

# AMPHITHEATER ELEMENTARY SCIENCE CURRICULUM



6/30/2015

FIRST GRADE

The following pages provide guidance to teachers when implementing science instruction in Amphitheater Elementary Schools. This guide will be revised regularly to ensure alignment with current Arizona State Standards and the requirements of the district.

## FORWARD

Dear Teachers and Administrators,

One of the best ways to engage children in their learning and in the world around them is to provide hands-on opportunities to learn and actually “do” science. Science and engineering education is more important than ever. Becoming college and career ready not only involves gaining factual knowledge, it also involves teaching children to question, explore, build, collaborate, explain, analyze, think critically and creatively, and communicate. Science provides the opportunity for all children to be engaged and solve problems which require these skills.

Over the past two years we have implemented new curriculum in the areas of reading and mathematics. Both of these curriculum areas are critical to student success. Science skills and processes give students real situations to apply what they have learned in reading, writing, and mathematics. Technical writing is necessary when students record their observations, record their analysis of data, and develop conclusions and reports. Integration of the subject areas is critical.

A committee of district teachers met over the past six months to discuss science in our schools, review the Arizona Science Standards, make recommendations regarding the teaching of science, discuss the need for materials, and to develop a science curriculum framework for our schools. According to the committee’s analysis, science instruction is scarce in most elementary classrooms, if taught at all. There are classrooms where science is taught regularly. This was a pleasant finding. **The committee is recommending that science be taught a minimum of 90 minutes per week for all students beginning with the 2015-2016 school year.**

A common question is, “How will we fit this in?”, or, “What should we give up?” in order to teach science. *You will be given the flexibility to reduce some of the time spent on reading and/or math in order to teach science.* Many creative scheduling ideas have come up when teachers begin to talk about how to fit the teaching of science into the day/week.

We introduce the **Amphitheater Elementary Science Curriculum** guides. These guides lay out the Arizona Science Standards by grade level, list important academic vocabulary in science, give suggestions for materials and resources and provide many other details for teachers as they prepare their science instruction. We added engineering standards to our curriculum because we know that this type of thinking and “doing” is an important part of STEM education. Inquiry and the Engineering Design Process are the two main threads from Kindergarten through fifth grade. The new curriculum guides will be available electronically and in print. Each school will be scheduling a time to review and discuss the guides, allocate time and resources toward science, and to inventory their science materials.

The guides are not all inclusive. There are many more resources in the community that are not listed, and many more materials that are very effective and practical. We hope to add to these as teachers contribute what they use in their classrooms.

Thank you for all you do to teach science to our youngest scientists!

Sincerely,

Dr. Roseanne Lopez, Chief Academic Officer Elementary Education

Amphitheater Elementary Science Curriculum Plan	
<b>Grade: K-2</b>	<b>Strand: 1 Inquiry Process (Science Lab)</b>
<b>Enduring Understandings (Big Idea)</b> Inquiry uses the scientific process to conduct a complete investigation which is embedded into all areas of science.	
Essential Questions	
What is the process for conducting an investigation? What evidence should be in a science journal during a complete investigation? How do we use scientific investigations to find answers to questions?	
Understanding the Content of this Standard	Essential Knowledge, Skills, and Processes
1. Identify a problem.	<ul style="list-style-type: none"> <li>• Make <b>observations</b> using multiple senses</li> <li>• Ask questions about a simple problem</li> <li>• Collect <b>research</b>/information</li> <li>• <b>Predict</b> the <b>results</b> in a <b>hypothesis</b> (using “if-then” language)</li> </ul>
2. Scientific testing	<ul style="list-style-type: none"> <li>• Demonstrate safe behavior and appropriate procedures</li> <li>• Find and list materials and tools</li> <li>• With guidance list the complete steps to conduct the <b>investigation</b></li> <li>• Participate in the <b>investigation</b></li> <li>• Make <b>observations</b> and measurements</li> <li>• Record <b>data</b> in a <b>data chart</b> (chart, table, list, log)</li> </ul>
3. Analyze data and draw conclusions	<ul style="list-style-type: none"> <li>• Organize the data into <b>graphs</b> (bar, pictograph, tally chart)</li> <li>• <b>Interpret</b> the results of the data</li> <li>• <b>Compare</b> the results to the <b>hypothesis</b></li> <li>• Generate <b>questions</b> for possible future <b>investigations</b></li> </ul>
4. Communication	<u>Explain the results</u> <ul style="list-style-type: none"> <li>• Create a display of the complete <b>investigation</b></li> <li>• Include a science journal with all parts of the <b>inquiry process</b> including <b>research</b>, testing, and <b>analysis</b></li> <li>• Present the results with others (classroom, grade level, Science Fair)</li> <li>• </li> </ul>
Science Vocabulary	
inquiry, question, scientific process, experiment, investigation, opinion, hypothesis, observations, data chart, graphs, results, compare, communication, research, predict, data, models, patterns, conclusion, evidence, classify, sequence, label, diagram, etc.	

