



***Resource Guide to the Arkansas
Curriculum Framework for
Students with Disabilities
for Science Grades 5 and 7***

***Summer 2006
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Purpose and Process

The Individuals with Disabilities Education Act and No Child Left Behind mandates that schools provide access to the general education curriculum for all students receiving special education services. In recognizing the challenge of providing opportunities for students with disabilities to access general education curriculum, it is the desire of the Arkansas Department of Education to assist educators with this process. The goal is to assist school personnel who serve children with disabilities in conceptualizing, planning, and implementing activities that are aligned to the Arkansas Curriculum Framework.

The following document contains ideas for linking activities to the same science frameworks used for the general education curriculum. When selecting appropriate activities, decisions must be based on individual student needs and abilities. Collaboration with general education personnel will provide assistance in linking curriculum with the state framework. The Arkansas Alternate Portfolio Assessment must have alignment to the Arkansas Curriculum Frameworks for Science. The Alternate Portfolio Assessment for Students with Disabilities must align with the same content standards used by other students. The following are the strands used in the content area for Science.

Science Curriculum Framework
Life Science
Physical Science
Earth and Space Science

In June 2006, the Arkansas Department of Education convened a task force of general education English language arts, mathematics, and science teachers, teachers of students with disabilities and administrators to collaborate and develop the following resource guide to be used to help with the process of developing the resource guide for the Alternate Portfolio Assessment for Students with Disabilities.

This publication includes selected student learning expectations from the each of the above-mentioned Curriculum Frameworks. It also uses a matrix visual organizer to provide several sample activities that demonstrate alignment from least complex activities to more complex activities. Teachers on the committee discussed the specific student learning expectation to determine the basic learning needed to find the essence of the learning. Using the essence of the student learning expectation, different levels of complexity of the learning were written for students to have access to the same standards.

Although this publication is not intended for generating specific test item activities for the Arkansas Alternate Portfolio System for Students with Disabilities, its purpose is to provide educators in Arkansas with a process for determining alignment between models of education that have been to some extent separate. Using the activities as idea starters, the educators can then individualize and develop specific activities that align with the education program, demonstrate performance of skills, and document educational opportunities. The members of the committee do not intend this publication to be used as a checklist, a menu of alternate assessment “test activities or items”, or as IEP goals and objectives.

The following is a non-inclusive list of possible ways that students with disabilities access the curriculum.

Oral and Visual	Writing	Reading	Mathematics
Braille	Dictating	Books on CD	Abacus/Math Line
CCTV	Drawings	Change in text size, spacing, color	Alternative keyboard
Dictation software	Eye gaze	Computer	Calculators (with printout, large keys or display, talking)
Eye glasses/optical aids	Intellikeys	Logos	Enlarged math worksheets
Gestures/	Neo	Objects	Manipulatives
Large print materials	Paper/pencil	Pictures	Tactile/voice output measuring devices
Magnification devices	Pictures (glue)	Scanners	Talking watches/clocks
Point to poster	Pointing	Signing	Voice recognition software
Show a book/with verbal peer	Stamps	Signs	
Switches	Stickers	Tactile	
Technology (powerpoint)	Switches (choice making between two)	Talking electronic devices or software	
Voice output devices	Word cards/book/wall	Text	
Word processor	Word Processor		

Augmentative communication equipment and/or other adaptations should be used to make accommodations for students who require them to meet the student learning expectation (SLE). Teachers will have to use creativity in adapting the suggested activities to meet the student's individual needs. An attempt has been made to organize activities from Less Complex to More Complex, although this did not work well for every student learning expectation. These activities are a sampling of activities that may be used to meet the SLE.

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Strands	Content Standards
Nature of Science	
1. Characteristics and Processes of Science	Students shall demonstrate and apply knowledge of the characteristics and processes of science using appropriate safety procedures, equipment, and technology.
Life Science	
2. Living Systems: Characteristics, Structure, and Function	Students shall demonstrate and apply knowledge of living systems using appropriate safety procedures, equipment, and technology.
3. Life Cycles, Reproduction, and Heredity	Students shall demonstrate and apply knowledge of life cycles, reproduction, and heredity using appropriate safety procedures, equipment, and technology.
4. Populations and Ecosystems	Students shall demonstrate and apply knowledge of populations and ecosystems using appropriate safety procedures, equipment, and technology.
Physical Science	
5. Matter: Properties and Changes	Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology.
6. Motion and Forces	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology.
7. Energy and Transfer of Energy	Students shall demonstrate and apply knowledge of energy and transfer of energy using appropriate safety procedures, equipment, and technology.
Earth and Space Science	
8. Earth Systems	Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology.
9. Earth's History: Changes in Earth and Sky	Students shall demonstrate and apply knowledge of Earth's history using appropriate safety procedures, equipment, and technology.
10. Objects in the Universe	Students shall demonstrate and apply knowledge of objects in the universe using appropriate safety procedures, equipment, and technology.

*Each grade level continues to address earlier **Student Learning Expectations**.

A minimum of 20% of instructional time in science must be spent in inquiry and conducting hands-on investigations. Equipment, training, and grant information are available through the Arkansas Centers for Mathematics and Science Education.

