles, such as the seasons or body temperature, can be described by their cycle length or frequency, what the highest and lowest values are, and when they occur.  12C Manipulation &amp; Observation  Use computers to store and retrieve information ...and create simple files of their own devising.  Read analog and digital meters on instruments used to make direct measurements...and choose appropriate units for reporting various magnitudes.  12D Communication Skills  Use tables, charts, and graphs in asking arguments and claims in oral and written presentations.</p>	<p>5 to 8:  A1 Abilities necessary to do scientific inquiry  A2 Understandings about scientific inquiry  D1 Structure of the earth system  F3 Natural hazards</p>	<p>Grade 7:  <i>Unifying Themes</i>  3.1.7.C.2 Identify repeating structure patterns  <i>Inquiry &amp; Design</i>  3.2.7.C.5 Judge the significance of experimental information in answering the question.  3.2.7.C.6 Communicate appropriate conclusions from the experiment.  <i>Technological Devices</i>  3.7.7.D.5 Apply intermediate skills in utilizing word processing, database and spreadsheet software.  <i>Ecosystems &amp; their Interactions</i>  4.6.7.A.9 Identify the major characteristics of a biome.  4.6.7.A.10 Compare and contrast different biomes and their characteristics.  Grade 10:  <i>Unifying Themes</i>  3.1.10.C.1 Examine and describe recurring patterns that form the basis of biological classification, chemical periodicity, geological order and astronomical order.  <i>Inquiry &amp; Design</i>  3.2.10.C.5 Organize experimental information using a variety of analytical methods.  3.2.10.C.6 Judge the significance of experimental information in answering the question.</p>
			<p><i>Technological Devices</i>  3.7.10.D.4 Apply advanced word processing, database and spreadsheet skills.  Grade 12:  <i>Inquiry &amp; Design</i>  3.2.12.C.4 Organize experimental information using analytic and descriptive techniques.</p>
<p>Create a world travel booklet including people, culture, economics, animals, vegetation.</p>	<p>The amount of life any environment can support is limited by the available energy, water, oxygen, and minerals, and by the ability of the ecosystems to recycle the residue of dead organic materials. Human activities and technology can change the flow and reduce the fertility of the land.</p>	<p>5 to 8:  A1 Abilities necessary to do scientific inquiry  C4 Populations and ecosystems  D1 Structure of the earth system  F5 Science and technology in society</p>	<p>Grade 7:  <i>Ecosystems &amp; Their Interactions</i>  4.6.7.A.10 Compare and contrast different biomes and their characteristics.  <i>Humans &amp; the Environment</i>  4.8.7.A.1 Explain how people use natural resources in their environment.  4.8.7.A.2 Locate and identify natural resources in different parts of the world.  Grade 10:  4.8.10.A.2 Compare and contrast the use of natural resources and the environmental conditions in several countries.</p>

<p><a href="http://www.leo.lehigh.edu/envirosci/weather/bitsofbiomes/decision_making_activities.htm">http://www.leo.lehigh.edu/envirosci/weather/bitsofbiomes/decision_making_activities.htm</a></p> <p>Think about the dilemma of building a baseball stadium versus keeping the bird and wildlife sanctuary in the role of a specific community member. How would you vote? Justify your answer.</p>	<p>6-8</p> <p>1B Scientific Inquiry Scientists differ greatly in what phenomena they study and how they go about their work. Although there is no fixed set of steps that all scientists follow, scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.</p> <p>12A Values and Attitudes Know that often different explanations can be given for the same evidence, and it is not always possible to tell which one is correct.</p> <p>12E Critical-Response Skills Be aware that there may be more than one good way to interpret a given set of findings.</p> <p>9-12</p> <p>12E Critical-Response Skills Insist that the critical assumption behind any line of reasoning be made explicit so that the validity of the position being taken-whether one's own or that of others-can be judged ...suggest alternative trade-offs in decisions and designs and criticize those in which major trade-offs are not acknowledged.</p>	<p>5 to 8:</p> <p>A1 Abilities necessary to do scientific inquiry A2 Understandings about scientific inquiry C4 Populations and ecosystems E1 Abilities of technological design E2 Understandings about science and technology F3 Natural hazards F5 Science and technology in society</p> <p>9-12:</p> <p>A2 Understandings about scientific inquiry C4 The independence of organisms E1 Abilities of technological design E2 Understandings about science and technology F4 Environmental quality F5 Natural and human-induced hazards F6 Science and technology in local, national, and global challenges</p>	<p>Grade 7:</p> <p><i>Inquiry &amp; Design</i> 3.2.7.A.2 Answer "What if" questions based on observation, inference or prior knowledge or experience. 