

IES Correlations to South Carolina Earth Science Standards Grades 6-8

	Climate and Weather	Dynamic Planet	Energy Resources	Fossils	Materials and Minerals	Oceans	Rocks and Landforms	Soil	Water as a Resource
<p>Correlation Key: "XX" In-depth Coverage = In-depth coverage of concept in student edition "X" Coverage = Coverage in student edition and/or teacher edition supports the development of the concept.</p>									
Grades 6, 7, 8									
I. Inquiry - Grades 6, 7, 8									
A. Abilities Necessary to do Scientific Inquiry									
1. Identify process skills that can be used in scientific investigations.									
a. Observe									
1. Observe patterns of objects and events.	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Distinguish between qualitative and quantitative observations.	XX	XX	XX	XX	XX	XX	XX	XX	XX
b. Classify									
1. Arrange data in sequential order.	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Use scientific (e.g., field guides, charts, periodic tables, etc.) and dichotomous keys for classification.	XX				XX		XX		
c. Measure									
1. Select and use appropriate tools (e.g., metric ruler, graduated cylinder, thermometer, balances, spring scales, stopwatches) and units (e.g., meter, liter, Celsius, gram, Newton, second) to measure to the unit required in a particular situation.	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Select and use appropriate metric prefixes to include milli-, centi-, and kilo-.	XX	XX	XX	XX	XX	XX	XX	XX	XX
d. Infer									
1. Make inferences based on observations.	XX	XX	XX	XX	XX	XX	XX	XX	XX
e. Predict									
1. Predict the results of actions based on patterns in data and experiences.	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Design and conduct a scientific investigation.									
a. Recognize potential hazards within a scientific investigation and practice appropriate safety procedures.	XX	XX	XX	XX	XX	XX	XX	XX	XX
b. Pose questions and problems to be investigated.	XX	XX	XX	XX	XX	XX	XX	XX	XX
c. Obtain scientific information from a variety of sources (such as Internet, electronic encyclopedias, journals, community resources, etc.).	XX	XX	XX	XX	XX	XX	XX	XX	XX

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d. Distinguish and operationally define independent (manipulated) and dependent (responding) variables.	X	X	X	X	X	X	X	X	X
e. Manipulate one variable over time with repeated trials and controlled conditions.	X	X	X	X	X	X	X	X	X
f. Collect and record data using appropriate metric measurements.	XX	XX	XX	XX	XX	XX	XX	XX	XX
g. Organize data in tables and graphs.	XX	XX	XX	XX	XX	XX	XX	XX	XX
h. Analyze data to construct explanations and draw conclusions.	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Use appropriate tools and techniques to gather, analyze, and interpret data.									
a. Select and use appropriate tools and technology (such as calculators, computers, probes, thermometers, balances, spring scales, microscopes, binoculars, and hand lenses) to perform tests, collect data, and display data.	XX	XX	XX	XX	XX	XX	XX	XX	XX
b. Analyze and interpret data using computer hardware and software designed for these purposes.	X	X	X	X	X	X	X	X	X
4. Develop descriptions, explanations, predictions, and models using evidence.									
a. Discriminate among observations, inferences, and predictions.	XX	XX	XX	XX	XX	XX	XX	XX	XX
b. Construct and/or use models to carry out/support scientific investigations.	XX	XX	XX	XX	XX	XX	XX	XX	XX
5. Think critically and logically to make relationships between evidence and explanations.									
a. Review and summarize data to show cause-effect relationships in experiments.	X	X	X	X	X	X	X	X	X
b. State explanations in terms of independent (manipulated) and dependent (responding) variables.	X	X	X	X	X	X	X	X	X
c. State hypotheses in ways that include the independent (manipulated) and dependent (responding) variables.	X	X	X	X	X	X	X	X	X
6. Recognize and analyze alternative explanations and predictions.									
a. Analyze different ideas and explanations to consider alternative ideas.	XX	XX	XX	XX	XX	XX	XX	XX	XX
b. Accept the skepticism of others as part of the scientific process. (N)	XX	XX	XX	XX	XX	XX	XX	XX	XX
7. Communicate scientific procedures and explanations.									
a. Use drawings and written and oral expression to communicate information.	XX	XX	XX	XX	XX	XX	XX	XX	XX
b. Create drawings, diagrams, charts, tables and graphs to communicate data.	XX	XX	XX	XX	XX	XX	XX	XX	XX