Life Science	Content Standard 2: Living Systems: Characteristics, Structure, and Function: Students shall demonstrate and apply knowledge of living systems using appropriate safety procedures, equipment, and technology.				
Student Learning Expectation Grade 5	Essence of Student Learning Expectation	Less Complex  More Complex			
LS.2.5.2- Examine cells on a microscopic level	All living things are made of cells. Students will have an understanding about cells through the use of pictures/ visuals/ etc.	Identify a cell versus something that is not a cell using a picture, magnifying glass, or a microscope.	Examine a picture or visual representation of a cell and draw or create a model of the cell.	Peel an onion and examine the cell using a magnifying glass.	Compare and contrast various types of cells using the Internet and/or a microscope. Draw or print out the cells.
LS.2.5.4- Model and identify the parts of animal cells and plant cells	Identify the cytoplasm, nucleus, and cell membrane of animal and plant cells.	Identify the various parts of an animal or plant cell by matching using a visual model.	Create a model of an animal or plant cell. // Example: --Gelatin- cytoplasm --Orange- (take out pulp and pour gelatin into orange)- cell membrane --Grapes- (nucleus) --Hair gel and found objects in plastic baggie	Dissect food as a representation of an animal or plant cell. Example: -- turtle candy (chocolate- cell membrane, caramel- cytoplasm, nuts- nucleus) -- hot pockets or pita sandwich	Create and label a model of an animal or plant cell. Example: --modeling clay --make turtle candy

Life Science	Content Standard 4: Populations and Ecosystems: Students shall demonstrate and apply knowledge of populations and ecosystems using appropriate safety procedures, equipment, and technology.				
Student Learning Expectation Grade 5	Essence of Student Learning Expectation	Less Complex  More Complex			
LS.4.5.12- Conduct investigations in which plants are encouraged to thrive.	Discover the basic needs of plants.	Identify plant needs using a visual (flashcards or picture symbols) or object representation. Example: --Water versus another object --Food versus another object -- Sun versus dark	Demonstrate the elements needed for plants to thrive using picture symbols to create games (i.e., card games, matching card game, bingo)	Explore the school grounds to discover reasons why different areas do not contain healthy plants. Identify the missing elements (water, soil, sun). Using a teacher made worksheet/ Venn Diagram, chart the missing elements.	Plant a variety of plants in a variety of conditions. The students will determine the missing need- water, sun, or soil. Have the student compile a data sheet to show missing elements and growth rate. Measure growth. Compare/contrast.
LS.4.5.15- Conduct field studies identifying and categorizing organisms in a given area of an ecosystem.	Discover and experience areas that certain organisms live.	Use the school campus and/or community to discover different areas (i.e., rocks, pond or stream, etc.) and explore the types of organisms in each area.	Identify organisms. Examples: Look under a rock for: --moss --worm --beetle --pill bugs	Collect and document (drawings/ photographs) organisms found. Example: --scavenger hunt	Replicate with art an ecosystem that you have explored. Examples: --poster --diorama --clay/modeling clay --photo collage --found objects
LS.4.5.16- Evaluate positive and negative human effects on ecosystems.	Recognize human impact on the environment.	Identify human effects. Positive Examples: --planting trees --recycling --picking up trash	Identify human effects. Negative Examples: --littering --oil spills --forest fires --cars and smog	Make a positive impact on the environment. Examples: --pick up trash --recycle --animal feeders --plant trees/flowers	Research positive and/or negative human impact on the environment using the Internet.

Physical Science	Content Standard 5: Matter: Properties and Changes: Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology				
Student Learning Expectation Grade 5	Essence of Student Learning Expectation	Less Complex  More Complex			
PS.5.5.3- Identify common examples of physical properties.	Find objects with common physical properties.	Explore two physical characteristics using everyday objects. Examples: --hard/soft --rough/smooth --color Follow the exploration with questions and/or a worksheet demonstrating understanding about various physical properties.	Investigate textures using a touch box and record the observations. Examples: --find the soft object --find the rough object	Participate in a scavenger hunt finding objects with similar physical properties. Examples: --soft objects --green objects --rough object --soft and rough	Investigate common physical properties of objects using a Venn diagram.
PS.5.5.7- Demonstrate the effect of changes in the physical properties of matter.	Objects remain the same even though a physical change has occurred.	Create a mosaic out of whole ceramic pieces or whole colored sheets of paper.	Demonstrate physical changes. Examples: --cut orange into pieces; it's still an orange --water added to powdered drink mix is still water --paint a piece of paper --straw/bendable straw --blending whole food	Create a crayon shaving between wax paper to demonstrate physical change. Making paper with a blender. Candy making mold	Take a nature walk and record observations of change. Examples: --stick that's broken --crack in sidewalk --tree that's fallen After the walk, take a stick, measure it, and break into pieces. Show by measurement that the broken pieces equal the whole stick.

Physical Science	Content Standard 5: Matter: Properties and Changes: Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology				
Student Learning Expectation Grade 5	Essence of Student Learning Expectation	Less Complex  More Complex			
PS.5.5.9- Conduct investigations demonstrating expansion and contraction	Change in temperature effects the expansion and contraction of objects.	Pop popcorn or microwavable pork rinds using a microwave.	Place a full container of water in the freezer and record the changes in the water.	Place a balloon on top of a bottle. Put bottle in ice water. Put in hot water. Balloon will expand. Record the results.	Cook food in the microwave and observe the change in size. Example: --Hot dog --Baked potato --Sausage biscuit (packaging changes)

Physical Science	Content Standard 6: Motion and Forces: Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology.				
Student Learning Expectation Grade 5	Essence of Student Learning Expectation	Less Complex → More Complex			
		PS 6.5.2 Conduct investigations using: <ul style="list-style-type: none"> levers (e.g. toothbrush) pulleys inclined planes-ramps, wedges, and screws wheels and axles 	Simple machines make work easier.	Locate simple machines in the school environment. Example: Can opener, pencil sharpener, hand mixer, ramps, toy cars, scissors.	Use simple machines. Example: --Raise the flag --Open a can --Pulling a nail from a board --Pepper or salt mill
PS 6.5.6 Conduct investigations using potential energy or kinetic energy.	Potential energy is stored in an object at rest. Kinetic energy is an object in motion.	Identify objects, picture symbols, etc. as having potential or kinetic energy.	Use an object to demonstrate potential and kinetic energy. Example: --Kitchen timer --Mixer --Battery operated item --Roll a ball	Model or act out activities that demonstrate use of potential and kinetic energy. Example: Playground equipment --swing --slide	Predict how the height of a ramp will effect the distance an object will travel.

