

Ark Community Charter School Science Curriculum Framework – Grade 1

<u>Suggested Pacing</u>	<u>Units</u>	<u>New York State Standards</u>	<u>New York State Skills Standards</u>	<u>New York State Performance Indicators</u>	<u>Assessments</u>
When and in what order will the standards be taught and assessed?	What are your unit titles	What should students know? Optional: You can also identify essential questions based on the content standards.)	What should students be able to do? (Indicate which skill is a benchmark standard that will be assessed at this grade level (A) which will be bolded below , and which skills are introduced (I) and/or practiced (P) at this grade level.	What qualities of the physical and living environment will the students will be able to observe or describe? (Indicate which skill is a benchmark standard that will be assessed at this grade level (A) which will be bolded below , and which skills are introduced (I) and/or practiced (P) at this grade level	What specific tools will be used to assess which content bolded standard or skills standard at this grade level?
Scientific Procedure will be practiced in all units. Bolded standards/PI will be assessed in the Weather Unit and Butterfly Unit	Weather Unit and Butterfly Unit	STANDARD 1- Analysis, Inquiry, and Design: SCIENTIFIC INQUIRY:	<i>Key Idea 1:</i> The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process. S1.1 Ask "why" questions in attempts to seek greater understanding concerning objects and events they have observed and heard about. S1.1a Observe and discuss objects and events and record observations S1.1b Articulate appropriate questions based on observations S1.2 Question the explanations they hear from others and read about, seeking clarification and comparing them with their own observations and understandings. S1.2a Identify similarities and differences between explanations received from others or in print and personal observations or understandings		Assessed (written and/or oral) for use and understanding of Question and Hypothesis

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			<p>S1.3 Develop relationships among observations to construct descriptions of objects and events and to form their own tentative explanations of what they have observed.</p> <p>S1.3a Clearly express a tentative explanation or description which can be tested</p> <p><i>Key Idea 2:</i> Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.</p> <p>S2.1 Develop written plans for exploring phenomena or for evaluating explanations guided by questions or proposed explanations they have helped formulate.</p> <p>S2.1a Indicate materials to be used and steps to follow to conduct the investigation and describe how data will be recorded (journal, dates and times, etc.)</p> <p>S2.2 Share their research plans with others and revise them based on their suggestions.</p> <p>S2.2a Explain the steps of a plan to others, actively listening to their suggestions for possible modification of the plan, seeking clarification and understanding of the suggestions and modifying the plan where appropriate</p> <p>S2.3 Carry out their plans for exploring phenomena through direct observation and through the use of simple instruments that permit measurement of quantities, such as length, mass, volume, temperature, and time.</p> <p>S2.3a Use appropriate "inquiry and process skills" to collect data</p> <p>S2.3b Record observations accurately and</p>	<p>To fulfill S2.3 students be introduced to using the following tools:</p> <ul style="list-style-type: none"> •hand lens •ruler (metric) •thermometer (C °,F °) •measuring cups •graduated cylinder <p>Venn diagram Bar Graphs Tables</p>	

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			<p>concisely</p> <p><i>Key Idea 3:</i> The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.</p> <p>S3.1 Organize observations and measurements of objects and events through classification and the preparation of simple charts and tables.</p> <p>S3.1a Accurately transfer data from a science journal or notes to appropriate graphic organizer</p> <p>S3.2 Interpret organized observations and measurements, recognizing simple patterns, sequences, and relationships.</p> <p>S3.2a State, orally and in writing, any inferences or generalizations indicated by the data collected</p> <p>S3.3 Share their findings with others and actively seek their interpretations and ideas.</p> <p>S3.3a Explain their findings to others, and actively listen to suggestions for possible interpretations and ideas</p> <p>S3.4 Adjust their explanations and understandings of objects and events based on their findings and new ideas.</p> <p>S3.4a State, orally and in writing, any inferences or generalizations indicated by the data, with appropriate modifications of their original prediction/explanation</p> <p>S3.4b State, orally and in writing, any new questions that arise from their investigation</p>		
Building and		Standard 6: Interconnected	Students will understand the relationships and common themes that connect mathematics,	•observe and describe interactions among components of simple systems	Assessing responses in