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c. Interpret and describe patterns of data on drawings, diagrams, charts, tables, graphs, and maps.	XX	XX	XX	XX	XX	XX	XX	XX	XX
d. Create and/or use scientific models to communicate information.	XX	XX	XX	XX	XX	XX	XX	XX	XX
8. Use mathematics in all aspects of scientific inquiry.									
a. Use mathematics to gather, organize and present data.	X	X	X	X	X	X	X	X	X
b. Use mathematics to structure convincing explanations.	X	X	X	X	X	X	X	X	X
B. Abilities Necessary to Do Technological Design									
1. Identify appropriate problems for technological design.									
a. Identify a specific need for a product.	X				XX			X	
b. Determine whether the product will meet the identified need.	X				XX			X	
2. Design a solution or product.									
a. Compare and contrast different proposals using selected criteria (e.g., cost, time, trade-off, and materials needed).	X				XX			X	
b. Communicate ideas with drawings and simple models.	X				XX			X	
3. Implement a proposed design.									
a. Select suitable tools and techniques to ensure adequate accuracy.	X				XX			X	
b. Organize materials, devise a plan and work collaboratively where appropriate.	X				XX			X	
4. Evaluate completed technological designs or products.									
a. Measure the quality of the product based on the original purpose or need and the degree to which it meets the needs of the users.	X				XX			X	
b. Suggest improvements and try proposed modifications to the design.	X				XX			X	
5. Communicate the process of technological design.									
a. Identify the four stages of problem solving: problem identification, solution design, implementation, and evaluation.	X				XX			X	
C. Understandings about Science and Technology									
1. Scientific inquiry and technological design have similarities and differences.									
a. Compare and contrast scientific inquiry and technological design.	X		X		X	X			X
2. Many different people in different cultures have made and continue to make contributions to science and technology.									
a. Describe examples of contributions people have made to science and technology.	X		X		X	X			X
3. Science and technology are reciprocal.									
a. Explain how science and technology are essential to each other.	X	X	X	X	X	X	X	X	X
4. Perfectly designed solutions do not exist.									

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a. Discuss factors that affect product design and alter the original design.	X		X		XX			X	X
b. Discuss risk versus benefit factors in product design.	X		X		XX			X	X
5. Technological designs have constraints.									
a. Describe examples of constraints on technological designs.	X		X		X			X	X
b. Explain why constraints on technological design are unavoidable.	X		X		X			X	X
6. Technological solutions have intended benefits and unintended consequences.									
Grade 6									
III. Earth Science: Unit of Study: Energy Transfer in the Atmosphere									
A. Structure of the Earth System									
1. Water, which covers the majority of the Earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the "water cycle." Water evaporates from the Earth's surface, rises and cools as it moves to higher elevations, condenses as rain or snow and falls to the surface, where it collects in lakes, oceans, soil, and rocks underground.									
a. Identify, investigate and explain the processes of condensation, evaporation, precipitation, and runoff using a model or diagram.	XX								XX
b. Relate the occurrence of water in the Earth's crust, oceans, and atmosphere to the water cycle processes.	XX					XX			XX
c. Analyze why precipitation occurs in the form of rain, sleet, hail, or snow.	XX								
2. Water is a solvent. As it passes through the water cycle, it dissolves minerals and gases and carries them to the oceans.									
a. Classify different substances based on their solubility in water.					X			X	
b. Infer the effects of water on the weathering of the Earth's surface in terms of solubility.							X	X	
c. Describe how minerals (and salts) accumulate in lakes and oceans. [Concept has been taught at a previous grade level]					X	X			
d. Explain how acid rain forms from gases (carbon dioxide, sulfur and nitrogen oxides from burning fossil fuels) dissolved in the water in the atmosphere.	X								
3. The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor.									
a. Identify the gas composition of the atmosphere.	X								

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conditions.	XX								
4. The atmosphere has different properties at different elevations.									
a. Compare and contrast the physical characteristics of the different layers of the atmosphere (e.g., troposphere, stratosphere, mesosphere, thermosphere, exosphere).	X								
b. Relate the characteristics of the layers of the atmosphere (e.g., temperature, pressure, composition of gases) to different altitudes.	XX								
c. Explain the effect of air pressure at different elevations (e.g., effects on cooking, on our ears popping).	X								
5. Clouds, formed by the condensation of water vapor, affect weather and climate.									
a. Demonstrate and explain the formation of clouds.	XX								
b. Classify shapes and types of clouds according to elevation.	XX								
c. Relate cloud types to weather events and patterns.	XX								
d. Use weather maps, Internet sites with satellite images, and other weather data to identify and predict weather conditions.	XX								
6. Global patterns of atmospheric movement influence local weather.									
a. Relate heat transfer to the movement of air masses, high and low pressure areas, and fronts in the atmosphere.	XX								
b. Compare characteristics and locations of global wind patterns (e.g., trade winds and the jet stream), and give examples of how these global patterns can affect local weather.	XX								
c. Describe how satellites and computers provide information on local and worldwide weather patterns.	XX								
7. Oceans have a major effect on climate, because water in the oceans holds a large amount of heat.									
a. Relate heat transfer to the circulation of ocean currents.						XX			
b. Compare the characteristics of the Gulf Stream with other large ocean currents and their effects on climate in Eastern North America and Western Europe.						XX			
c. Infer why air temperatures are more moderate in areas near large bodies of water.	X					X			
d. Describe where hurricanes form and their movement across the oceans.	X								