Physical Science	Content Standard 7: Energy and Transfer of Energy: Students shall demonstrate and apply knowledge of energy and transfer of energy and using appropriate safety procedures, equipment, and technology				
Student Learning Expectation Grade 5	Essence of Student Learning Expectation	Less Complex  More Complex			
PS 7.5.2 Investigate how light travels and interacts with an object or material.	Light travels in straight lines. Light reflects, absorbs and refracts (bends).	<p>Make shadows</p> <p>Example: Trace silhouettes. Make finger shadow animals. Identify object by observing the shadow.</p>	<p>Use black and white objects in the sun to identify/measure the temperature difference.</p>	<p>Use a prism or water to separate light into the colors of the rainbow.</p>	<p>Reflect light beams with a mirror to find the location of the reflected beam.</p> <p>Example: Use a light pointer for making choices. Explain how light travels</p>
PS 7.5.4 Design and conduct investigations of transparent, translucent, and opaque as applied to light.	Transparent objects allow light to pass through and objects to be seen clearly. Translucent objects allow some light to pass through. Opaque objects do not allow light to pass through.	<p>Distinguish which is easier to see through using three types of glass: translucent, transparent, and opaque.</p> <p>Example: --Drinking glasses --Eyeglasses --Storage containers</p>	<p>Sort objects by type of container: transparent, translucent, and opaque containers.</p> <p>Example: --In a store --In a kitchen</p>	<p>Identify the use of transparent, translucent, and opaque as required by function.</p> <p>Example: --Windows --Shower doors --Doors and walls --Eyeglasses --Picture frames</p>	<p>Make a model or object to illustrate transparent, translucent and opaque objects.</p> <p>Example: Clear plastic, waxed paper, aluminum foil. Art project using paint, wax crayons, etc. Christmas ornaments.</p>

Earth and Space Science	Content Standard 8: Earth Systems: Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology				
Student Learning Expectation Grade 5	Essence of Student Learning Expectation	Less Complex → More Complex			
ESS 8.5.2 Investigate the growth of crystals.	Crystals are minerals that have formed into geometric shapes.	Identify an object as crystal or not. Example --rock crystal candy --crystals in rocks --rock salt	Model the structure of crystals using food, paper, etc. Example --pretzels and marshmallows --gumdrops and toothpicks	Make crystals. Example: --salt solution evaporated --borax solution evaporated on window --Epsom salt solution evaporated on window.	Find pictures and information about crystals formations using books and/or the internet.
ESS 8.5.7 Identify characteristics of sedimentary, igneous, and metamorphic rocks	Sedimentary rocks are formed in layers of mud and sand settling over time. Igneous rocks are formed when molten lava cools. Metamorphic rocks have been changed inside the earth over time.	Demonstrate how sedimentary rocks form Example: Shake up sand, soil, and pebbles in a jar of water and watch it settle.	Demonstrate how igneous rocks form. Example: Make hard sugar candy (peanut brittle).	Demonstrate how metamorphic rocks form. Example: Make chocolate chip cookies.	Create something from rocks. Example: --rock jewelry --rock turtle or other animal

Earth and Space Science	Content Standard 8: Earth Systems: Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology				
Grade 5	Essence of Student Learning Expectation	Less Complex → More Complex			
ESS .8.5.11 Investigate the formation of soil.	Soil is formed from very fine rock fragments mixed with decayed plant and animal material.	Identify soil apart from rocks, plants, etc.	<p>Make simple observations about different samples of soil</p> <p>Example: Compare soil samples brought by students by shaking each soil sample in a jar of water and observe settled soil.</p>	<p>Make soil by composting</p> <p>Example: --newsprint --vegetable scraps --coffee/tea grounds --worms --grass clippings/leaves --keep moist and covered. --stir occasionally. Or—Make edible dirt. (See appendix for recipe)</p>	Examine composting in the community or state

Earth and Space Science	Content Standard 10: Objects in the Universe: Students shall demonstrate and apply knowledge of objects in the universe using appropriate safety procedures, equipment, and technology.				
Student Learning Expectation Grade 5	Essence of Student Learning Expectation	Less Complex  More Complex			
ESS.10.5.2 Demonstrate the order of planets and other space objects in our solar system.	Planets and objects in our solar system are in an established order.	Identify the planets and other objects in our solar system (e.g. sun, moon planets, asteroids, comets)	Make a map of the solar system with the sun in the center out of candy, fruit, vegetables, etc.	Make a map of the solar system including the sun using familiar objects.	Make a map of the solar system including the sun.
ESS.10.5.3 Compare the properties of planets in our solar system: <ul style="list-style-type: none"> • size • shape • density • atmosphere • distance from the sun • orbital path • moons • surface • composition 	Each planet has distinct identifying properties.	Order planets in Earth's solar system by size.	Order planets in Earth's solar system by placement relative to the sun.	Write a descriptive poem or riddle about each planet to illustrate identifying properties of that planet (e.g. moons, density, gravity, atmosphere, distance from the sun, etc.).	Mark the position and orbits of the planets around the sun, using sidewalk chalk for the playground or parking lot, and walk around the orbits.