<b>Assessment</b>	
Research report Science Fair projects (individual, group, or class) Interpretation and evaluation of data and graphs to answer the relevant question Science journal showing reflections throughout the inquiry process Presentation of the complete inquiry process Teacher observation	
<b>Materials</b>	<b>Resources and Ideas</b>
Research materials specific to each design	Research sites for kids: <ul style="list-style-type: none"> <li>• <a href="http://www.factmonster.com">www.factmonster.com</a></li> <li>• <a href="http://www.kidsclick.org">www.kidsclick.org</a></li> <li>• <a href="http://www.ipl.org/div/kidspace">www.ipl.org/div/kidspace</a></li> <li>• <a href="http://www.kidrex.org">www.kidrex.org</a></li> <li>• <a href="http://www.sciencebuddies.org/">www.sciencebuddies.org/</a></li> <li>• <a href="http://www.sarsef.org/">www.sarsef.org/</a> (<i>volunteers are available through SARSEF</i>)</li> <li>• <a href="http://www.powershow.com/view/26bf93-Mzg0N/LPS_Science_Fair_Bill_Nye_the_Science_Guy_powerpoint_ppt_presentation">www.powershow.com/view/26bf93-Mzg0N/LPS Science Fair Bill Nye the Science Guy powerpoint ppt presentation</a></li> </ul> FOSS kits Engineering is Elementary units Teachers Pay Teachers BrainPop

Amphitheater Elementary Science Curriculum Plan	
<b>Grade: 1st</b>	<b>Strand 4: Life Science</b>
<p align="center"><b>Enduring Understandings (Big Idea)</b></p> <p>Explore/investigate the characteristics, features, life cycle and habitats of plants/animals.</p> <p align="center"><b>Concepts</b></p> <p align="center">Strand 2- History and Nature of Science: Concept 1  Strand 3- Science in Personal and Social Perspectives: Concept 2  Strand 4- Life Science: Concept 1- Characteristics of Organisms  Strand 4- Life Science: Concept 2- Life Cycles  Strand 4- Life Science: Concept 3- Organism and Environments</p>	
<p align="center"><b>Essential Questions</b></p> <p>What are the characteristics of plants/animals? What are the observable features of plants/animals? What are the stages of human life? What are some plants and animals that exist in our local environment? What are the different habitats in which plants and animals live? How are plants and animals dependent on each other within a habitat?</p>	
Understanding the Content of this Standard	Essential Skills and Processes
Characteristics of plants and animals including growth and development, reproduction and response to stimulus	Identify characteristics of living things by observation or research
Features of plants and animals including movement, protection, respiration and support	Compare observable features of living things
Similarities and differences between/among different groups of animals (e.g. number of legs, body coverings, size)	Identify observable similarities and differences between/among groups of animals
Stages of human life (e.g. infancy, adolescence, adulthood)	Identify stages of human life
Similarities and differences between animals and their parents	Identify similarities and differences between animals and their parents
Plants and animals in the local environment	Identify plants and animals in the local environment
Habitats (e.g. desert, forest, prairie, water, underground)	Compare habitats in which plants and animals live
Plant/animal habitat dependency	Describe how plants and animals within a habitat are dependent on each other
Life science in daily life	Give examples of how diverse people use life science in daily life
Life science contributions and innovations	Identify how diverse people and/or cultures, past or present, have made important contributions to life science innovations

