Ark Community Charter School
Science Curriculum Framework – Grade 6

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? **(Assessed) 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?
	Behavior Study & Timeline Evolution		**General Skills** 1. follow safety procedures in the classroom and laboratory 2. safely and accurately use the following measurement tools: ¥ metric ruler ¥ stopwatch ¥ thermometer 3. use appropriate units for measured or calculated values 4. recognize and analyze patterns and trends 5. classify objects according to an established scheme and a student-generated scheme 6. develop and use a dichotomous key 7. sequence events 8. identify cause-and-effect relationships 9. use indicators and interpret results **Living Environment Skills**		Teachers checklist and worksheets

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	SS units Timeline		1. manipulate a compound microscope to view microscopic objects 2. determine the size of a microscopic object, using a compound microscope 5. design and use a Punnett square or a pedigree chart to predict the probability of certain traits 6. classify living things according to a student-generated scheme and an established scheme 7. interpret and/or illustrate the energy flow in a food chain, energy pyramid, or food web 9. identify structure and function relationships in organisms **Physical Setting Skills** 1. given the latitude and longitude of a location, indicate its position on a map and determine the latitude and longitude of a given location on a map 12. using the periodic table, identify an element as a metal, nonmetal, or noble gas 13. determine the identity of an unknown element, using physical and chemical properties		Quizzes and tests
	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.	*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.	**1.1 Analyze science/technology/society problems and issues at the local level and plan and carry out a remedial course of action.** **1.2 Make informed consumer decisions by seeking answers to appropriate questions about products, services, and systems; determining the cost/benefit and risk/benefit tradeoffs; and applying this knowledge to a potential purchase.** **1.3 Design solutions to real-world problems of general social interest related to home, school, or community using scientific experimentation to inform the solution and applying mathematical concepts and reasoning to assist in developing a solution.** **1.4 Describe and explain phenomena by designing and**	Teacher observations during class discussions individual and group

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			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.	**conducting investigations involving systematic observations, accurate measurements, and the identification and control of variables; by inquiring into relevant mathematical ideas; and by using mathematical and technological tools and procedures to assist in the investigation.** **2.1 Students participate in an extended, culminating mathematics, science, and technology project. The project would require students to:** **¥ Working Effectively: Contributing to the work of a brainstorming group, laboratory partnership, cooperative learning group, or project team; planning procedures; identify 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 data bases, and community resources and using the 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 result.** **¥ Presenting Results: Using a variety of media to present the solution and to communicate the results.**	
Sept	Timeline	STANDARD 6 Interconnectedn	*Key Idea 5:* Identifying patterns of change is necessary for making	**5.1 Use simple linear equations to represent how a parameter changes with time.**	Completion

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		ess: Common Themes PATTERNS OF CHANGE: STANDARD 4: The Physical Setting	predictions about future behavior and conditions. Develop mental models to explain common chemical reactions and changes in states of matter.	**5.2 Observe patterns of change in trends or cycles and make predictions on what might happen in the future.** **3.3a All matter is made up of atoms. Atoms are far too small to see with a light microscope.** **3.3b Atoms and molecules are perpetually in motion. The greater the temperature, the greater the motion.** **3.3c Atoms may join together in well-defined molecules or may be arranged in regular geometric patterns.** **3.3d Interactions among atoms and/or molecules result in chemical reactions.** **3.3e The atoms of any one element are different from the atoms of other elements.** **3.3f There are more than 100 elements. Elements combine in a multitude of ways to produce compounds that account for all living and nonliving substances. Few elements are found in their pure form.** **3.3g The periodic table is one useful model for classifying elements. The periodic table can be used to predict properties of elements (metals, nonmetals, noble gases).**	of Timeline Quiz on big band theory
Oct- Dec	Evolution	STANDARD 4: Living Environment	Describe sexual and asexual mechanisms for passing genetic materials from generation to generation.	**. 2.1a Hereditary information is contained in genes. Genes are composed of DNA that makes up the chromosomes of cells.** **2.1b Each gene carries a single unit of information. Asingle inherited trait of an individual can be determined by one pair or by many pairs of genes. A human cell contains thousands of different genes.** **2.1c Each human cell contains a copy of all the genes needed to produce a human being.** **2.1d In asexual reproduction, all the genes come from a single parent. Asexually produced offspring are genetically identical to the parent.**	Quizzes and test during this unit

