Investigating Earth Systems Correlation to Arkansas									
Grades 5-8 Earth/Space Systems Benchmarks									
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STRAND 3: Earth/Space Systems									
CONTENT STANDARD 1 Students will demonstrate an understanding of the inquiry process through the study of earth and space systems									
ES.1.1. Identify the components of Earth (rocks, water, and air) and their properties.									
Grade five: Students can identify the layers of the atmosphere.	X								
Grade six: Students can identify the layers of Earth.		XX				XX	XX		
Grade seven: Students can identify rocks, water, layers of the Earth and atmosphere from models or posters.	X	XX	X	X	X	XX	XX	X	XX
Grade eight: Students can identify rocks, water, layers of the Earth and atmosphere from models or posters.	X	XX	X	X	X	XX	XX	X	XX
ES.1.2. Understand that Earth and objects in space constantly undergo changes and/or cycles that can be observed and measured.									
Grade five: Students explain the evolution of stars and planets in general terms									
Grade six: Students can explain the Big Bang Theory in broad terms.									
Grade seven: Students describe the Big Bang Theory and the evolution of our sun and planets.									
Grade eight: Students describe the Big Bang Theory and the evolution of our sun and planets.									
ES.1.3. Generate conclusions based on evidence acquired through experimentation.									
Grade five: Students draw conclusions from their experiments.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade six: Students draw conclusions based on their experiments.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade seven: Students draw conclusions based on their experiments.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade eight: Students draw conclusions based on their experiments.	XX	XX	XX	XX	XX	XX	XX	XX	XX

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ES.1.4. Interpret scientific information from graphs and charts.									
Grade five: Students interpret graphs and charts.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade six: Students form interpretations based on graphs and charts.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade seven: Students can draw interpretations about scientific information taken from graphs or charts.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade eight: Students can read and interpret earth science graphs, charts and models.	XX	XX	XX	XX	XX	XX	XX	XX	XX
ES.1.5. Identify and classify rocks and minerals.									
Grade five: Students can identify common sandstone, shale, and limestone rocks native to Arkansas.		X	X	X	X		XX	X	
Students can identify some common minerals.					XX		X	X	
Grade six: Students can classify rock into sedimentary, igneous, and metamorphic groupings.		X	X	X			XX	X	
Students can classify minerals by hardness					XX		X		
Grade seven: Students can identify common rocks and minerals based on characteristics such as color, streak tests, hardness, crystal shape, etc.					XX		XX		
Students can name ways that common rocks and minerals are used by people.			XX		XX				
Students can identify common rocks found in their area.			X	X	X		XX	X	
Grade eight: Students can identify common rocks and minerals based on characteristics such as color, streak tests, hardness, crystal shape, etc.			X	X	XX		XX	X	
Students can name ways that common rocks and minerals are used by people			X		XX				
Students can identify common rocks found in their area			X	X	X		XX	X	

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ES.1.6. Understand the relationship between Earth and objects in space.									
Grade five: Students demonstrate on understanding of Earth's place in the solar system.									
Grade six: Students demonstrate an understanding of the relationship between the Earth and objects in space.									
Grade seven: Students understand Earth's position in our galaxy and in our solar system.									
Grade eight: Students understand Earth's position in our galaxy and in our solar system.									
Content Standard 2 Student will explore, demonstrate, communicate, apply and evaluate knowledge of the properties of earth and space systems.									
ES.2.1. Investigate the formation and properties of rocks (igneous, sedimentary, and metamorphic), minerals, and fossils.									
Grade five: Students can describe the formation of igneous, metamorphic, and sedimentary rocks.		**X**	**X**	**X**			**XX**	**X**	
Students can identify common Arkansas fossils.			**X**	**XX**			**X**		
Grade six: Students can describe the crystal structure of common minerals and how they were formed.					**XX**				
Students can identify common minerals.					**XX**				
Grade seven: Students research and explore the rock cycle.							**XX**		
Students can describe the formation of minerals and fossils.		**X**	**X**	**XX**	**XX**		**X**		
Students can describe the properties of igneous, metamorphic and sedimentary rocks.		**X**	**X**	**X**			**XX**	**X**	
Students can identify common types of igneous, metamorphic and sedimentary rocks, minerals, and fossils.				**XX**	**XX**		**XX**		
Grade eight: Students research and explore the rock cycle.							**XX**		
Students can describe the formation of minerals and fossils.		**X**	**X**	**XX**	**XX**		**X**		
Students can describe the properties of igneous, metamorphic and sedimentary rocks.		**X**	**X**	**X**			**XX**	**X**	
Students can identify common types of igneous, metamorphic and sedimentary rocks, minerals, and fossils.		**X**	**X**	**XX**	**XX**		**XX**		