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e. Describe what happens when hurricanes move over land.	X								
Grade 7									
III. Earth Science: Unit of Study: Ecology — The Abiotic Environment									
A. Structure of the Earth System									
1. Landforms are the result of a combination of constructive forces (e.g., deposition of sediments) and destructive forces (e.g., weathering and erosion).									
a. Distinguish among weathering, erosion, and deposition.				X			XX	XX	
b. Examine how physical weathering and chemical weathering break rocks into fragments.				X			XX	X	
c. Investigate and examine how the earth's surface is constantly changed by weathering, erosion, deposition and human impact.				X			XX	X	
d. Examine the effects of weathering, erosion, and deposition on the formation of major landform regions in South Carolina.				X			XX	X	
e. Relate the fertility of floodplains to deposition of sediments.							X	X	
f. Discuss the benefits and hazards of living on a floodplain.							XX		
2. Soil consists of weathered rocks and decomposed organic material from dead plants, animals, and bacteria. Soils are often found in layers, with each having a different chemical composition. Living organisms have played many roles in the Earth system, including affecting the composition of the atmosphere, producing some types of rocks, and contributing to the weathering of rocks.									
a. Discuss how climatic conditions affect the development of soils.								X	
b. Analyze soil properties that can be observed (soil profile, composition, texture, particle size) and measured (permeability, temperature, pH, moisture) to predict soil quality.								XX	
c. Explain why soil (sediments) can be a major pollutant of streams.								X	
d. Evaluate ways in which human activities have affected soil and the measures taken to control the impact (silt fences, ground cover, farming, land use, nutrient balance).								X	
3. Water, which covers the majority of the Earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the "water cycle." Water evaporates from the Earth's surface, rises and cools as it moves to higher elevations, condenses as rain or snow, and falls to the surface where it collects in lakes, oceans, soil, and in rocks underground.									
a. Define groundwater, runoff, drainage divide and drainage basin (watershed).									XX

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b. Infer what happens to water that does not soak into the ground or evaporate.									X
c. Analyze the factors that affect runoff.									X
d. Differentiate between drainage divides and drainage basins using maps or aerial photography and illustrate the relationships between groundwater and surface water in a watershed.									XX
e. Identify and illustrate groundwater zones including water table, zone of saturation, and zone of aeration.									X
f. Identify technologies designed to reduce sources of point and nonpoint water pollution.									XX
4. The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor.									
a. Infer how air pollution affects people and the environment.	X		X						
b. Infer how air pollution affects the human body.	X		X						
c. Analyze ways air pollution can be reduced.	X		X						
d. Analyze how chemical hazards (pollutants in air, water, soil, and food) affect populations and ecological succession.	X		X						
5. The sun is a major source of energy for changes on the Earth's surface. Energy is transferred in many ways.									
a. Analyze the greenhouse effect and its consequences.	X		X						
b. Describe ways that humans may be influencing or contributing to global warming.	X		X						
6. For ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy then passes from organism to organism in food webs.									
a. Describe how sunlight, through photosynthesis, is transferred by producers into chemical energy.			XX						
b. Trace the path of solar energy through a simple food chain and through food webs that include humans.						X			
c. Examine how energy is transferred through an ecosystem.						X			
d. Examine how energy is distributed in an energy pyramid.			X						
7. The number of organisms an ecosystem can support depends upon the abiotic factors. Given adequate abiotic resources and no disease or predators, populations (including humans) increase at a rapid rate. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.									

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a. Compare and contrast the abiotic factors that affect population growth and size (quantity of light, water, range of temperatures, soil compositions).	X					X		X	X
b. Diagram the cycles of water, carbon, oxygen, and nitrogen in the environment.						XX			XX
c. Analyze the vital role of single-celled organisms (e.g., phytoplankton) in the carbon, oxygen cycles.									
d. Examine how materials are reused in a continuous cycle in ecosystems.									
e. Distinguish between renewable and nonrenewable resources and examine the importance of their conservation.			XX		XX				XX
f. Evaluate the effects of human population on air, water, and land.	X		X			X			X
g. Analyze the benefits of solid waste management (reduce, reuse, recycle).									

