Ark Community Charter School
Science Curriculum Framework – Grade 4

Suggested Pacing	Units	New York State Standards	New York State Skills Standards	New York State Performance Indicators	Assessments
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? **(Assessed) will be bolded below,** the rest will be practiced (P) at this grade level.	What qualities of the physical and living environment will the students will be able to observe or describe? **(Assessedd) will be bolded below,** the rest will be 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 and assessed	Electrical Unit Floating and Sinking Unit Erosion Unit	STANDARD 1- Analysis, Inquiry, and Design: SCIENTIFIC INQUIRY:	***Key Idea 1:*** **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** **S1.3 Develop relationships among observations to**		Assessed in written scientific reports and worksheets for each unit

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			construct descriptions of objects and events and to form their own tentative explanations of what they have observed. **S1.3a Clearly express a tentative explanation or description which can be tested** ***Key Idea 2:*** **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.** **S2.1 Develop written plans for exploring phenomena or for evaluating explanations guided by questions or proposed explanations they have helped formulate.** **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.)** **S2.2 Share their research plans with others and revise them based on their suggestions.** **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** **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.** **S2.3a Use appropriate "inquiry and process skills" to collect data** **S2.3b Record observations accurately and concisely**	**To fulfill S2.3 students be introduced to using the following tools:** **•hand lens** **•ruler (metric)** **•thermometer (C °,F °)** **•measuring cups** **•graduated cylinder** **Venn diagram** **Bar Graphs** **Tables**	

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			Key Idea 3: **The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.** **S3.1 Organize observations and measurements of objects and events through classification and the preparation of simple charts and tables.** **S3.1a Accurately transfer data from a science journal or notes to appropriate graphic organizer** **S3.2 Interpret organized observations and measurements, recognizing simple patterns, sequences, and relationships.** **S3.2a State, orally and in writing, any inferences or generalizations indicated by the data collected** **S3.3 Share their findings with others and actively seek their interpretations and ideas.** **S3.3a Explain their findings to others, and actively listen to suggestions for possible interpretations and ideas** **S3.4 Adjust their explanations and understandings of objects and events based on their findings and new ideas.** **S3.4a State, orally and in writing, any inferences or generalizations indicated by the data, with appropriate modifications of their original prediction/explanation** **S3.4b State, orally and in writing, any new questions that arise from their investigation**		
		Standard 6: Interconnectedness: Common Themes	**Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.** ***Key Idea 1:***	•observe and describe interactions among components of simple systems •identify common things that can be considered to be systems (e.g., a plant, a transportation system, human beings)	

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			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.		
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.	**Connections** ***Key Idea 1:*** **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.** **Strategies** ***Key Idea 2:*** **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.** **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** **Gathering and Processing Information –accessing information from printed media, electronic databases, and community resources; using the**	•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	

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			information to develop a definition of the problem and to research possible solutions **Generating and Analyzing Ideas –developing ideas for proposed solutions, investigating ideas, collecting data, and showing relationships and patterns in the data** **Common Themes –observing examples of common unifying themes, applying them to the problem, and using them to better understand the dimensions of the problem** **Realizing Ideas –constructing components or models, arriving at a solution, and evaluating the results** **Presenting Results – using a variety of media to present the solution and to communicate the results**		
Sept - Oct	Electricity	**STANDARD 4: The Physical Setting**	**Key Idea 4:** **Energy exists in many forms, and when these forms change energy is conserved.** Students should understand that energy exists in a variety of forms. Students should observe the results of simple energy transformations from one form to another in their physical environment. The safe use and respect of various energy forms should be stressed in the classroom. Note: Attempting to understand heat and its difference from temperature is too abstract a concept for elementary students. Energy is a subject that is difficult for students to understand. Students cannot hold it in their hands and, with the exception of light, they cannot see it.	**Describe a variety of forms of energy (e.g., heat, chemical, light) and the changes that occur in objects when they interact with those forms of energy.** **4.1a Energy exists in various forms: heat, electric, sound, chemical, mechanical, light.** **4.1b Energy can be transferred from one place to another.** **4.1c Some materials transfer energy better than others (heat and electricity).** **4.1d Energy and matter interact: water is evaporated by the Sun's heat; a bulb is lighted by means of electrical current; a musical instrument is played to produce sound; dark colors may absorb light, light colors may reflect light.** **4.1e Electricity travels in a closed circuit.** **4.1f Heat can be released in many ways, for example, by burning, rubbing (friction), or**	Completing the Carolina biologic workbook