Life science technology	Identify various technologies people use Describe how suitable tools help make better observations and measurements
<b>Science Vocabulary</b>	
<ul style="list-style-type: none"> <li>- Reproduction</li> <li>- Growth</li> <li>- Development</li> <li>- Stimulus</li> <li>- Movement (legs, wings)</li> <li>- Protection (skin, feathers, tree bark)</li> <li>- Respiration (lungs, gills)</li> <li>- Support (stems, trunks)</li> <li>- Life Cycle (infancy, adolescence, adulthood)</li> <li>- Habitat names</li> <li>- Local plants</li> <li>- Local animals</li> </ul>	
<b>Assessment</b>	
<ul style="list-style-type: none"> <li>- Teacher observation</li> <li>- Journal</li> <li>- Informational writing</li> <li>- Projects</li> <li>- Sorts</li> <li>- Written assessment</li> </ul>	
<b>Materials and Resources</b>	
<b><u>Other</u></b> Concept books Reading street- extend your day Scholastic News Pearson Interactive Science FOSS Kits National Geographic Discovery Education Highlights Kids Teachers Pay Teachers BrainPopJR	<b><u>Field Trips</u></b> <ul style="list-style-type: none"> <li>- Desert Museum</li> <li>- Tucson Village Farm</li> <li>- Pumpkin Patch</li> <li>- Sabino Canyon</li> <li>- Catalina State Park</li> <li>- Wildlife Museum</li> </ul>
<b><u>Videos</u></b>  Magic school bus: Plant Seeds, Gets Planted, All Dried Up (desert), In the Arctic (arctic), In the Rainforest (rainforest), Takes a Dive (ocean)  <a href="http://www.bbc.co.uk/schools/scienceclips/ages/5_6/science_5_6.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/5_6/science_5_6.shtml</a>	<b><u>Websites</u></b>  <a href="http://pbskids.org/wildkratts/">http://pbskids.org/wildkratts/</a>  <a href="http://www.bbc.co.uk/schools/scienceclips/ages/5_6/growing_plants.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/5_6/growing_plants.shtml</a>  <a href="http://www.crickweb.co.uk/ks2science.html#habitats4b">http://www.crickweb.co.uk/ks2science.html#habitats4b</a>  <a href="http://www.abpishools.org.uk/activescience/module">http://www.abpishools.org.uk/activescience/module</a>
<b><u>Curriculum</u></b>	