Grade 8

II. Life Science: Unit of Study: Classification, Diversity, and Adaptations of Organisms Over Time

A. Diversity and Adaptations of Organisms

1. Millions of species of animals, plants, and microorganisms are alive today. Although different species might look dissimilar, the unity among organisms becomes apparent from an analysis of internal structures, the similarity of their chemical processes and the evidence of common ancestry.

a. Observe, describe, and examine the diversity of organisms over time including differences and similarities based on kingdoms, phyla, classes(e.g., sturcture, body temperature, size, and shape). *[This concept has been taught at a previous grade level]				XX					
2. Biological change accounts for the diversity of species developed through gradual processes over many generations. Biological adaptations, which involve the									
a. Suggest evidence of how species have adapted to changes in their habitats.				XX		XX			
b. Analyze how an adaptation can increase an organism's chances to survive and reproduce in a particular habitat (e.g., cacti needles/leaves, fur/scales). *[This concept has been taught at a previous grade level]				XX					
c. Examine how natural selection increases the variations within populations.				XX					
3. Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival.									
a. Determine the factors that contribute to an organism becoming extinct.				X					

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b. Explain some of the natural and human-made pressures that can cause extinciton.				X					
c. Examine ways to prevent the extinction of an organism.				X					
4. Fossils provide important evidence of how life and environmental conditions have changed. (Earth's History: Earth Science) Fossils indicate that many organisms that lived long ago are extinct. Extinction of species is common. Most of the species that have lived on the Earth no longer exist.									
a. Examine how scientists use fossils as clues to study the Earth's past.				XX					
b. Observe, interpret, and analyze fossilized tracks.				XX					
c. List different types of fossils and infer how each formed (petrification, mold and cast, imprint).				XX					
d. Demonstrate how to determine the relative age of rocks and fossils (index fossil, oldest rock layer, and youngest rock layer).				XX			X		
e. Explain how scientists use technology to date rocks and fossils (e.g.,radioactive dating).				XX			X		
5. The Earth's processes we see today including erosion, movement of lithospheric plates, and changes in atmospheric composition, are similar to those that occurred in the past. Earth's history is also influenced by occasional catastrophes such as the impact of an asteroid or comet.									
a. Illustrate the principle of uniformitarianism (the concept that Earth processes over time are consistent).		X					X		
b. Explain how the geologic time scale is divided into units (e.g., era, period, and epoch).				XX					
c. Group different life forms according to the geologic time scale.				XX					
III. Earth Science: Unit of Study: Earth and Space Systems - Grade 8									
A. Earth in the Solar System									
1. The Earth is the third planet from the sun in the system that includes the moon, the sun, eight other planets and their moons, and smaller objects, such as asteroids and comets (solar system).									
a. Describe the features of the planets in terms of size, composition, relative distance from the sun, and ability to support life.									
b. Compare and contrast the Earth to other planets in terms of size, composition, and relative distance from the sun, and ability to support life.									
c. Describe the features and explain the origins of asteroids, comets, and meteors.									
2. The sun, an average star, is central and largest body in the solar system.									

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a. Describe and classify the main layers of the sun's atmosphere (corona, chromosphere, photosphere) and core.									
b. Evaluate how phenomena on the sun's surface (e.g., sunspots, prominences, and solar flares) affect earth.									
c. Describe how the solar wind affects Earth (e.g., auroras, interference in radio, television communication).									
3. Energy is a property of many substances and is associated with nuclei.									
a. Explain the process by which the sun produces energy (fusion).									
b. Compare and contrast nuclear fusion and nuclear fission.									
4. Most objects in the solar system are in regular and predictable motion which explains such phenomena as the day, the year, phases of the moon, and eclipses.									
a. Compare and contrast the Earth's rotation and revolution as they relate to daily and annual changes.									
b. Sequence and predict the phases of the moon (e.g., waxing, waning, crescent, new, and full).									
c. Demonstrate the arrangement of the sun, the moon, and the Earth during solar and lunar eclipses (include partial eclipses).									
5. Gravity alone holds us to the Earth's surface and explains the phenomena of the tides.									
a. Compare and contrast the contributions of Copernicus and Galileo.									
b. Diagram the relative position of the sun, the moon, and the Earth during tides.									
c. Examine the effect of the sun and moon on tides.									
6. Seasons result from variations in the amount of the sun's energy hitting the surface, due to the tilt of the Earth's rotation on its axis and the length of the day.									
a. Analyze how the parallel rays of the sun effect the temperature of Earth and produce different amounts of heating on Earth's surface.									
b. Diagram how the tilt of Earth's axis affects the seasons and the length of day.									
c. Relate the seasons to the tilt of the Earth and the angle of the sun's rays.									
7. Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion in the solar system.									
a. Examine the role of gravity in keeping the components of the solar system in orbit.									
b. Describe the relationship among gravity, distance and mass on orbiting bodies.									