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				2.1e In sexual reproduction typically half of the genes come from each parent. Sexually produced offspring are not identical to either parent.	
			Describe simple mechanisms related to the inheritance of some physical traits in offspring. Major Understandings:	**2.2a In all organisms, genetic traits are passed on from generation to generation.** **2.2b Some genes are dominant and some are recessive. Some traits are inherited by mechanisms other than dominance and recessiveness.** **2.2c The probability of traits being expressed can be determined using models of genetic inheritance. Some models of prediction are pedigree charts and Punnett squares.**	
			Describe sources of variation in organisms and their structures and relate the variations to survival.	**3.1a The processes of sexual reproduction and mutation have given rise to a variety of traits within a species.** **3.1b Changes in environmental conditions can affect the survival of individual organisms with a particular trait. Small differences between parents and offspring can accumulate in successive generations so that descendants are very different from their ancestors. Individual organisms with certain traits are more likely to survive and have offspring than individuals without those traits.** **3.1c Human activities such as selective breeding and advances in genetic engineering may affect the variations of species.**	
			Observe and describe the variations in reproductive patterns of organisms, including asexual and sexual reproduction.	**4.1a Some organisms reproduce asexually. Other organisms reproduce sexually. Some organisms can reproduce both sexually and asexually.** **4.1b There are many methods of asexual reproduction, including division of a cell into two cells, or separation of part of an animal or plant from the parent, resulting**	

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			Explain the role of sperm and egg cells in sexual reproduction. Observe and describe cell division at the microscopic level and its macroscopic effects.	**in the growth of another individual.** **4.1c Methods of sexual reproduction depend upon the species. All methods involve the merging of sex cells to begin the development of a new individual. In many species, including plants and humans, eggs and sperm are produced.** **4.1d Fertilization and/or development in organisms may be internal or external.** **4.2a The male sex cell is the sperm. The female sex cell is the egg. The fertilization of an egg by a sperm results in a fertilized egg.** **4.2b In sexual reproduction, sperm and egg each carry one-half of the genetic information for the new individual. Therefore, the fertilized egg contains genetic information from each parent.** **4.4a In multicellular organisms, cell division is responsible for growth, maintenance, and repair. In some one-celled organisms, cell division is a method of asexual reproduction.** **4.4b In one type of cell division, chromosomes are duplicated and then separated into two identical and complete sets to be passed to each of the two resulting cells. In this type of cell division, the hereditary information is identical in all the cells that result.** **4.4c Another type of cell division accounts for the production of egg and sperm cells in sexually reproducing organisms. The eggs and sperm resulting from this type of cell division contain one-half of the hereditary information.** **4.4d Cancers are a result of abnormal cell division.**	
Jan-March	Animal Behaviors	STANDARD 1- Analysis, Inquiry,	*Key Idea 1:* The central purpose of scientific inquiry is to develop	**S1.1 Formulate questions independently with the aid of references appropriate for guiding the search for**	Scientific experiments

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	Studies & Multi Intelligences	and Design: SCIENTIFIC INQUIRY:	explanations of natural phenomena in a continuing, creative process. *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.	**explanations of everyday observations.** **S1.1a formulate questions about natural phenomena** **S1.1b identify appropriate references to investigate a question** **S1.1c refine and clarify questions so that they are subject to scientific investigation** **S1.2 Construct explanations independently for natural phenomena, especially by proposing preliminary visual models of phenomena.** **S1.2a independently formulate a hypothesis** **S1.2b propose a model of a natural phenomenon** **S1.2c differentiate among observations, inferences, predictions, and explanations** **S1.3 Represent, present, and defend their proposed explanations of everyday observations so that they can be understood and assessed by others.** **S1.4 Seek to clarify, to assess critically, and to reconcile with their own thinking the ideas presented by others, including peers, teachers, authors, and scientists.** **S2.1 Use conventional techniques and those of their own design to make further observations and refine their explanations, guided by a need for more information.** **S2.1a demonstrate appropriate safety techniques** **S2.1b conduct an experiment designed by others** **S2.1c design and conduct an experiment to test a hypothesis** **S2.1d use appropriate tools and conventional techniques to solve problems about the natural world, including:** **¥ measuring** **¥ observing** **¥ describing** **¥ classifying** **¥ sequencing**	done with animals and fellow students