<p>Engineering is Elementary -The Best of Bugs- Insects and Plants</p> <p>Reading Street -A Fox and a Kit- Unit 1 Week 4 (Characteristics, Habitat, Parent Offspring differences) - Get the Egg- Unit 1 Week 5 (Characteristics, Life Cycle) - Animal Park- Unit 1 Week 6 (Characteristics, Habitat) - The Big Circle- Unit 2 Week 4 (Characteristics, Habitat) - Life in the Forest- Unit 2 Week 5 (Characteristics, Habitat) - Honey Bees- Unit 2 Week 6 (Characteristics, Habitat) - Frog and Toad- Unit 3 Week 4 (Plants) - I'm A Caterpillar- Unit 3 Week 5 (Characteristics, Life Cycle) - Where are my Animal Friends?- Unit 3 Week 6 (Habitat) - Mole and Baby Bird- Unit 5 Week 2 (Habitat)</p>	<p><a href="http://home.html">1/home.html</a></p> <p><a href="http://www.bbc.co.uk/schools/scienceclips/ages/6_7/plants_animals_env.shtml">http://www.bbc.co.uk/schools/scienceclips/ages/6_7/plants_animals_env.shtml</a></p> <p><a href="http://www.turtlediary.com/grade-1-games/science-games.html">http://www.turtlediary.com/grade-1-games/science-games.html</a></p> <p><a href="http://www.sheppardsoftware.com/content/animals/kidscorner/kidscorner3.htm">http://www.sheppardsoftware.com/content/animals/kidscorner/kidscorner3.htm</a></p> <p><a href="http://www.science4us.com/science-songs/">http://www.science4us.com/science-songs/</a></p> <p><a href="http://www.education.com/worksheets/first-grade/life-science/">http://www.education.com/worksheets/first-grade/life-science/</a></p> <p><a href="http://www.education.com/activity/first-grade/life-science/">http://www.education.com/activity/first-grade/life-science/</a></p> <p><a href="http://www.greatschools.org/worksheets/first-grade/science/">http://www.greatschools.org/worksheets/first-grade/science/</a></p> <p><a href="http://skyenimals.com/">http://skyenimals.com/</a></p> <p><a href="http://web.compton.k12.ca.us/pages/departments/curriculum/pdf/1stgradeunitbchp3_5.pdf">http://web.compton.k12.ca.us/pages/departments/curriculum/pdf/1stgradeunitbchp3_5.pdf</a></p> <p><a href="http://www.internet4classrooms.com/grade_level_help/life_science_first_1st_grade_science.htm">http://www.internet4classrooms.com/grade_level_help/life_science_first_1st_grade_science.htm</a></p> <p><a href="http://lessonplanspage.com/?t=Search+lesson+plans&amp;s=+&amp;search-token=55147028e06b94.00387556&amp;searchCat%5B%5D=10&amp;searchCat%5B%5D=143464">http://lessonplanspage.com/?t=Search+lesson+plans&amp;s=+&amp;search-token=55147028e06b94.00387556&amp;searchCat%5B%5D=10&amp;searchCat%5B%5D=143464</a></p>
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Amphitheater Elementary Science Curriculum Plan	
<b>Grade: 1st</b>	<b>Strand 5: Physical Science</b>
<b>Enduring Understandings (Big Idea)</b>  Classify objects and materials by their observable properties and understand the way they move.	
<b>Concepts</b> Strand 2- History and Nature of Science: Concept 1 Strand 3- Science in Personal and Social Perspectives: Concept 2 Strand 5- Physical Science: Concept 1- Properties of Objects and Materials Strand 5- Physical Science: Concept 2- Position and Motion of Objects	
Essential Questions	
What are the observable properties of an object/material? How can you classify objects/materials by their properties? What is a solid? What is a liquid? In what way can objects move?	
Understanding the Content of this Standard	Essential, Skills and Processes
Shape, texture, size, color, weight of objects	Classify objects by observable properties
Solids and liquids	Classify materials as a solid or liquid
Various ways objects can move (straight line, zig zag, back-and-forth, round-and-round, fast, slow)	Demonstrate the ways objects can move
Physical science in daily life	Give examples of how diverse people use physical science in daily life
Physical science contributions and innovations	Identify how diverse people and/or cultures, past or present, have made important contributions to physical science innovations
Physical science technology	Identify various technologies people use Describe how suitable tools help make better observations and measurements
Science Vocabulary	
<ul style="list-style-type: none"> <li>- Shape</li> <li>- Texture</li> <li>- Size</li> <li>- Color</li> <li>- Weight</li> <li>- Solid</li> <li>- Liquid</li> <li>- Straight</li> <li>- Zig-zag</li> <li>- Back and forth</li> <li>- Round and round</li> </ul>	



<ul style="list-style-type: none"> <li>- Fast</li> <li>- Slow</li> </ul>	
<b>Assessment</b>	
<ul style="list-style-type: none"> <li>- Observations</li> <li>- Journal writing</li> <li>- Informational writing</li> <li>- Written assessments</li> <li>- Project</li> <li>- Sorts</li> </ul>	
<b>Materials and Resources</b>	
<b><u>Other</u></b> Concept books Reading street- extend your day Scholastic News Pearson Interactive Science FOSS Kits National Geographic Discovery Education Highlights Kids Teachers Pay Teachers BrainPopJR  Science Assemblies- Mad scientist Guest speakers- Raytheon	<b><u>Field Trips</u></b>  <ul style="list-style-type: none"> <li>- Tucson Children's Museum</li> </ul>
<b><u>Videos:</u></b> <ul style="list-style-type: none"> <li>- Magic school bus: plays ball (forces)</li> <li>- Bill Nye Simple Machines</li> </ul> <b><u>Curriculum:</u></b> Engineering is Elementary <ul style="list-style-type: none"> <li>- Catching the Wind- Mechanical</li> </ul> Reading Street <ul style="list-style-type: none"> <li>- Simple Machines- Unit 5, Week 4</li> </ul>	<b><u>Websites</u></b>  <a href="http://www.msichicago.org/play/simplemachines/">http://www.msichicago.org/play/simplemachines/</a>  <a href="http://www.abcya.com/states_of_matter.htm">http://www.abcya.com/states_of_matter.htm</a>  <a href="http://www.education.com/activity/first-grade/physical-science/">http://www.education.com/activity/first-grade/physical-science/</a>  <a href="http://www.internet4classrooms.com/grade_level_help/physical_science_first_1st_grade_science.htm">http://www.internet4classrooms.com/grade_level_help/physical_science_first_1st_grade_science.htm</a>  <a href="http://www.internet4classrooms.com/grade_level_help/physical_science_first_1st_grade_science.htm">http://www.internet4classrooms.com/grade_level_help/physical_science_first_1st_grade_science.htm</a>  <a href="http://www.discoveryeducation.com/search/page/-/-/-/-/index.cfm?Ntx=mode+matchallpartial&amp;Ntk=all-prelogin&amp;Ne=4294967203&amp;Nr=OR(OR(d_Index_Type:Pre-">http://www.discoveryeducation.com/search/page/-/-/-/-/index.cfm?Ntx=mode+matchallpartial&amp;Ntk=all-prelogin&amp;Ne=4294967203&amp;Nr=OR(OR(d_Index_Type:Pre-</a>