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Butterfly Units		ness: Common Themes	science, and technology and apply the themes to these and other areas of learning. <i>Key Idea 1:</i> Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.	<ul style="list-style-type: none"> •identify common things that can be considered to be systems (e.g., a plant, a transportation system, human beings) 	building our future- teacher observation of butterfly discussions and butterfly observation studies
All Units		Standard 7: Interdisciplinary Problem Solving Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.	<p>Connections <i>Key Idea 1:</i> The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/society, consumer decision making, design, and inquiry into phenomena.</p> <p>Strategies <i>Key Idea 2:</i> Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.</p> <p>Working Effectively –contributing to the work of a brainstorming group, laboratory partnership, cooperative learning group, or project team; planning procedures; identifying and managing responsibilities of team members; and staying on task, whether working alone or as part of a group</p>	<ul style="list-style-type: none"> •analyze science/technology/society problems and issues that affect their home, school, or community, and carry out a remedial course of action •make informed consumer decisions by applying knowledge about the attributes of particular products and making cost/benefit trade-offs to arrive at an optimal choice •design solutions to problems involving a familiar and real context, investigate related science concepts to determine the solution, and use mathematics to model, quantify, measure, and compute •observe phenomena and evaluate them scientifically and mathematically by conducting a fair test of the effect of variables and using mathematical knowledge and technological tools to collect, analyze, and present data and conclusions 	Teacher observations during science time

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			<p>Gathering and Processing Information – accessing information from printed media, electronic databases, and community resources; using the information to develop a definition of the problem and to research possible solutions</p> <p>Generating and Analyzing Ideas –developing ideas for proposed solutions, investigating ideas, collecting data, and showing relationships and patterns in the data</p> <p>Common Themes –observing examples of common unifying themes, applying them to the problem, and using them to better understand the dimensions of the problem</p> <p>Realizing Ideas –constructing components or models, arriving at a solution, and evaluating the results</p> <p>Presenting Results – using a variety of media to present the solution and to communicate the results</p>		
All year	Weather	Standard 4	Physical	<p>1.1a Natural cycles and patterns include:</p> <ul style="list-style-type: none"> • Earth spinning around once every 24 hours (rotation), resulting in day and night • Earth moving in a path around the Sun (revolution), resulting in one Earth year • the length of daylight and darkness varying with the seasons • weather changing from day to day and through the seasons • the appearance of the Moon changing as it moves in a path around Earth to complete a single cycle <p>1.1b Humans organize time into units based on natural motions of Earth:</p> <ul style="list-style-type: none"> • second, minute, hour • week, month 	Teacher observations when doing and presenting the weather report. Cloud book, Temperature experiment

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				<p>1.1c The Sun and other stars appear to move in a recognizable pattern both daily and seasonally.</p> <p>2.1a Weather is the condition of the outside air at a particular moment.</p> <p>2.1b Weather can be described and measured by:</p> <ul style="list-style-type: none"> • temperature • wind speed and direction • form and amount of precipitation • general sky conditions (cloudy, sunny, partly cloudy) <p>2.1c Water is recycled by natural processes on Earth.</p> <ul style="list-style-type: none"> • evaporation: changing of water (liquid) into water vapor (gas) • condensation: changing of water vapor (gas) into water (liquid) • precipitation: rain, sleet, snow, hail • runoff: water flowing on Earth’s surface • groundwater: water that moves downward into the ground 	
Sept - Dec	Building community	STANDARD 1- Analysis, Inquiry, and Design: ENGINEERING DESIGN:	Engineering design is an iterative process involving modeling and optimization (finding the best solution within given constraints);this process is used to develop technological solutions to problems within given constraints.	<p>T1.1 Describe objects, imaginary or real, that might be modeled or made differently and suggest ways in which the objects can be changed, fixed, or improved.</p> <p>T1.1a Identify a simple/common object which might be improved and state the purpose of the improvement</p> <p>T1.1b Identify features of an object that help or hinder the performance of the object</p> <p>T1.1c Suggest ways the object can be made differently, fixed, or improved within given constraints</p> <p>T1.2 Investigate prior solutions and ideas from books, magazines, family, friends, neighbors, and community members.</p>	<p>Teacher-developed checklist used during conferences after each Building lesson</p> <p>Building Rubric and student – student assessment by map placement assessment</p>