3.2.7.C.5 Judge the significance of experimental information in answering the question. 3.2.7.C.6 Communicate appropriate conclusions from the experiment.</p> <p><i>Watersheds &amp; Wetlands</i> 4.1.7.B.3 Explain factors that affect water quality and flow through a watershed. 4.1.7.E.1 Explain the impact of watersheds and wetlands in flood control, wildlife habitats and pollution abatement.</p> <p><i>Environmental Health</i> 4.3.7.B.1 Identify land use practices and their relation to environmental health</p> <p><i>Threatened, Endangered and Extinct Species</i> 4.7.7.C.1 Identify natural or human impacts that cause habitat loss. 4.7.7.C.2 Explain how habitat loss can affect the interaction among species and the population of a species.</p>
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			<p><i>Humans &amp; the Environment</i>  4.8.10.C.1 Analyze and evaluate changes in the environment that are the result of human activities  Grade 12:  <i>Inquiry &amp; Design</i>  3.2.12.C.4 Organize experimental information using analytic and descriptive techniques.  <i>Science, Technology &amp; Human Endeavors</i>  3.8.12.C.2 Analyze scientific and technological solutions through the use of risk/benefit analysis.  <i>Watersheds &amp; Wetlands</i>  4.1.12.E.2 Evaluate the effects of human activities on watersheds and wetlands.  <i>Environmental Health</i>  4.3.12.C.2 Explain how man-made systems may affect the environment  <i>Ecosystems &amp; their Interactions</i>  4.6.12.A.5 Analyze the positive or negative impacts of outside influences on an ecosystem.</p>

<p>Hurricanes Exploration  <a href="http://www.leo.lehigh.edu/enviros/ci/weather/phenweather/hurricanes2.html">http://www.leo.lehigh.edu/enviros/ci/weather/phenweather/hurricanes2.html</a>  Let's learn more about hurricanes.</p>	<p>3-5  11A Systems  In something that consists of many parts, the parts usually influence one another.  6-8  4B The Earth  The cycling of water in and out of the atmosphere plays an important role in determining climatic patterns. ...  4E Energy Transformations  Most of what goes on in the universe...involves some form of energy being transformed into another. Energy in the form of heat is almost always one of the products of an energy transformation.  11A A system consists of processes as well as things.  9-12  4B Weather and climate involve the transfer of energy in and out of the atmosphere...  11A A system usually has some properties that are different from those of its parts, but appear because of the interaction of those parts.</p>	<p>5 to 8:  A1 Abilities necessary to do scientific inquiry  B3 Transfer of energy  D1 Structure of the earth system  F3 Natural hazards  9 to 12:  A1 Abilities necessary to do scientific inquiry  D1 Energy in the earth system  F5 Natural and human-induced hazards</p>	<p>Grade 7:  <i>Earth Sciences</i>  3.5.7.C.2 Explain the oceans' impact on local weather and the climate of a region.  3.5.7.C.3 Identify how cloud types, wind directions and barometric pressure changes are associated with weather patterns in different regions of the country.  Grade 12:  <i>Earth Sciences</i>  3.5.12.C.2 Explain how unequal heating of the air, ocean and land produces wind and ocean currents.  3.5.12.C.4 Analyze the mechanisms that drive a weather phenomena using the correlation of three methods of heat transfer.  <i>Science, Technology &amp; Human Endeavors</i>  4.8.12.D.1 Identify natural occurrences that have international impact.</p>
<p>Tornadoes Exploration  <a href="http://www.leo.lehigh.edu/enviros/ci/weather/phenweather/tornadoes.html">http://www.leo.lehigh.edu/enviros/ci/weather/phenweather/tornadoes.html</a>  Discover what conditions cause tornadoes, where they get their energy, how they are measured, and how many get where you live.</p>	<p>3-5  11A Systems  In something that consists of many parts, the parts usually influence one another.  6-8  4E Energy Transformations  Most of what goes on in the universe...involves some form of energy being transformed into another. Energy in the form of heat is almost always one of the products of an energy transformation.  6-8  11A A system consists of processes as well as things.  9-12  4B The Earth  Weather and climate involve the transfer of energy in and out of the atmosphere...  9-12  11A A system usually has some properties that are different from those of its parts, but appear because of the interaction of those parts.</p>	<p>5 to 8:  A1 Abilities necessary to do scientific inquiry  B3 Transfer of energy  D1 Structure of the earth system  F3 Natural hazard  9 to 12:  A1 Abilities necessary to do scientific inquiry  D1 Energy in the earth system  F5 Natural and human-induced hazards</p>	<p>Grade 12:  <i>Earth Sciences</i>  3.5.12.C.2 Explain how unequal heating of the air, ocean and land produces wind and ocean currents.  3.5.12.C.4 Analyze the mechanisms that drive a weather phenomena using the correlation of three methods of heat energy transfer.</p>