	<a href="#">login),OR(d_Domain:www.fit4theclassroom.com))&amp;N=4294967203+31&amp;Ntt=physical%20science</a> <a href="http://www.education.com/worksheets/first-grade/physical-science/">http://www.education.com/worksheets/first-grade/physical-science/</a> <a href="http://www.learninglabresources.com/2013/10/teaching-matter-with-root-beer-floats.html">http://www.learninglabresources.com/2013/10/teaching-matter-with-root-beer-floats.html</a>
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Amphitheater Elementary Science Curriculum Plan	
<b>Grade: 1st</b>	<b>Strand 6: Earth and Space Science</b>
<p align="center"><b>Enduring Understandings (Big Idea)</b></p> <p align="center">Develop an understanding of the properties of Earth materials.</p> <p align="center"><b>Concepts</b></p> <p align="center">Strand 2- History and Nature of Science: Concept 1  Strand 3-Science in Personal and Social Perspectives: Concept 2  Strand 6- Earth and Space Science: Concept 1- Properties of Earth Material</p>	
Essential Questions	
<p align="center">What are the basic Earth materials?  How can you compare the physical properties of basic Earth materials?  What are the common uses of basic Earth materials?  What are natural resources?  How can we conserve natural resources?</p>	
Understanding the Content of this Standard	Essential Skills and Processes
Earth material including rocks, soil, water	Describe basic Earth materials
Physical properties of Earth materials including color, texture and capacity to retain water	Compare physical properties of basic Earth materials
Common uses of Earth materials	Identify common uses of Earth materials
Natural resources including air, water, soil, tress, wildlife	Identify natural resources
Ways to conserve natural resources (e.g. reduce, reuse, recycle, find alternatives)	Identify ways to conserve natural resources
Earth science in daily life	Give examples of how diverse people use space/earth science in daily life
Earth science contributions and innovations	Identify how diverse people and/or cultures, past or present, have made important contributions to space/earth science innovations
Earth science technology	Identify various technologies people use Describe how suitable tools help make better observations and measurements
Science Vocabulary	
<ul style="list-style-type: none"> <li>- Earth</li> <li>- Rocks</li> <li>- Soil</li> <li>- Water</li> <li>- Color</li> <li>- Texture</li> </ul>	