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		Standard 4	<p>Physical</p> <p>Living 7. Human decisions and activities have had a profound impact on the physical and living environment.</p>	<p>T1.2a Identify appropriate questions to ask about the design of an object T1.2b Identify the appropriate resources to use to find out about the design of an object T1.2c Describe prior designs of the object T1.3 Generate ideas for possible solutions, individually and through group activity; apply age-appropriate mathematics and science skills; evaluate the ideas and determine the best solution; and explain reasons for the choices. T1.3a List possible solutions, applying age-appropriate math and science skills T1.3c Select a solution consistent with given constraints and explain why it was chosen T1.4 Plan and build, under supervision, a model of the solution, using familiar materials, processes, and hand tools. T1.4a Create a grade-appropriate graphic or plan listing all materials needed, showing sizes of parts, indicating how things will fit together, and detailing steps for assembly T1.4b Build a model of the object, modifying the plan as necessary T1.5 Discuss how best to test the solution; perform the test under teacher supervision; record and portray results through numerical and graphic means; discuss orally why things worked or didn't work; and summarize results in writing, suggesting ways to make the solution better. T1.5a Determine a way to test the finished solution or model T1.5c Analyze results and suggest how to improve the solution or model, using oral, graphic, or written formats</p>	

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				<p>5.1a The position of an object can be described by locating it relative to another object or the background (e.g., on top of, next to, over, under, etc.).</p> <p>5.1b The position or direction of motion of an object can be changed by pushing or pulling.</p> <p>7.1c Humans, as individuals or communities, change environments in ways that can be either helpful or harmful for themselves and other organisms.</p>	
Jan-Feb	Hibernation/ Cave	Standard 4	<p>Environment</p> <p>3. Individual organisms and species change over time.</p>	<p>2.1b Some characteristics result from an individual's interactions with the environment and cannot be inherited by the next generation (e.g., having scars; riding a bicycle).</p> <p>3.1a Each animal has different structures that serve different functions in growth, survival, and reproduction.</p> <ul style="list-style-type: none"> • wings, legs, or fins enable some animals to seek shelter and escape predators • the mouth, including teeth, jaws, and tongue, enables some animals to eat and Drink • eyes, nose, ears, tongue, and skin of some animals enable the animals to sense their surroundings • claws, shells, spines, feathers, fur, scales, and color of body covering enable some animals to protect themselves from predators and other environmental conditions, or enable them to obtain food • some animals have parts that are used to produce sounds and smells to help the animal meet its needs • the characteristics of some animals change as seasonal conditions change (e.g., fur grows and is shed to help regulate body heat; body fat is a form of stored energy and it changes as the seasons change) 	<p>Teacher-developed checklist used during conferences</p> <p>Writing sample scored with a rubric/checklist</p> <p>Social Studies or Science Research Project - Rubric for each ELA Performance Indicator</p>