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ES.2.2. Understand the relationship, which exists between rock formation, fossil evidence, and geological history and age of the Earth.									
Grade five: Students understand the Earth's age to be 4.5 billion + years old based on the age of the rocks based on radioactive dating.				**XX**					
Students can describe how fossils are used to compare the layers and ages of the Earth.				**XX**					
Grade six: Students understand the age of the Earth and when living things first appeared on Earth 3.5 billion years ago.				**XX**					
Grade seven: Students can identify common fossils found in Arkansas.				**XX**					
Students understand the Earth's age to be 4.5 billion + years old based on the age of the rocks determined by radioactive dating.				**XX**					
Students understand that life on Earth began 3.5 billion years ago and that there have been several large extinctions, but life has evolved since that time.				**XX**					
Grade eight: Students can identify common fossils found in Arkansas.				**XX**					
Students understand the Earth's age to be 4.5 billion + years old based on the age of the rocks determined by radioactive dating.				**XX**					
Students understand that life on Earth began 3.5 billion years ago and that there have been several large extinctions, but life has evolved since that time.				**XX**					

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ES.2.3. Investigate how Earth's internal processes affect external features (volcanoes, earthquakes, and mountain formation).									
Grade five: Students can identify layers of the Earth's core and their properities.		XX							
Students can identify various landforms.		XX					XX		
Grade six: Students can explain the processes related to the formation of mountains, earthquakes, and volcanoes.		XX							
Grade seven: Students can describe plate tectonics and evidence for continental drift.		XX				XX			
Students can read topographic maps.				XX			XX	XX	XX
Grade eight: Students can describe plate tectonics and evidence for continental drift.		XX		XX		XX	X		
Students can read topographic maps.				XX			XX	XX	XX
ES.2.4. Understand the effects of weathering and erosion on the Earth's surface.									
Grade five: Students can describe how soil is formed and how it erodes.								XX	
Students can describe how wind, water, and ice erode rocks and soil.						X		XX	
Grade six: Students can explain the process of erosion.							XX	XX	
Grade seven: Students can describe how rocks are weathered.							XX	XX	
Students can describe how soil is formed.								XX	
Students can identify soil types found in their area.								XX	
Students can identify and give examples of local erosions and depositions.							XX	X	
Grade eight: Students can describe how rocks are weathered.							XX	XX	
Students can describe how soil is formed.								XX	
Students can identify soil types found in their area.								XX	
Students can identify and give examples of local erosions and depositions.							XX	X	

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ES.2.5. Describe and model the natural divisions of Arkansas.									
Grade five: Students can identify the geologic features and plant communities of the six natural divisions of Arkansas.							**X**		
Grade six: Students can name the land uses and history in each of the six natural divisions of Arkansas.							**X**		
Grade seven: Students can describe the characteristics and components of each of the natural divisions in Arkansas.							**X**		
Students understand why we have biodiversity in the natural divisions.				**X**			**X**		
Grade eight: Students can describe the characteristics and components of each of the natural divisions in Arkansas.							**X**		
Students understand why we have biodiversity in the natural divisions.				**X**			**X**		
ES.2.6. Describe the energy transfer within the atmosphere as it relates to the development of weather and climate patterns.									
Grade five: Students can describe how sun heats the atmosphere and produces our winds.	**X**								
Students can describe how the sun heats the atmosphere and drives the water cycle.									**XX**
Grade six: Students can describe how the energy transfer within the atmosphere produces our weather and climate.	**XX**								
Grade seven: Students can describe the properties of air and the layers of the atmosphere.	**XX**								
Students can describe how the sun drives our climate, seasons, and weather changes.	**XX**		**X**						
Grade eight: Students can describe the properties of air and the layers of the atmosphere.	**XX**								
Students can describe how the sun drives our climate, seasons, and weather changes.	**X**		**X**						