<ul style="list-style-type: none"> <li>- Capacity</li> <li>- Air</li> <li>- Trees</li> <li>- Wildlife</li> <li>- Reduce</li> <li>- Reuse</li> <li>- Recycle</li> </ul>	
<b>Assessment</b>	
<ul style="list-style-type: none"> <li>- Teacher observation</li> <li>- Journal</li> <li>- Informational writing</li> <li>- Projects</li> <li>- Sorts</li> <li>- Written assessment</li> </ul>	
<b>Materials and Resources</b>	
<b><u>Other</u></b> Concept books Reading street- extend your day Scholastic News Pearson Interactive Science FOSS Kits National Geographic Discovery Education Highlights Kids Teachers Pay Teachers BrainPop JR  School grounds	<b><u>Field Trips</u></b> <ul style="list-style-type: none"> <li>- Desert Museum</li> <li>- Sabino Canyon</li> <li>- Catalina State Park</li> <li>- Gem and Mineral Show</li> </ul>
<b><u>Videos:</u></b> <ul style="list-style-type: none"> <li>- Magic school bus: recycling</li> </ul> <b><u>Curriculum:</u></b> Engineering is Elementary <ul style="list-style-type: none"> <li>- A Work in Process- Playdough- Chemical</li> </ul>	<b><u>Websites</u></b>  <a href="http://www.teachers.cr.k12.de.us/~galgano/1linkssci.htm">http://www.teachers.cr.k12.de.us/~galgano/1linkssci.htm</a>  <a href="http://www.science4us.com/science-songs/">http://www.science4us.com/science-songs/</a>  <a href="http://www.education.com/activity/first-grade/earth-science/">http://www.education.com/activity/first-grade/earth-science/</a>  <a href="http://www.simplyscience.com/firstgrade.html">http://www.simplyscience.com/firstgrade.html</a>  <a href="http://www.msncucleus.org/membership/html/k-6/rc/pdf/rc1rock.pdf">http://www.msncucleus.org/membership/html/k-6/rc/pdf/rc1rock.pdf</a>  <a href="http://www.education.com/worksheets/first-grade/earth-science/">http://www.education.com/worksheets/first-grade/earth-science/</a>

Amphitheater Elementary Science Curriculum Plan	
<b>Grade: 1st</b>	<b>Strand 6: Earth and Space Science</b>
<b>Enduring Understandings (Big Idea)</b>  Identify, compare and describe objects and changes in the earth and sky  <b>Concepts</b> Strand 2- History and Nature of Science: Concept 1 Strand 3-Science in Personal and Social Perspectives: Concept 2 Strand 6-Earth and Space Science: Concept 2- Objects in the Sky Strand 6- Earth and Space Science: Concept 3- Changes in the Earth and Sky	
Essential Questions	
What evidence shows that the sun is a natural source of heat and light? What is the difference between a celestial object and a transient object? What are some changes that occur in the sky? What are the characteristics of seasonal weather patterns? How does weather affect our activities? How do people use space/earth science in their daily lives? Who/what contributed to innovations in space/earth science?	
Understanding the Content of this Standard	Essential Skills and Processes
The sun is a natural source of heat and light on Earth (e.g. warm surfaces, shadows, shade)	Identify evidence that the sun is a natural source of heat
Celestial objects (e.g. sun, moon, stars) and transient objects in the sky (e.g. clouds, birds, airplanes)	Compare celestial objects and transient objects
Changes that occur in the sky (e.g. clouds forming and moving, position of the moon)	Describe observable changes that occur in the sky
Temperature, type of precipitation, wind	Identify characteristics of weather patterns
Weather affects on daily activities	Analyze how weather affects daily activities
Space/earth science in daily life	Give examples of how diverse people use space/earth science in daily life
Space/earth science contributions and innovations	Identify how diverse people and/or cultures, past or present, have made important contributions to space/earth science innovations
Space/earth science technology	Identify various technologies people use Describe how suitable tools help make better observations and measurements
Science Vocabulary	
<ul style="list-style-type: none"> <li>- Sun</li> <li>- Shadow</li> <li>- Shade</li> <li>- Moon</li> </ul>	