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			<p>4. The continuity of life is sustained through reproduction and development.</p> <p>5. Organisms maintain a dynamic equilibrium that sustains life.</p>	<p>3.1c In order to survive in their environment, plants and animals must be adapted to that environment.</p> <ul style="list-style-type: none"> • animal adaptations include coloration for warning or attraction, camouflage, defense mechanisms, movement, hibernation, and migration <p>3.2a Individuals within a species may compete with each other for food, mates, space, water, and shelter in their environment</p> <p>3.2b All individuals have variations, and because of these variations individuals of a species may have an advantage in surviving and reproducing.</p> <p>4.2b Food supplies the energy and materials necessary for growth and repair.</p> <p>5.2f Some animal behaviors are influenced by environmental conditions. These behaviors may include: nest building, hibernating, hunting, migrating, and communicating.</p>	
March – April	Primitive people	Standard 4	<p>Living</p> <p>5. Organisms maintain a dynamic equilibrium that sustains life.</p>	<p>1.1a Animals need air, water, and food in order to live and thrive.</p> <p>1.1b Plants require air, water, nutrients, and light in order to live and thrive.</p> <p>1.1c Nonliving things do not live and thrive.</p> <p>1.1d Nonliving things can be human-created or naturally occurring.</p> <p>1.2a Living things grow, take in nutrients, breathe, reproduce, eliminate waste, and die.</p> <p>5.2d Some animals, including humans, move from place to place to meet their needs.</p> <p>5.2f Some animal (human) behaviors are influenced</p>	<p>Living/Non living venn diagram</p> <p>Teacher-developed</p>

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			7. Human decisions and activities have had a profound impact on the physical and living environments.	<p>by environmental conditions. These behaviors may include: nest building, hibernating, hunting, migrating, and communicating.</p> <p>7.1a Humans depend on their natural and constructed environments.</p> <p>7.1b Over time humans have changed their environment by cultivating crops and raising animals, creating shelter, using energy, manufacturing goods, developing means of transportation, changing populations, and carrying out other activities.</p> <p>7.1c Humans, as individuals or communities, change environments in ways that can be either helpful or harmful for themselves and other organisms.</p>	checklist used during conferences
April- May	Butterfly	Standard 4	Living	<p>4.1a Plants and animals have life cycles. These may include beginning of a life, development into an adult, reproduction as an adult, and eventually death.</p> <p>4.1b Each kind of plant goes through its own stages of growth and development that may include seed, young plant, and mature plant.</p> <p>4.1c The length of time from beginning of development to death of the plant is called its life span.</p> <p>4.1d Life cycles of some plants include changes from seed to mature plant.</p> <p>4.1e Each generation of animals goes through changes in form from young to adult. This completed sequence of changes in form is called a life cycle. Some insects change from egg to larva to pupa to adult.</p> <p>4.1f Each kind of animal goes through its own</p>	By keeping daily records, students will learn to identify sequences of changes and look for patterns; this skill will be useful throughout their study of the natural world. Younger students should draw what they see

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				<p>stages of growth and development during its life span.</p> <p>4.1g The length of time from an animal's birth to its death is called its life span. Life spans of different animals vary.</p> <p>4.2a Growth is the process by which plants and animals increase in size.</p> <p>4.2b Food supplies the energy and materials necessary for growth and repair.</p>	
May- June	Solar System	Standard 4	<p>Key Idea 1: The Earth and celestial phenomena can be described by principles of relative motion and perspective. The universe is made up of many different objects. Students should observe and describe the motions of the Sun, Moon, and stars. The movement of these objects through space can be traced and measured over various time segments. <i>Note: Students at this age are concrete thinkers; therefore, only the effects of gravity they can directly observe should be discussed. Drawing models that show size and position and discussing phenomena based on gravity are too abstract and may lead to misconceptions</i></p>	<p>Describe patterns of daily, monthly, and seasonal changes in their environment.</p> <p>1.1a Natural cycles and patterns include:</p> <ul style="list-style-type: none"> • Earth spinning around once every 24 hours (rotation), resulting in day and night • Earth moving in a path around the Sun (revolution), resulting in one Earth year • the length of daylight and darkness varying with the seasons • weather changing from day to day and through the seasons • the appearance of the Moon changing as it moves in a path around Earth to complete a single cycle <p>1.1b Humans organize time into units based on natural motions of Earth:</p> <ul style="list-style-type: none"> • second, minute, hour • week, month <p>1.1c The Sun and other stars appear to move in a recognizable pattern both daily and seasonally</p>	Completion and then assessment of Solar System book