Life Science	Content Standard 2: Living Systems: Characteristics, Structure, and Function: Students shall demonstrate and apply knowledge of living systems using appropriate safety procedures, equipment, and technology.				
Student Learning Expectation Grade 7	Essence of Student Learning Expectation	Less Complex  More Complex			
LS.2.7.2 Analyze how two or more organs work together to perform a function (e.g., mouth and stomach to digest food)	Two or more organs work together in a body system to perform specific functions.	Identify organs that work together. Example: --Mouth/stomach --Nerves/brain --Nose/lungs	Play a game to match organs that work together. Example: --Concentration --Operation	Make a tracing of the student's body shape. Use picture symbols or line drawings of organs to place organ systems where they belong in the body.	Make a model of two organs that work together and write a report about it. Example: Bones/muscles
LS.2.7.6 Identify human body systems: <ul style="list-style-type: none">• nervous• digestive• circulatory• respiratory• excretory• integumentary• skeletal/muscular• endocrine• reproductive	There are different systems that work in the human body.	Identify systems in the human body Example: --Picture symbols --Models --x-rays - Transparencies/ overlays	Choose a body system and label some parts of that system.	Draw or trace a body system.	Explore body systems using technology.
LS.2.7.8 Investigate functions of human body systems.	Each body system has a different function.	Identify the job of human body systems Example: --Digestive system breaks down food for use by the body. --Circulatory system moves blood through the body.	Sequence the activities of body systems Example: Trace the movement of food through the body.	Sequence the activities of body systems and match each part to its job.	Name and describe the function of human body systems.

Life Science	Content Standard 3: Life Cycles, Reproduction, and Heredity: Students shall demonstrate and apply knowledge of life cycles, reproduction, and heredity using appropriate safety procedures, equipment, and technology.				
Student Learning Expectation Grade 7	Essence of Student Learning Expectation	Less Complex  More Complex			
LS.3.7.5 Dissect a poultry egg to analyze its structure (e.g., paper, plastic, or clay models, virtual dissection, or specimen dissection.)	Look closely at a part of the reproductive system as represented by an egg.	Break open a raw or hard-boiled egg. Look at the egg and name the parts to develop vocabulary.	Discuss and trace vocabulary naming the parts of the egg.	Make a model of an egg to show the parts of the egg. Example: --Model made of paper in booklet form. --Model made of modeling clay	Investigate egg hatching and match the parts of the egg to the end result of the hatching process. Example: --Video --Field trip to see eggs hatch --Incubate eggs*
LS.3.7.6 Dissect a flower to analyze the reproductive system of angiosperms. (e.g., paper, plastic, or clay models; virtual dissection; or specimen dissection)	Look closely at the reproductive system as represented by a flower.	Look at a flower and name the parts to develop vocabulary.	Discuss and trace vocabulary naming the parts of a flower.	Make a model of a flower to show the parts of a flower.	Look at a variety of flowers to identify the parts. Respond to questions about the activity. Example: --Invite a florist. --Take a field trip. --Use pressed flowers or picture symbols.

Physical Science	Content Standard 5: Matter: Properties and Changes: Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology				
Student Learning Expectation Grade 7	Essence of Student Learning Expectation	Less Complex  More Complex			
PS.5.7.5 Demonstrate techniques for forming and separating mixtures: <ul style="list-style-type: none"> • mixing • magnetic attraction • evaporation • filtration • chromatography • settling 	A mixture can be separated and form a liquid into its parts in many ways.	Mix together a variety of items to make a mixture. Example: --Trail mix --Cereal mix --Rice and paper clips --Nuts and bolts --Sand and rocks --Fruit Salad or Tossed Salad --Epsom salts and water painted on black paper	Use colored markers to mark on wet coffee filters. Watch the colors wick through the filters.	Separate metal objects from non-metal objects using a magnet. Example: --Paper clips and rice --Iron filings and pencil shavings. --Iron fortified cereal)	Predict what will happen when you attempt to separate a mixture and check the prediction. Example: Will the magnet separate the paper clips from the rice?
PS.5.7.8 Investigate the effect of variables on solubility rates.	Stirring, heating, and/or crushing will speed up dissolving.	Add a substance to both a container of hot water and a container of cold water. Compare the rate of dissolving and document using a lab sheet may be used to document results Example: --Gelatin --Sugar cubes --Bouillon cubes	Add the same amount of a substance to two containers of water. Stir or shake one. Compare the rate of dissolving and document using a lab sheet may be used to document results Example: --Drop of food coloring --Sugar --Flavored drink mix	Using a solid substance and the same substance crushed into bits, add each to different containers of water. Compare the rate of dissolving and document using a lab sheet may be used to document results Example: --Sugar cube --Bouillon cube --Aspirin --Hard candy	Following an investigation of dissolving, record observations on data sheet and answer questions about results.

Physical Science	Content Standard 6: Motion and Forces: Students shall demonstrate and apply knowledge of motion and forces, using appropriate safety procedures, equipment, and technology				
Student Learning Expectation	Essence of Student Learning Expectation	Less Complex  More Complex			
Grade 7					
PS.6.7.5 Explain how Newton's three laws of motion apply to real world situations (e.g., sports, transportation)	Fundamental laws govern the motion of everything in the universe.	Demonstrate that objects in motion stay in motion and objects at rest stay at rest unless acted upon by an outside force. Example: Play a game using a ball. The ball remains still until it is pushed, hit, or thrown. Example: --Croquet --Pool --Baseball --Bowling	Demonstrate that when a force is placed on an object, the object will accelerate in the direction of the force. Example: Play a game using a ball. When the ball is hit, pushed or thrown, the ball will accelerate in the direction it is pushed, hit or thrown. Example: --Push a bowling ball down a ramp. --Hit a baseball. --Throw a ball. --Miniature golf.	Demonstrate that when a force acts on an object, it is balanced by an equal and opposite force. Example: --Put a fishing line several feet long through a straw. --Inflate a balloon, twist, and use a clothespin to hold in air. --Tape the balloon to the straw. --Pull the string taut with the straw at one end of the string. --Release the air from the balloon. --The balloon will move down the string.	Give examples of Newton's of motion using picture symbols or actual objects and record observations on a data sheet and answer questions about the results