<ul style="list-style-type: none"> <li>- Stars</li> <li>- Clouds</li> <li>- Temperature</li> <li>- Weather</li> <li>- Precipitation</li> <li>- Wind</li> <li>- Climate</li> </ul>	
<b>Assessment</b>	
<ul style="list-style-type: none"> <li>- Teacher observation</li> <li>- Journal</li> <li>- Informational writing</li> <li>- Projects</li> <li>- Sorts</li> <li>- Written assessment</li> </ul>	
<b>Materials and Resources</b>	
<b><u>Other</u></b> Concept books Reading Street- extend your day Scholastic News Pearson Interactive Science FOSS Kits National Geographic Discovery Education Highlights Kids Teachers Pay Teachers BrainPopJR  The sky/the outdoors	<b><u>Field Trips</u></b> <ul style="list-style-type: none"> <li>- Flandreau Planetarium</li> <li>- On-site on the playground</li> </ul>
<b><u>Videos:</u></b> <ul style="list-style-type: none"> <li>- Magic school bus: Lost in Solar System, Sees the Stars</li> <li>- Magic School Bus: Kicks Up a Storm, Inside a Hurricane, Makes a Rainbow</li> </ul> <b><u>Curriculum:</u></b> Reading Street <ul style="list-style-type: none"> <li>- Where are my Animal Friends? Unit 3 Week 6 (Weather changes)</li> </ul>	<b><u>Websites</u></b> <a href="http://www.teachers.cr.k12.de.us/~galgano/1linkssci.htm">http://www.teachers.cr.k12.de.us/~galgano/1linkssci.htm</a>  <a href="http://www.science4us.com/science-songs/">http://www.science4us.com/science-songs/</a>  <a href="http://www.education.com/worksheets/first-grade/earth-science/">http://www.education.com/worksheets/first-grade/earth-science/</a>  <a href="https://www.teacherspayteachers.com/Product/Free-Phases-of-the-Moon-With-Oreo-Cookies-1135117">https://www.teacherspayteachers.com/Product/Free-Phases-of-the-Moon-With-Oreo-Cookies-1135117</a>  <a href="http://www.education.com/worksheets/first-grade/weather-seasons+science/">http://www.education.com/worksheets/first-grade/weather-seasons+science/</a>

Amphitheater Elementary Science Curriculum Plan	
Grade: K-5	Engineering Design Process
<b>Enduring Understandings (Big Ideas)</b> <ul style="list-style-type: none"> <li>Defining and Delimiting Engineering Problems</li> <li>Developing Possible Solutions</li> <li>Optimizing the Design Solution</li> </ul>	
<b>Essential Questions</b> <p>How might we define a simple design problem reflecting a need or a want?</p> <p>What are the constraints/criteria?</p> <p>How might we generate and compare possible solutions to a problem?</p> <p>How might we plan and carry out fair tests?</p> <p>How might we improve upon our design?</p>	
Understanding the Content of this Standard	Essential Skills and Processes
Students will be able to use the <b>Design Process</b> . ( <i>italics denote K-2 language</i> )	<b><u>Design Process:</u></b> Students will understand how technology solves problems and makes work easier. <div>Identify the problem (<i>Ask</i>)</div> <div>Do research</div> <div>Develop possible solutions (<i>Imagine</i>)</div> <div>Choose one solution</div> <div>Design and construct a prototype (<i>Plan and Create</i>)</div> <div>Test the prototype (<i>Test</i>)</div> <div>Evaluate and redesign (<i>Improve</i>)</div> <div>Communicate results</div>
<b><u>Identify the problem (<i>Ask</i>)</u></b> <b><u>Research</u></b>  Find a design problem, based on the fact that peoples' needs and desires change over time as well as their demand for new technologies.	<ul style="list-style-type: none"> <li>Identify &amp; create a solvable <b>design problem/need/want</b></li> <li>Explain why that problem is relevant</li> <li>Conduct research</li> </ul>