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ES2.7. Explain and illustrate the water cycle.									
Grade five: Students can identify the components in the water cycle (evaporation, condensation, and precipitation) from models or drawings.									**XX**
Grade six: Students demonstrate with a model the water cycle by using a heat source to drive the process.									**XX**
Grade seven: Students can relate the water cycle to weathering and erosion.							**X**	**X**	**X**
Grade eight: Students can relate the water cycle to weathering and erosion.							**X**	**X**	**X**
Students can construct a water cycle model.									**XX**
ES.2.8. Model and explain how the Earth's shape and tilt result in different seasons.									
Grade five: Students can describe how the tilt of the Earth produces our seasons.									
Grade six: Students can describe what produces the different seasons on Earth (tilt of the Earth).									
Grade seven: Students can set up a model to explain the different seasons on Earth.									
Grade eight: Students can set up a model to explain the different seasons on Earth.									
ES.2.9. Investigate the predictable motion of objects in space in explaining phenomena such as day, night, moon phases, ocean tides, and eclipses.									
Grade five: Students can design models to show the rotation and revolution of the Earth. Students can also model one Earth day in relationship to the sun.									
Grade six: Students can design a model to illustrate what causes tides on Earth.									
Students can design a model to illustrate what causes lunar eclipses.									
Grade seven: Students can explain rotation, revolution of the Earth, the moon and the sun and the relationship each has to the other (day, night, moon phases, tides, and eclipses).									
Grade eight: Students set up models to explain rotation, revolution of the Earth, moon and the sun and the relationship each has to the other (day, night, moon phases, tides, and eclipses).									

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ES.2.10. Analyze how the features of the oceans affect humans.									
Grade five: Students can describe the features of the ocean.		**X**				**XX**			
Grade six: Students can describe how man has depended upon the ocean for resources.			**X**		**X**	**XX**			
Grade seven: Students can describe human uses of the ocean for travel, food production (estuaries), exploration, energy, and mineral sources.						**X**			
Students can describe ocean features, landforms, and pressure and how these have affected exploration of the marine frontier.		**X**				**XX**			
Grade eight: Students can describe human uses of the ocean for travel, food production (estuaries), exploration, energy, and mineral sources.			**X**		**X**	**XX**			
Students can describe ocean features, landforms, and pressure and how these have affected exploration of the marine frontier.		**X**	**X**			**XX**			
ES.2.11. Compare the ability to support life on Earth and other objects in space.									
Grade five: Students can compare and contrast the life supporting abilities of the Earth and our moon.									
Grade six: Students can compare and contrast the life supporting abilities of the Earth and the International Space Station.									
Grade seven: Students can name conditions needed for life as we know it on Earth and can compare these with conditions we think exist on other planets and moons.									
Students can describe man's attempts at monitoring life in outer space, e.g., the International Space Station.									
Grade eight: Students can name conditions needed for life as we know it on Earth and can compare these conditions we think exist on other planets and moons.									
Students can descirbe man's attempst at monitoring life in outer space, e.g., the International Space Station.									
ES.2.12. Explain and compare the properties (gravity, size, shape, distance, and color) of objects in the solar system.									
Grade five: Students can name and describe objects in our solar system.									
Grade six: Students can describe the formation of our solar system.									
Students can describe the characteristics of objects in our solar system.									

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Grade seven: Students can compare and contrast our sun, planets, moons, meteors, comets and other objects (size, shape, color distance and gravity).									
Students can describe the evolution of the universe.									
Grade eight: Students can compare and contrast our sun, planets, moons, meteors, comets and other objects (size, shape, color distance and gravity).									
Students can describe the evolution of the universe.									
ES.2.13. Explore past, present, and future space technology.									
Grade five: Students can describe the history of space exploration from the first satellites to the present.									
Grade six: Students can describe the present and future efforts of NASA.									
Grade seven: Students can depict a history of developments in space programs.									
Grade eight: Students can depict a history of developments in space programs.									
ES.2.14. Relate the physical characteristics of the sun to other stars.									
Grade five: Students can compare our sun to other stars.									
Grade six: Students can compare the life cycle of our sun to other stars.									
Grade seven: Students can compare and contrast our sun to other well-known stars.									
Students can compare our sun's evolution to that of other stars.									
Grade eight: Students can compare and contrast our sun to other well-known stars.									
Students can compare our sun's evolution to that of other stars.									
Content Standard 3 Students will demonstrate an understanding of the connections and applications of earth/space systems.									
ES.3.1. Design and conduct scientific investigations to answer different kinds of questions.									
Grade five: Students can design and conduct scientific experiments.	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**

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Grade six: Students can design and conduct scientific experiments.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade seven: Students can design and conduct scientific experiments.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade eight: Students can design and conduct scientific experiments.	XX	XX	XX	XX	XX	XX	XX	XX	XX
ES.3.2. Apply multiple strategies to problem solving.									
Grade five: Students can research various print and nonprint resources to find solutions for scientific problems.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade six: Students develop multiple strategies to solve problems.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade seven: Students can apply brainstorming techniques in problem solving.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade eight: Students can apply brainstorming techniques in problem solving.	XX	XX	XX	XX	XX	XX	XX	XX	XX
ES.3.3. Use appropriate equipment, tools, techniques, technology, mathematics, and technical writing in scientific investigations.									
Grade five: Students are aware of and practice safety rules and can identify these rules on exams.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade six: Students are aware of and practice safety rules and can identify these rules on exams.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade seven: Students are aware of and practice safety rules and can identify these rules on exams.	XX	XX	XX	XX	XX	XX	XX	XX	XX
Grade eight: Students are aware of and practice safety rules and can identify these rules on exams.	XX	XX	XX	XX	XX	XX	XX	XX	XX