Physical Science		Content Standard 7: Energy and Transfer of Energy: Students shall demonstrate and apply knowledge of energy and transfer of energy using appropriate safety procedures, equipment, and technology.			
Student Learning Expectation		Essence of Student Learning Expectation			
Grade 7		Less Complex		More Complex	
PS.7.7.1 Identify natural resources used to supply energy needs.	Many of our energy needs are met using resources from nature.	List in words or pictures resources in nature used to supply energy. Example: --Sun --Water --Wood --Fossil fuels	Using pictures of a variety of environments mark or circle the natural resources that are energy sources.	Collect pictures of natural resources and use them to make a collage.	Collect pictures of natural resources and write or tell how they are used as sources of energy.
PS.7.7.2 Describe alternatives to the use of fossil fuels: <ul style="list-style-type: none"> • solar energy • geothermal energy • wind • hydroelectric power • nuclear energy • biomass 	Other forms of energy exist that can be used in place of fossil fuels.	Find items or pictures of energy sources that are alternatives to fossil fuels. Example: --Water wheel --Sun	Draw or trace pictures of natural resources that are alternatives to fossil fuels.	Use energy sources that are alternatives to fossil fuels. Example: --Make sun tea --Roast marshmallows over a fire. --Cook hot dogs over a charcoal fire. --Make a solar oven.	Use technology to gather information about alternatives to the use of fossil fuels. Example: Make a booklet
PS.7.7.3 Conduct investigations to identify types of potential energy and kinetic energy.	Recognize that there are different types of potential (stored in an object at rest) kinetic energy (an object in motion).	Identify objects, picture symbols, etc. as having potential or kinetic energy.	Use an object to demonstrate potential and kinetic energy. Example: --Kitchen timer --Mixer --Battery operated item --Roll a ball	Model or act out activities that demonstrate use of potential and kinetic energy. Example: Playground equipment --Swing --Slide	Predict how the height of a ramp will effect the distance an object will travel and record the results on a lab sheet.

Earth and Space Science		Content Standard 8: Earth Systems: Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology			
Student Learning Expectation	Essence of Student Learning Expectation	Less Complex More Complex			
Grade 7					
ESS.8.7.5 Identify elements of weather: <ul style="list-style-type: none"> • temperature • air pressure • wind speed • wind direction • humidity 	Many factors determine the weather.	Record daily weather conditions from a source and post conditions in the classroom, office, or daily announcements. Example: --newspaper --internet --telephone --radio station	Choose clothing and activities appropriate for the day's weather. Example: --match rain with raincoat or umbrella	Look at pictures of different environments and identify the elements of weather that determine the climate of each one. Example: --rainforest --tundra --desert	Record daily weather conditions and chart the weather over a period of time (e.g. two weeks).
ESS.8.7.6 Conduct investigations using weather devices: <ul style="list-style-type: none"> • anemometers • barometers • sling psychrometers • thermometers • weather charts 	Scientists use instruments to measure the weather.	Use thermometer to measure the temperature.	Make a pinwheel or anemometer and use to measure wind speed.	Use a barometer to measure the barometric pressure and record weather conditions along with the barometric pressure.	Chart and compare weather conditions in various regions of the country. Example: --my city/ grandparent's city --my city/ nation's capitol
ESS.8.7.7 Predict weather conditions using data on the following: <ul style="list-style-type: none"> • temperature • air pressure: highs, lows, fronts • clouds • wind speed • wind direction • humidity 	Indicate how the weather conditions will change.	Use data to select the symbol or picture that indicates the weather forecast.	Predict what to wear based on the weather forecast.	Predict the weather for an upcoming event. Example: --holiday --field trip --recess	Predict weather conditions by observing elements of the weather and record results on a lab sheet.

Earth and Space Science		Content Standard 9: Earth's History: Students shall demonstrate and apply knowledge of Earth's history using appropriate safety procedures, equipment, and technology			
Student Learning Expectation Grade 7	Essence of Student Learning Expectation	Less Complex → More Complex			
		ESS.9.7.3 Compare and contrast Earth's magnetic field to those of natural or human-made magnets with: <ul style="list-style-type: none"> • North and South poles • Lines of force 	The earth has a magnetic field that attracts and repels objects.	Experiment with objects and magnets and sort into two groups-magnetic and non-magnetic.	Recognize that magnets push and pull on objects. Example: --Toys that use magnets to build or draw. --Magnetic maze toys
ESS.9.7.5 Research ways in which people have used compasses.	People use compasses to find their way.	Identify and locate pictures of people who use compasses in their work or leisure. Example: --forester --hiker --hunter --military --land survey	Read an article or book that explains how people use compasses.	Interview someone whose job requires the use of a compass.	Research, using technology, how people use or have used compasses.

Earth and Space Science	Content Standard 10: Objects in the Universe: Students shall demonstrate and apply knowledge of objects in the universe using appropriate safety procedures, equipment, and technology.				
Student Learning Expectation Grade 7	Essence of Student Learning Expectation	Less Complex  More Complex			
ESS.10.7.1 Identify and model the causes of night and day.	Night and day are caused by the rotation of the earth on its axis.	Using pictures to identify if an activity is a daytime or nighttime activity.	Act out the rotation of the earth, using a light to represent the sun, to illustrate the cause of day and night.	Use a globe and a flashlight to demonstrate the cause of day and night.	Label a diagram, draw picture, or make a model to illustrate the causes of day and night.
ESS.10.7.3 Identify and model the cause of planetary years.	A planetary year is caused by the revolution of a planet around the sun.	Use a calendar to show that an Earth year is 12 months.	Act out the revolution of the earth around the sun to illustrate the cause of a planetary year.	Using a globe to represent the earth and a table lamp to represent the sun, demonstrate the cause of a planetary year.	Label a diagram, draw a picture, or make a model to illustrate the cause of a planetary year.
ESS.10.7.5 Identify and model the causes of seasons.	The tilt of the earth on its axis causes the earth's seasons.	Use picture symbols of the earth tilted on its axis to identify the four seasons of the year and position the pictures to match a diagram illustrating the cause of the seasons.	Use a globe to represent the earth and a table lamp to represent the sun and demonstrate the tilt of the earth as it revolves around the sun, which causes the earth's seasons.	Draw or trace a picture to illustrate the causes of the earth's seasons.	Label a diagram or make a model to illustrate the causes of the earth's seasons.