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B. Structure of the Earth System									
1. The solid Earth is layered with a lithosphere; hot, convecting asthenosphere within the mantle; and dense metallic core.									
a. Describe how seismic wave velocities support the existence of a layered Earth.		XX							
b. Explain the relative position, density, and composition of Earth’s crust, mantle, and core.		XX				XX			
c. Differentiate among composition, density, and location of continental crust and oceanic crust.		XX				XX			
d. Identify the lithosphere as comprised of crust and upper mantle.		XX				XX			
e. Identify the asthenosphere as the hot convecting mantle below the lithosphere.		XX				XX			
f. Compare the physical nature of the lithosphere (brittle and rigid) with the asthenosphere (plastic and flowing).		XX				XX			
g. Examine how the lithosphere responds to tectonic forces (faulting and folding).		XX							
2. Some changes in the solid Earth can be described as the “rock cycle.” Old rocks at the Earth’s surface weather, forming sediments that are buried, then compacted, heated, and often recrystallized into new rock. Eventually, those new rocks may be brought to the surface by the forces that drive plate motions, and the rock cycle continues.									
a. Identify and classify minerals that form rocks and explain how recrystallization of these minerals can take place.					XX		XX		
b. Distinguish minerals by their physical properties with a dichotomous key.					XX				
c. Identify and classify common rock types based on physical characteristics (such as minerals present, grain size, banding or layering, presence of organic material).							XX		
d. Compare and contrast intrusive and extrusive igneous rocks; clastic and chemical sedimentary rocks; and foliated and nonfoliated metamorphic rocks.		X					XX		
e. Explain how igneous, metamorphic, and sedimentary rocks are related in a rock cycle.		X					XX		
3. Major geologic events such as earthquakes, volcanic eruptions, and mountain building result from lithospheric plate motions. Landforms and sea-floor features are the result of a combination of constructive (crustal deformation, volcanic eruptions, deposition of sediment) and destructive (weathering, erosion) processes.									
a. Illustrate and summarize what causes a volcano to erupt.		XX							
b. Compare and contrast how volcanoes are formed at mid ocean ridges, within intra-plate regions, at island arcs, and along some continental edges.		XX							
c. Examine how earthquakes result from forces inside Earth (tension, shearing, and compression).		XX							

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d. Compare and contrast the three major types of seismic waves (primary, secondary, and surface waves).		X							
e. Identify and investigate longitudinal and transverse waves.		X							
f. Describe how the seismograph measures seismic activity (size and type of wave).		X							
g. Demonstrate how an earthquake's epicenter is located by using seismic wave information.		X							
h. Explain the hazards that earthquakes pose to structures.		X							
i. Identify ways architectural engineers design and construct buildings in earthquake prone areas (e.g., buildings use shock absorbers and are designed to bend).		X							
j. Relate the occurrence of earthquakes and volcanoes to lithospheric plate boundaries using seismic data.		X							
k. Compare and contrast constructive and destructive forces in volcanic and folded mountain building.		X							
l. Identify and interpret geological features using imagery (aerial photography and satellite) and topographic maps.		XX	X			X	XX		
m. Describe the geologic history of South Carolina including the formation of the major landform regions (Blue Ridge, Piedmont, Sandhills, Coastal Plains and Coastal Zone) according to the geologic time scale.		XX				X	XX		
n. Explain the modern distribution of continents to the movement of lithospheric plates since the formation of Pangaea.		XX				X			
4. Lithospheric plates on the scales of continents and oceans move at rates of centimeters per year in response to movement in the asthenosphere.									
a. Explain how plate tectonics accounts for the motion of lithospheric plates and the break-up of Pangaea.		XX				XX			
b. Compare and contrast the characteristics and interactions of the three types of plate boundaries (divergent, convergent, and transform plate boundaries).		XX				X			
c. Explain how the age of rocks and magnetic data on opposite sides of a divergent boundary are used to estimate the rates at which plates move.		X							
d. Explain how paleoclimate evidence of fossil records supports the theory of plate tectonics.		X		X					
e. Infer how subduction supports the theory of plate tectonics		XX				X			
f. Examine how the movement of a lithospheric plate over a hot spot formed the Hawaiian Islands.		X							