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ES.3.4. Investigate a variety of earth science related careers									
Grade five: Students research careers in soil science and geology.		**X**		**X**	**X**		**X**	**X**	
Grade six: Students research careers in astronomy and space flight.									
Grade seven: Students research careers in the earth sciences.	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Grade eight: Students research careers in the earth sciences.	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
ES.3.5. Construct models of earth science systems and make real world applications.									
Grade five: Students build models to illustrate the effects of erosion on different slopes and vegetation.							**XX**	**XX**	
Grade six: Students build models to show how different building material and structures are affected by earthquakes.							**XX**	**XX**	
Grade seven: Students construct models of the earth and explain how they function.		**XX**	**X**		**X**		**X**		
Grade eight: Students construct models of the earth and explain how they function.		**XX**	**X**		**X**		**X**		

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ES.3.6. Analyze the impact of human activities on the Earths crust, hydrosphere, atmosphere, and biosphere (e.g., climate change, greenhouse effect, global warming, ozone depletion, and UV radiation) and demonstrate methods of conservation and recycling of the Earth's resources.									
Grade five: Students can analyze the impact of human activities on the Earth			**X**		**X**	**X**	**X**	**X**	
Grade six: Students can name and describe man's activities that pollute the Earth.			**X**		**X**				**X**
Students can name conservation activities that would help the environment.			**XX**		**X**			**X**	**XX**
Grade seven: Students can give the causes of global climate changes through time, greenhouse effect, global warming, ozone depletion and increased UV radiation and how to improve or prevent some of the more damaging problems.	**X**		**X**						
Students can demonstrate conservation and recycling at the school and home level.			**XX**		**X**				**XX**
Students can name ways that the nation can conserve and recycle.			**XX**		**X**			**X**	**XX**
Grade eight: Students can give the causes of global climate changes through time, greenhouse effect, global warming, ozone depletion and increased UV radiation and how to improve or prevent some of the more damaging problems.	**X**		**X**						
Students can demonstrate conservation and recycling at the school and home level.			**XX**		**X**			**X**	**XX**
Students can name ways that the nation can conserve and recycle.			**XX**		**X**				**XX**

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ES.3.7. Explore the impact of space technology on society.									
Grade five: Students can identify space technology that has benefited people on Earth.									
Grade six: Students can identify how space technology has improved communication on Earth.									
Grade seven: Students can research and write about the benefits to humans of space technology and exploration.									
Grade eight: Students can research and write about the benefits to humans of space technology and exploration.									
ES.3.8. Illustrate the positive and negative effects of human use of natural resources on Earth.									
Grade five: Students can describe how man uses natural resources in a positive and negative manner.			**XX**		**XX**	**X**		**X**	**XX**
Grade six: Students can describe how man uses natural resources in a positive and negative manner.			**XX**		**XX**	**X**		**X**	**XX**
Grade seven: Students can understand how people have effectively and ineffectively used natural resources on Earth.			**XX**		**XX**	**X**		**X**	**XX**
Grade eight: Students can understand how people have effectively and ineffectively used natural resources on Earth.			**XX**		**XX**	**X**		**X**	**XX**

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ES.3.9. Measure weather conditions using appropriate equipment.									
Grade five: Students can effectively and safely use materials and equipment to measure weather conditions.	**XX**								
Grade six: Students can use appropriate materials and equipment to predict the weather and to solve earth science problems.	**XX**								
Grade seven: Students can effectively and safely use science materials and equipment.	**XX**								
Grade eight: Students can effectively and safely use science materials and equipment.	**XX**								
ES.3.10. Calculate the gravitational forces of objects in space.									
Grade five: Students can describe gravitation forces on objects.							**X**	**XX**	**XX**
Grade six: Students can describe why the moon circles the Earth.									
Grade seven: Students can calculate the gravitational forces of objects in space.									
Students can describe in general terms the theory of gravity.								**X**	**X**
Grade eight: Students can calculate the gravitational forces of objects in space.									
Students can describe in general terms the theory of gravity.								**X**	**X**