Science Glossary

Absorption	When white light wave passes through a substance the energy of certain colors may be taken in by the substance and converted to a different form of energy
Acid precipitation	Rain or snow produced when gases, released by burning fossil fuels, mix with water in the air
Adaptation	Any structure or behavior that helps an organism survive in its environment; develops in a population over a long period of time
Amplitude	The distance between a wave's midpoint and its crest or trough
Anemometer	A device used to measure wind speed
Angiosperm	A flowering plant with seeds enclosed in a fruit such as an apple
Asexual reproduction	A type of reproduction in which a new organism is produced from one parent
Atmosphere	The mixture of gases, solids, and liquids that surrounds a celestial body
Atom	Smallest unit of matter that cannot be broken down by chemical means
Axis	The imaginary line through Earth's center from the North Pole to the South Pole
Barometer	An instrument for measuring air pressure
Biomass	Organic material from plants or animals that is used to produce energy
Biosphere	All parts of Earth where life exists
Carbon cycle	The flow of carbon through Earth's ecosystems
Carbon dioxide-oxygen cycle	The flow of carbon dioxide and oxygen through Earth's ecosystems
Carnivore	An animal that feeds on other animals
Carrying capacity	The largest number of individuals that an environment can support over time
Cell	The smallest unit of an organism that can perform life functions
Cell theory	The major theory that the cell is the basic unit of life; organisms are made up of one or more cells; and all cells come from other living cells
Chemical change	Any change where one or more of the original materials changes into other materials
Chemical property	Characteristic of a substance that allows it to change to a new substance
Cirrus	A cloud that is thin, feathery, and high in the sky, usually associated with sunny weather
Clay	A sedimentary material with grains smaller than 0.002 mm in diameter
Climate	Average of weather conditions in a given area over a period of years
Closed Circuit	Circuit having a complete path for current flow
Comet	A ball of ice, rock, and frozen gases that orbits the sun
Commensalism	A symbiotic relationship that benefits one partner but not the other
Communication	An exchange of information from one organism to another

Community	All of the populations of different species that live in the same place at the same time and interact with each other
Compound machines	Combination of two or more simple machines
Compound	Pure substance produced when two or more elements combine and whose properties are different from the elements from which it is formed
Compression	Process of being pressed together
Cumulus	A cloud that looks like puffy white cotton, usually associated with fair weather
Conductors	Materials that transfer energy from one particle to another
Conifer	A tree that produces seeds in cones and has needle-like leaves
Conservation of matter (mass)	Law that states that matter is neither created nor destroyed, only changed in form
Consumer	Organism that cannot make its own food
Control	In an experiment, the standard for comparison
Convection	Transfer of thermal energy through liquid and gases
Complete metamorphosis	Complete reorganization of the tissues of an animal during its life cycle from egg to larva to pupa to adult, usually involving the addition of legs and wings
Coriolis effect	Force that changes the direction of solids, liquids, and gases to the right in the northern hemisphere and to the left in the southern hemisphere as a result of earth's rotation
Crustal deformation	Alteration of Earth's crust by forces applied by the movement of the tectonic plates
Decomposer	Organisms that break down and absorb nutrients from dead organisms
Density	The amount of mass in a given volume ($D=m/v$)
Dependent variable	Factor being measured in an experiment, found on the vertical or Y-axis on a graph
Deposition	The dropping of sediment from wind or water
Dichotomous key	System used for identifying plants, animals, rocks, or minerals that is made up of a series of paired descriptions to choose between
Dominant trait	Form of a trait that masks another form of the same trait
Earthquake	A sudden movement of Earth's crust caused by the release of stress accumulated along geologic fault lines or by volcanic activity
Ecosystem	Populations interacting with the living and non-living parts of the environment
Egg	The female sex cell
Electricity	The interaction of electric charges
Electromagnet	A temporary magnet made by passing electric current through a wire coiled around an iron bar
Elements	A pure substance that is made of only one kind of atom
Embryo	Fertilized egg that has begun to divide
Embryonic development	The growth of a fertilized egg from a single cell to multi-cells
Empirical evidence	Data that can be detected, observed, or measured

Endothermic	A chemical reaction in which more energy is taken in than given off
Energy	The capacity to cause change and do work
Environment	The surroundings and conditions in which an organism lives
Erosion	Transportation of soil and rock by wind, water, gravity, and ice
Estivation	An adaptation for survival in hot, dry weather during which an animal becomes inactive and all body processes slow down
Eukaryote	Cell with a nucleus
Evaporation	To change from a liquid into a gas
Exothermic	A chemical reaction in which more energy is given off than is taken in
Experimental design	The design of a suitable experiment to test a hypothesis
Extinction	The dying out of an entire species
Fault	A crack in Earth's crust along which rock moves
Field force	A force applied without physical contact
Field study	Planned small or large group activities that provide opportunities for students to practice skills in a variety of settings other than an actual classroom; conducting <i>scientific investigations</i> in a natural setting
Force	Any push or pull that tends to produce a change in the speed or direction of motion of an object
Fossil	The preserved remains or traces of an organism that lived in the past
Fossil fuels	Fuel such as coal, natural gas, or oil that formed underground millions of years ago from decaying organic matter
Frequency	The number of complete waves that pass a given point in a given amount of time
Friction	A force that opposes motion whenever two surfaces rub against each other
Galaxy	A large system of stars moving together through space
Gene	A section of DNA that controls specific cell activities and characteristics of every organism
Geothermal energy	Heat energy below Earth's surface
Glaciation	Any change in the landscape caused by glacial movement
Global warming	An increase in Earth's temperature caused by gases in the atmosphere that trap heat
Gravity	The force of attraction that exists between any two objects
Greenhouse effect	The natural heating process caused when gases trap heat in the atmosphere
Habitat	The place in an ecosystem where an organism lives
Heat	The transfer of thermal energy
Herbivore	An animal that eats only plants
Hibernation	An adaptation for winter survival during which an animal becomes inactive and all body processes slow down
Homeostasis	The process by which an organism's internal environment is kept stable in spite of changes in the external environment
Humidity	Water vapor in the air
Humus	Material in the soil that formed from decayed plant and animal matter