<p>Lightning Exploration  <a href="http://www.leo.lehigh.edu/enviros/ci/weather/phenweather/lightning.html">http://www.leo.lehigh.edu/enviros/ci/weather/phenweather/lightning.html</a>  Discover what causes lightning, different types, how to estimate the distance of a thunderstorm, and how often your area is struck by lightning.</p>	<p>3-5  11A Systems  In something that consists of many parts, the parts usually influence one another.  6-8  4E Energy Transformations  Most of what goes on in the universe...involves some form of energy being transformed into another. Energy in the form of heat is almost always one of the products of an energy transformation.  6-8  11A A system consists of processes as well as things.  9-12  4B The Earth  Weather and Climate involve the transfer of energy in and out of the atmosphere...  9-12  11A A system usually has some properties that are different from those of its parts, but appear because of the interaction of those parts.</p>	<p>5 to 8:  A1 Abilities necessary to do scientific inquiry  B3 Transfer of energy  D1 Structure of the earth system  F3 Natural hazards  9 to 12:  A1 Abilities necessary to do scientific inquiry  D1 Energy in the earth system  F5 Natural and human-induced hazards</p>	
<p>Greenhouse Effect Exploration  <a href="http://www.leo.lehigh.edu/enviros/ci/weather/phenweather/greenhouse.html">http://www.leo.lehigh.edu/enviros/ci/weather/phenweather/greenhouse.html</a>  Let's learn more about the greenhouse effect (cars, greenhouse, temperature increase, global warming, greenhouse gases).</p>	<p>6-8  4B The Earth  Climates have sometimes changes abruptly in the past as a result of changes in the earth's crust...Even relatively small changes in atmospheric or ocean content can have widespread effects on climate if the change lasts long enough.  The benefits of the earth's resources...can be reduced by using them wastefully or by deliberately or inadvertently destroying them.  The atmosphere and the oceans have a limited capacity to absorb wastes and recycle materials naturally.  4C Processes That Shape the Earth  Human activities, such as reducing the amount of forest cover, increasing the amount and variety of chemicals released into the atmosphere, and intensive farming, have changed the earth's land, oceans, and atmosphere.  9-12  4B The Earth  Weather and climate involve the transfer of energy in and out of the atmosphere...</p>	<p>5 to 8:  A1 Abilities necessary to do scientific inquiry  B3 Transfer of energy  D1 Structure of the earth system  E2 Understandings about science and technology  F1 Personal health  F2 Populations, resources, and environments  F3 Natural hazards  F4 Risks and benefits  F5 Science and technology in society  9 to 12:  A1 Abilities necessary to do scientific inquiry  B6 Interactions of energy and matter  C4 The independence of organisms  D2 Geochemical cycles  E2 Understandings about science and technology  F4 Environmental quality  F5 Natural and human-induced hazards  F6 Science and technology in local, national, and global challenges</p>	<p>Grade 7:  <i>Humans &amp; the Environment</i>  4.8.7.B.3 Explain how climate and extreme weather events influence people's lives.  4.8.7.C.1 Describe what effect consumption and related generation of wastes have on the environment.  Grade 10:  4.8.10.C.1 Analyze and evaluate changes in the environment that are the result of human activities.  Grade 12:  4.8.12.D.1 Identify natural occurrences that have international impact.  4.8.12.D.2 Analyze environmental issues and their international implications.</p>