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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.	**S2.2 Develop, present, and defend formal research proposals for testing their own explanations of common phenomena, including ways of obtaining needed observations and ways of conducting simple controlled experiments.** **S2.2a include appropriate safety procedures** **S2.2b design scientific investigations (e.g., observing, describing, and comparing; collecting samples; seeking more information, conducting a controlled experiment; discovering new objects or phenomena; making models)** **S2.2c design a simple controlled experiment** **S2.2d identify independent variables (manipulated), dependent variables (responding), and constants in a simple controlled experiment** **S2.2e choose appropriate sample size and number of trials** **S2.3 Carry out their research proposals, recording observations and measurements (e.g., lab notes, audiotape, computer disk, videotape) to help assess the explanation.** **S2.3a use appropriate safety procedures** **S2.3b conduct a scientific investigation** **S2.3c collect quantitative and qualitative data** **S3.1 Design charts, tables, graphs, and other representations of observations in conventional and creative ways to help them address their research question or hypothesis.** **S3.1a organize results, using appropriate graphs, diagrams, data tables, and other models to show relationships** **S3.1b generate and use scales, create legends, and appropriately label axes** **S3.2 Interpret the organized data to answer the research question or hypothesis and to gain insight into the**	

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				problem. **S3.2a accurately describe the procedures used and the data gathered** **S3.2b identify sources of error and the limitations of data collected** **S3.2c evaluate the original hypothesis in light of the data** **S3.2d formulate and defend explanations and conclusions as they relate to scientific phenomena** **S3.2e form and defend a logical argument about cause-and-effect relationships in an investigation** **S3.2f make predictions based on experimental data** **S3.2g suggest improvements and recommendations for further studying** **S3.2h use and interpret graphs and data tables** **S3.3 Modify their personal understanding of phenomena based on evaluation of their hypothesis.**	
March-June	Solar Systems	STANDARD 4: The Physical Setting	Explain daily, monthly, and seasonal changes on Earth.	**1.1a Earth's Sun is an average-sized star. The Sun is more than a million times greater in volume than Earth.** **1.1b Other stars are like the Sun but are so far away that they look like points of light. Distances between stars are vast compared to distances within our solar system.** **1.1c The Sun and the planets that revolve around it are the major bodies in the solar system. Other members include comets, moons, and asteroids. Earth's orbit is nearly circular.** **1.1d Gravity is the force that keeps planets in orbit around the Sun and the Moon in orbit around the Earth.** **1.1e Most objects in the solar system have a regular and predictable motion. These motions explain such phenomena as a day, a year, phases of the Moon, eclipses, tides, meteor showers, and comets.** **1.1f The latitude/longitude coordinate system and our**	Completion of report and posters

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				system of time are based on celestial observations. **1.1g Moons are seen by reflected light. Our Moon orbits Earth, while Earth orbits the Sun. The Moon's phases as observed from Earth are the result of seeing different portions of the lighted area of the Moon's surface. The phases repeat in a cyclic pattern in about one month.** **1.1h The apparent motions of the Sun, Moon, planets, and stars across the sky can be explained by Earth's rotation and revolution. Earth's rotation causes the length of one day to be approximately 24 hours. This rotation also causes the Sun and Moon to appear to rise along the eastern horizon and to set along the western horizon. Earth's revolution around the Sun defines the length of the year as 365 1/4 days.** **1.1i The tilt of Earth's axis of rotation and the revolution of Earth around the Sun cause seasons on Earth. The length of daylight varies depending on latitude and season.** **1.1j The shape of Earth, the other planets, and stars is nearly spherical.**	