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				combining one substance with another. **4.1g Interactions with forms of energy can be either helpful or harmful.** **Observe the way one form of energy can be transferred into another form of energy present in common situations (e.g., mechanical to heat energy, mechanical to electrical energy, chemical to heat energy).** **4.2a Everyday events involve one form of energy being changed to another.** **• animals convert food to heat and motion** **• the Sun's energy warms the air and water** **4.2b Humans utilize interactions between matter and energy.** **• chemical to electrical, light, and heat: battery and bulb** **• electrical to sound (e.g., doorbell buzzer)** **• mechanical to sound (e.g., musical instruments, clapping)** **• light to electrical (e.g., solar-powered calculator)**	
Nov- Dec	Hudson River Erosion	**STANDARD 4: The Physical Setting**	**Key Idea 2:** **Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.** The water cycle, weather, erosion, deposition, and extreme natural events involve interactions among air, water, and land. Students should observe and describe naturally occurring changes in their world involving these phenomena.	**Describe the relationship among air, water, and land on Earth.** **2.1a Weather is the condition of the outside air at a particular moment.** **2.1b Weather can be described and measured by:** **• temperature** **• wind speed and direction** **• form and amount of precipitation** **• general sky conditions (cloudy, sunny, partly cloudy)** **2.1c Water is recycled by natural processes on Earth.** **• evaporation: changing of water (liquid) into**	Complete chapter on Erosion in Scott Forseman Science book and completion of erosion experiment

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				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** **2.1d Erosion and deposition result from the interaction among air, water, and land.** **• interaction between air and water breaks down earth materials** **• pieces of earth material may be moved by air, water, wind, and gravity** **• pieces of earth material will settle or deposit on land or in the water in different places** **• soil is composed of broken-down pieces of living and nonliving earth material** **2.1e Extreme natural events (floods, fires, earthquakes,volcanic eruptions, hurricanes, tornadoes, and other severe storms) may have positive or negative impacts on living things.**	
Jan-Feb	Simple machines	**STANDARD 4: The Physical Setting**	**Key Idea 5:** **Energy and matter interact through forces that result in changes in motion.** Students should be able to observe and describe relative positions between objects in their world. Exploring the observable effects of gravity and magnetism may help students develop an understanding of the reason for the direction of an object's motion. Manipulation and application of simple tools and machines may help students learn about the relationships between forces and motion.	**Describe the effects of common forces (pushes and pulls) of objects, such as those caused by gravity, magnetism, and mechanical forces.** **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.).** **5.1b The position or direction of motion of an object can be changed by pushing or pulling.** **5.1c The force of gravity pulls objects toward the center of Earth.** **5.1d The amount of change in the motion of an object is affected by friction.**	Complete chapter on Simple machines in Scott Foresman Science book and completion of simple machine experiments. Final

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				5.1e Magnetism is a force that may attract or repel certain materials. **5.1f Mechanical energy may cause change in motion through the application of force and through the use of simple machines such as pulleys, levers, and inclined planes.** **Describe how forces can operate across distances.** **5.2a The forces of gravity and magnetism can affect objects through gases, liquids, and solids.** **5.2b The force of magnetism on objects decreases as distance increases.**	Assessment Rube-Goldberg in art
March-April	Science Overview	**STANDARD 4: The Physical Setting & Living Environment**	Physical environment and Living Environment	**All key ideas are reviewed**	Green book worksheets, quizzes and test
May- June	Floating and sinking	**STANDARD 4: The Physical Setting**	Observe and describe properties of materials, using appropriate tools.	**3.1a Matter takes up space and has mass. Two objects cannot occupy the same place at the same time.** **3.1b Matter has properties (color, hardness, odor, sound, taste, etc.) that can be observed through the senses.** **3.1c Objects have properties that can be observed, described, and/or measured: length, width, volume, size, shape, mass or weight, temperature, texture, flexibility, reflectiveness of light.** **3.1d Measurements can be made with standard metric units and nonstandard units. (*Note: Exceptions to the metric system usage are found in meteorology.*)**	Completion of simple machine experiments.

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			Describe chemical and physical changes, including changes in states of matter.	**3.1e The material(s) an object is made up of determine some specific properties of the object (sink/float, conductivity, magnetism). Properties can be observed or measured with tools such as hand lenses, metric rulers, thermometers, balances, magnets, circuit testers, and graduated cylinders.** **3.1f Objects and/or materials can be sorted or classified according to their properties.** **3.1g Some properties of an object are dependent on the conditions of the present surroundings in which the object exists. For example:** **• temperature - hot or cold** **• lighting - shadows, color** **• moisture - wet or dry** **3.2a Matter exists in three states: solid, liquid, gas.** **• solids have a definite shape and volume** **• liquids do not have a definite shape but have a definite volume** **• gases do not hold their shape or volume** **3.2b Temperature can affect the state of matter of a substance.** **3.2c Changes in the properties or materials of objects can be observed and described.**	