Hydroelectric	Production of electricity by flowing water
Hypothesis	Explanation for a question or a problem that can be formally tested
Igneous	Rock formed by the solidification of magma or lava
Igneous intrusion	A body of solidified magma intruded into rock layers
Imprinting	A process in which newly hatched birds or newborn mammals learn to follow the first object they see
Incomplete metamorphosis	The life cycle of an animal, such as the grasshopper, whose form does not change substantially through its life stages from egg to nymph to adult
Independent variable	The one factor changed in an experiment; represented on the horizontal or X-axis of a graph
Innate behavior	Behavior that an organism is born with and does not have to learn
Inorganic	Not alive and none of its components have ever been alive
Insulators	Materials that prevent the transfer of energy
Invertebrate	An animal without a backbone
Jet stream	Narrow belt of strong winds near the top of the troposphere
Kinetic energy	Energy of motion
Lab activities	Inquiry-based <i>scientific investigations</i>
Law	A descriptive generalization about how some aspect of the natural world behaves under stated circumstances, often stated in the form of a mathematical equation
Law of conservation of momentum	The rule that, in the absence of outside forces, the total momentum of objects in an interaction does not change
Learned behavior	Behavior that an organism is not born with and must acquire
Light minute	The distance that light travels in one minute
Light year	The distance that light travels in one year
Limiting factor	Any living or non-living factor that restricts the number of individuals in a population
Lithosphere	The crust and the rigid upper mantle that is broken into plates
Living	Anything that is or has ever been alive
Longitudinal wave	A wave in which the particles vibrate parallel to the direction of wave motion
Lunar eclipse	A darkening of the moon when passed through Earth's shadow
Magnetic reversal	Earth's magnetic field reverses and the poles switch places
Magnetism	The force associated with some motion of electrical charges or by the field of force produced by a magnet
Mass	A measure of the amount of matter in an object (K-4 uses weight interchangeably)
Matter	Anything that has mass and occupies space
Metal	An element that conducts heat and electricity
Metamorphic	Rock formed by the effect of heat, pressure, and chemical action on other rocks

Meteor	A rock from space that is burning up in the atmosphere (commonly referred to as a falling star)
Microwave energy	A wavelength of energy in the electromagnetic spectrum
Migration	The instinctive seasonal movement of animals
Mimicry	The structural adaptation involved in some species where one species resembles another
Mixture	The combination of two or more substances that have not chemically combined
Molecule	The combination of atoms chemically bonded together
Moon phase	A change in appearance of the moon as it revolves around Earth
Mutualism	A symbiotic relationship that benefits both partners
Natural resources	Minerals, fossil fuels, trees, and other valuable materials that occur naturally
Natural selection	The idea that those organisms best adapted to their environment will be the ones most likely to survive and reproduce
Neap tide	During the first and last quarter moon phases, the tides are not as high or not as low as a normal tide
Newton	The metric unit for forces (Newton)
Non-living	Anything that is not now or never has been alive
Nuclear energy	The potential energy stored in the nucleus of an atom
Nucleus	The control center of the cell
Nutrients	The substance in food that produces energy and materials for life activities
Omnivore	An animal that eats both plants and animals
Opaque	Does not allow light to pass through
Open circuit	A break in the conductive path so that no current flows
Orbit	The path an object follows as it revolves around another object
Organ	Structures made up of different types of tissues that work together to do a certain job
Organ system	System made up of different types of organs to do a certain job
Organic	Anything that is or has ever been alive
Organism	A living thing
Parallel circuit	A circuit that provides more than one path for the electrical current to follow
Parasitism	A symbiotic relationship in which one organism benefits and the other is harmed
Periodic table	Organizational chart of the elements
Phloem	Tubes that move food in plants
Physical property	Characteristic that can be observed or measured
Pitch	How high or low a sound is
Planetary year	The length of time it takes a planet to orbit the sun
Plate tectonics	Theory which states that pieces of Earth's crust are moving around on the mantle
Population	All the members of one species in a particular area
Potential energy	Stored energy
Precipitation	Any form of water that falls to the earth

Predator	Any animal that hunts and kills other animals for food
Prey	An animal that a predator feeds upon
Producer	An organism that makes its own food
Prokaryote	Organism without a nucleus
Proton	Positively charged particle in an atom's nucleus
Punnett Square	A tool that can show how genes combine
Radiation	Transfer of thermal energy as waves
Reactivity	The ability of a substance to go through a chemical change
Recessive trait	Physical characteristic resulting when no dominant gene is present
Reflect/reflection	Change in the direction of a light ray as it bounces off an object
Refract/refraction	A bending of a light ray when it passes at an angle from one transparent substance into another transparent substance in which its speed is different (such as when it passes through air into water)
Reproduction	The production of offspring by an organism
Richter scale	A scale that measures the amount of energy released by an earthquake
Sand	A sedimentary material finer than a granule and coarser than silt, with grains between 0.06 mm and 2.0 mm in diameter
Scatter plot	A graph with one point for each item being measured
Scavenger	An animal that feeds on the bodies of dead organisms
Sedimentary rocks	Rock formed in layers from sediment
Seismograph	Instrument which detects and records earthquakes
Selective breeding	The process of selecting a few organisms with desired traits to serve as parents of the next generation
Series circuit	Having only one path for electrons to flow
Sexual reproduction	The joining of a male sperm cell and a female egg cell
SI units	International System of Units metric system
Silt	A sedimentary material consisting of very fine particles intermediate in size between sand and clay with grains between 0.002 mm and 0.05 mm in diameter
Simple machine	Machine that works with only one motion
Sling psychrometer	Instrument used to measure relative humidity
Soil profile	Layers of soil in an area
Solar eclipse	An alignment of the sun, moon, and Earth where the moon blocks the sun from Earth's view
Solar energy	Radiant energy that comes from the sun
Solar system	A star that is orbited by a group of planets, comets, and other objects
Solubility rate	Speed at which a substance dissolves
Solute	A substance that is dissolved