Create or identify criteria for success and constraints.	<ul style="list-style-type: none"> <li>Understand &amp; explain that there are <b>constraints</b> on <b>material</b>, <b>time</b> and <b>costs</b></li> </ul>
<u><b>Develop possible solutions (Imagine)</b></u> Generate and compare possible solutions to a problem.	<ul style="list-style-type: none"> <li>Work within the criteria while <b>generating</b> possible <b>solutions</b></li> <li>Judge solutions against constraints</li> <li>Identify solution(s) that best fits problem</li> </ul>
<u><b>Design and construct a prototype (Plan and Create)</b></u>  Plan the model or prototype based on chosen solution(s). Create the model prototype.	<ul style="list-style-type: none"> <li>Design a <b>model</b>.</li> <li>Communicate the design of a model (written on paper, whiteboard, or computer software, etc.)</li> <li>Construct a model using available resources.</li> </ul>
<u><b>Test the prototype (Test)</b></u>  Design and conduct fair tests with controlled variables.	<ul style="list-style-type: none"> <li>Plan and conduct <b>fair tests</b> using <b>prototypes</b></li> <li><b>Control variables</b></li> <li>Consider <b>failure points</b> found through testing</li> </ul>
<u><b>Evaluate and redesign (Improve)</b></u>  Evaluate & redesign model.	<ul style="list-style-type: none"> <li>Use failure points to identify parts of a model that can be improved</li> <li>Make changes to the model (<b>redesign</b>).</li> <li>Repeat testing process</li> </ul>
<u><b>Communicate results</b></u>  Communicate results.	<ul style="list-style-type: none"> <li>Explain your results using data</li> <li>Gather input from peers</li> <li>Describe successes and failures</li> <li>Suggest improvements based on the criteria and failure points</li> </ul>
<b>History of Engineering and Innovation</b>	
How have individuals contributed to engineering innovations?	<ul style="list-style-type: none"> <li>Research the various contributions of scientists and innovators in this field (e.g., Wilber and Orville Wright, Leonardo da Vinci, Thomas Edison, Benjamin Franklin, Steve Jobs, Bill Gates, Mary Anderson-windshield wiper, George de Mestral-velcro, Alan Turing-computer science/cryptologist, Hedy Lamarr- basis for wi-fi).</li> <li>Describe how science, engineering and technology have improved the lives of people.</li> <li>Critique the benefits and risks related to the use of technology.</li> <li>Investigate careers related to engineering &amp; design.</li> </ul>
<b>Science Vocabulary</b>	
prototype, model, design, process, predict, evaluate, technology, record, research, create, problem, solution, design problem, want, need, individual, community, global, technology, criteria, constraints, materials, cost, generate, compare, options, reasonable, plan, blueprints, investigate, variable, fair test, control, failure points, redesign	



Assessment	
Formative	Summative
<ul style="list-style-type: none"> <li>• Reflections</li> <li>• Center activities (teacher observation)</li> <li>• Engineering Journals</li> </ul>	<ul style="list-style-type: none"> <li>• Performance assessment</li> <li>• Presentation of design</li> </ul>
Materials	Resources
<p>Engineering is Elementary Units</p> <p>Various materials for making models and prototypes</p> <p>Collection of recycled materials, non-working objects and parts</p>	<ul style="list-style-type: none"> <li>• Discovery Education</li> <li>• Reading Street Leveled Readers (on-line)</li> <li>• Reading A-Z leveled readers</li> <li>• Khan Academy</li> <li>• <a href="http://www.sciencekids.co.nz/engineering.html">http://www.sciencekids.co.nz/engineering.html</a></li> <li>• <a href="http://www.teachengineering.org">www.teachengineering.org</a></li> <li>• <a href="http://www.childrensengineering.org/">http://www.childrensengineering.org/</a></li> <li>• <a href="http://www.childrensengineering.com/free-resources.htm">http://www.childrensengineering.com/free-resources.htm</a></li> <li>• <a href="https://www.teachengineering.org/googlesearch_results.php">https://www.teachengineering.org/googlesearch_results.php</a></li> <li>• <a href="http://betterlesson.com/lesson/620237/the-wonderful-towers-of-watts-building-background-knowledge?grade=14&amp;subject=2&amp;from=bl_directory_no-keywords_second-grade_technology-and-engineering_mt-lesson_620237_title">http://betterlesson.com/lesson/620237/the-wonderful-towers-of-watts-building-background-knowledge?grade=14&amp;subject=2&amp;from=bl_directory_no-keywords_second-grade_technology-and-engineering_mt-lesson_620237_title</a></li> <li>• <a href="http://www.engr.ncsu.edu/theengineeringplace/educators/k8plans.php">http://www.engr.ncsu.edu/theengineeringplace/educators/k8plans.php</a></li> <li>• <a href="https://drive.google.com/folderview?id=0Bzm8D1yH2vdZXzIERWhDYTFFLXc&amp;usp=sharing">https://drive.google.com/folderview?id=0Bzm8D1yH2vdZXzIERWhDYTFFLXc&amp;usp=sharing</a></li> <li>• YouTube videos <ul style="list-style-type: none"> <li>▪ Nasa For Kids: Intro to Engineering</li> <li>▪ The Engineering Process: Crash Course Kid</li> </ul> </li> <li>○ National Science Foundation Resources: <a href="https://www.nsf.gov/news/classroom/engineering.jsp">https://www.nsf.gov/news/classroom/engineering.jsp</a></li> <li>○ Teachers Pay Teachers</li> </ul>