<p>The Shell Island Dilemma  <a href="http://www.ncsu.edu/coast/shell">http://www.ncsu.edu/coast/shell</a>  After reviewing the resources, prepare a statement to decide what should be the next course of action regarding the Shell Island Resort.</p>	<p>6-8  1B Scientific Inquiry  Scientists differ greatly in what phenomena they study and how they go about their work. Although there is no fixed set of steps that all scientists follow, scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.  12A Values and Attitudes  Know that often different explanations can be given for the same evidence, and it is not always possible to tell which one is correct.  12E Critical-Response Skills  Be aware that there may be more than one good way to interpret a given set of findings.  9-12  12E Critical-Response Skills  Insist that the critical assumption behind any line of reasoning be made explicit so that the validity of the position being taken...can be judged.  Be aware, when considering claims, that when people try to prove a point, they may select only the data that support it and ignore any that would contradict it. ...suggest alternative trade-offs in decisions and designs...</p>	<p>5 to 8:  A1 Abilities necessary to do scientific inquiry  A2 Understandings about scientific inquiry  C4 Populations and ecosystems  E1 Abilities of technological design  E2 Understandings about science and technology  F3 Natural hazards  F5 Science and technology in society  9 to 12:  A1 Abilities necessary to do scientific inquiry  A2 Understandings about scientific inquiry  C4 The independence of organisms  E1 Abilities of technological design  E2 Understandings about science and technology  F4 Environmental quality  F5 Natural and human-induced hazards  F6 Science and technology in local, national, and global challenge  Teaching:  A2 Select science content and adapt interests, knowledge, understanding, abilities, and experience of students.  B1 Focus and support inquiries while interacting with students.  B3 Challenge students to accept and share responsibility for their own learning.  E3 Nurture collaboration among students.  E4 Structure and facilitate ongoing formal and informal discussion based on a shared</p>	<p>Grade 7:  <i>Unifying Themes</i>  3.1.7.E.3 Describe the effect of making a change in one part of a system on the system as a whole.  <i>Inquiry &amp; Design</i>  3.2.7.A.2 Answer "What if" questions based on observation, inference or prior knowledge or experience.  3.2.7.B.2 Describe relationships by making inferences and predictions.  3.2.7.D.2 Define all aspects of the problem, necessary information and questions that must be answered.  3.2.7.D.3 Propose the best solution.  3.2.7.D.6 Explain the results, present improvements, identify and infer the impacts of the solution.  <i>Earth Sciences</i>  3.5.7.D.5 Identify ocean and shoreline features.  <i>Technological Devices</i>  3.7.7.E.3 Apply basic on-line research techniques to solve a specific problem.  <i>Science, Technology &amp; Human Endeavors</i>  3.8.7.B.2 Identify and describe the resources necessary to solve a selected problem in a community and improve the quality of life.  <i>Threatened, Endangered &amp; Extinct Species</i>  4.7.7.C.1 Identify natural or human impacts that cause habitat loss.</p>
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		<p>understanding of rules of scientific discourse E5 Model and emphasize the skills, attitudes, and values of scientific inquiry.</p>	<p>4.7.7.C.2 Explain how habitat loss can affect the interaction among species and the population of a species.  Humans &amp; the Environment  4.8.7.D.1 Explain how human activities and natural events have affected ecosystems. Grade 10:  Inquiry &amp; Design  3.2.10.B.3 Use process skills to make inferences and predictions using collected information and to communicate, using space/time relationships, defining operationally.  3.2.10.C.6 Judge the significance of experimental information using a variety of analytic methods.  3.2.10.C.7 Suggest additional steps that might be done experimentally.  3.2.10.D.1 Examine the problem, rank all necessary information and all questions that must be answered.  3.2.10.D.2 Propose and analyze a solution.  3.2.10.D.5 Communicate the process and evaluate and present the impacts of the solution.  Science, Technology &amp; Human Endeavors  3.8.10.C.3 Compare and contrast potential solutions to technological, social, economic and environmental problems.  4.6.10.A.9 Identify a specific environmental impact and predict what change may take place to affect homeostasis.</p>
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			<p>4.6.12.A.5 Analyze the positive and negative impacts of outside influences on an ecosystem.</p> <p>4.6.12.C.3 Analyze effects of human action on an ecosystem.</p> <p>4.9.12.A.1 Analyze and explain how issues led to environmental law or regulation.</p> <p>4.9.12.A.2 Compare and contrast environmental laws and regulations that may have a positive or negative impact on the environment and the economy.</p>