Solution	A mixture in which the particles of each substance are mixed evenly
Solvent	A substance that dissolves other materials
Species	A group of similar organisms whose members successfully reproduce among themselves
Speed	The distance that an object moves in a certain period of time $s=d/t$
Sperm	The male sex cell
Spring tide	During the full moon and new moon phases, high tides are higher and lower than normal
Stability	The condition where a substance does not go through chemical changes easily
Stratus	A long, layered cloud
Structural adaptation	Adaptation that involves body parts or color
Temperature	Measure of the average motion of the particles in a substance (heat)
Tension	A stress created by pulling
Territorial behavior	Activities associated with the defense of an area
Theory	A unifying explanation that has the ability to explain what has been observed; predict what has not yet been observed; be tested further by experimentation; be modified as required by the acquisition of new data; be modified only with compelling empirical evidence, verification, and peer review; be supported by sufficient empirical evidence to make abandonment unlikely
Thermometer	Instrument used to measure temperature
Tissues	Group of similar cells that work together
Translucent	Describes matter that allows, some, but not all, of the light that hits it to pass through, and that scatters some light
Transparent	The ability of light to pass through without refraction
Transverse wave	A wave in which the particles vibrate at right angles to the direction of the wave
Tropism	The response of a plant to something in its environment
Variable	Measurable factor, characteristic, or attribute of an individual or a system
Vertebrate	Animals with a backbone
Water cycle	The movement of water through Earth's ecosystems
Wavelength	Distance between any point on one wave to a corresponding point on the next wave, such as crest to crest or trough to trough
Weathering	The breakdown of a material into smaller and smaller pieces by mechanical or chemical means
Weight	The downward pull of gravity on an object (K-4 uses mass interchangeably)
White light	Contains all the colors of the visible spectrum (colors of the rainbow)
Xylem	Vessels in a plant that carry water and nutrients from the roots to the leaves

Appendix

Suggested Science Labs-Grades 5-8

Grade	Strand	Suggested Laboratory or Activity
5 th	Nature of Science	Accurate observations lab Use mean, median, and mode Interpret scientific data using charts, graphs, stem and leaf plots
	Life Science	Use microscopes to identify cells Model parts of animal and plant cells Separate plant pigments for cell Demonstrate cellular respiration Energy pyramids Design food webs Investigate the carbon dioxide and oxygen cycle Create ecosystems Create system for plant growth Field study to categorize organisms
	Physical Science	Identify physical properties of objects Model the motion and position of molecules in the states of matter Model expansion and contraction Classify simple machines Investigate various simple machines Investigate potential/kinetic energy Investigate how light is absorbed, refracted, or reflected by matter Investigate matter that is translucent, transparent, or opaque Interactions of light, matter, and color perception
	Earth and Space Science	Grow crystals Investigate mineral properties Identify minerals Identify rocks Investigate the formation of soil Show how sedimentation occurs Model the rock cycle Analyze fossil record

Grade	Strand	Suggested Laboratory or Activity
6 th	Nature of Science	Accurate observations lab Use mean, median, and mode Interpret scientific data using charts, graphs, stem and leaf plots
	Life Science	Model and explain the functions of animal and plant organs Dissect animal and plant organs Simulate how organisms compete for resources Simulate natural selection
	Physical Science	Determine density of various materials Construct a density column and test various objects Investigate acid/base indicators Physical and chemical changes lab Conservation of mass lab Investigate forces using SI units Calculate direction based on changes of force Calculate the speed of an object based on force Investigate the transfer of energy
	Earth and Space Science	Model the layers of the earth Demonstrate convection currents and how they cause plate movements Demonstrate <i>variables</i> within volcanoes that cause different types of eruption Investigate Arkansas landforms created by internal forces: plateau, mountains, earthquake faults Map patterns of earthquake and volcanic activity Model major geological events on land and in the ocean Model rock layer sequencing based on fossils Model phases of the moon

Science Lab/Activity Report Sheet

What is the date? _____ What is the month? _____

Hypothesis: What you did you do today? What do you think would happen?

Materials-What supplies did you use?

Procedures-What did you do?

Observations-What did you see happen?

Results-Illustrate what happened.

Resources:

- Your local school science department is a good source of materials and equipment.
- University of Arkansas Cooperative Extension Service
- *U of A Division of Agriculture/Poultry Science, Dr. Susan E. Watkins 479-575- 4952
- NASCO (Science supply vendor)
- Arkansas Game and Fish Commission
- Project Wild, Pat Knighten
- Arkansas Geological Society
- Modern Woodsman of America
- U. S. Forestry Service
- Project Learning Tree, Mary Ann Halsey, mahalsey@arkforest.org
- Weyerhaeuser
- NOAA
- Arkansas Department of Environmental Quality
- Project Wet, Philip Osborne
- NASA
- Visit a weather station
- Heifer Project, Perryville
- Arkansas State Fair or the county fair

Helpful Websites

www.Brainpop.com
www.kathimitchell.com
www.weatherbug.com
www.tinships.org
www.edhelper.com
www.enature.com

*[www.aragriculture.org/poultry/Fun With Incubation/photogallery](http://www.aragriculture.org/poultry/Fun-With-Incubation/photogallery)

Create a Graph
www.plt.org