Jones County Schools

6th Grade
MS CCRS Science

Pacing Guide

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Critical to middle school students is the foundation needed to be successful in high school science. In Grades 6-8, students use an integrated science curriculum to develop and plan controlled investigations and create more explicit and detailed models and explanations. Students must have opportunities to develop the skills necessary to engage in scientific and technical reasoning that are necessary for success in college, careers, and citizenship. Because of using an integrated science model, the development of themes for each grade became necessary to assure continuity of thought processes.

FIRST NINE WEEKS

Comp/ Obj. #	Student Objective	Date Mastered
	L.6.1 Hierarchical Organization Conceptual Understanding: Living things are distinguished from nonliving things by several characteristics. All living things are comprised of one (unicellular) or more (multicellular) cells, which are the smallest units of life. Cells carry out life functions and undergo cell division using specialized structures that allow them to acquire energy and water, grow, reproduce, dispose of waste, and survive. Multicellular organisms are organized in a hierarchy of increasing complexity with related, specialized structures and functions.	
L.6.1	**Students will demonstrate an understanding that living things range from simple to complex organisms, are organized hierarchically, and function as whole living systems.**	
L.6.1.1	*Use argument supported by evidence in order to distinguish between living and non-living things, including viruses and bacteria.*	
L.6.1.2	*Obtain and communicate evidence to support the cell theory.*	
L.6.1.3	*Develop and use models to explain how specific cellular components (cell wall, cell membrane, nucleus, chloroplast, vacuole, and mitochondria) function together to support the life of prokaryotic and eukaryotic organisms to include plants, animals, fungi, protists, and bacteria (not to include biochemical function of cells or cell part).*	
L.6.1.4	*Compare and contrast different cells in order to classify them as a protist, fungus, plant, or animal.*	
L.6.1.5	*Provide evidence that organisms are unicellular or multicellular.*	
L.6.1.6	*Develop and use models to show relationships among the increasing complexity of multicellular organisms (cells, tissues, organs, organ systems, organisms) and how they serve the needs of the organism.*	

FIRST NINE WEEKS Cont.

Comp/ Obj. #	Student Objective	Date Mastered
	L.6.3Ecology and Interdependence Conceptual Understanding: All organisms depend on biotic and abiotic factors for survival. When any environmental factor changes, a corresponding change in diversity and population of organisms will also occur. The environment and the organism in which it lives are therefore interdependent.	
L.6.3	**Students will demonstrate an understanding of the relationships among survival, environmental changes, and diversity as they relate to the interactions of organisms, populations, and the environment.**	
L.6.3.1	*Use scientific reasoning to explain differences between biotic and abiotic factors that demonstrate what living organisms need to survive.*	
L.6.3.2	*Develop and use models to describe the levels of organization within ecosystems (species, populations, communities, ecosystems, and biomes).*	
L.6.3.3	*Analyze cause and effect relationships to explore how changes in the physical environment (limiting factors, natural disasters) can lead to population changes within an ecosystem.*	
L.6.3.4	*Investigate organism interactions in a competitive or mutually beneficial relationship (predation, competition, cooperation, or symbiotic relationships).*	
L.6.3.5	*Develop and use food chains, webs, and pyramids to analyze how energy is transferred through an ecosystem from producers (autotrophs) to consumers (heterotrophs, including humans) to decomposers.*	

SECOND NINE WEEKS

Comp./ Obj. #	Student Objective	Date Mastered
	L.6.4 Adaptation and Diversity Conceptual Understanding: Because living organisms are so diverse, scientists have created a system by which living things are organized into groups according to their characteristics (physical and/or genomic) for identification and research purposes. The kingdoms are very diverse but also have quite a bit in common. Organisms exhibit structural and behavioral characteristics such as adaptations, patterns of growth and development, and life cycles that increase their chances of reproduction and survival in a changing environment.	
L.6.4	**Students will demonstrate an understanding of classification tools and models such as dichotomous keys to classify representative organisms based on the characteristics of the kingdoms: Archaebacteria, Eubacteria, Protists, Fungi, Plants, and Animals.**	
L.6.4.1	*Compare and contrast modern classification techniques (e.g., analyzing genetic material) to the historical practices used by scientists such as Aristotle and Carolus Linnaeus.*	
L.6.4.2	*Use classification methods to explore the diversity of organisms in kingdoms (animals, plants, fungi, protists, bacteria). Support claims that organisms have shared structural and behavioral characteristics.*	
L.6.4.3	*Analyze and interpret data from observations to describe how fungi obtain energy and respond to stimuli (e.g., bread mold, rotting plant material).*	
L.6.4.4	*Conduct investigations using a microscope or multimedia source to compare the characteristics of protists (euglena, paramecium, amoeba) and the methods they use to obtain energy and move through their environment (e.g., pond water).*	
L.6.4.5	*Engage in scientific arguments to support claims that bacteria (Archaebacteria and Eubacteria) and viruses can be both helpful and harmful to other organisms and the environment.*	

THIRD NINE WEEKS

Comp./ Obj. #	Student Objective	Date Mastered
	P.6.6 Motions, Forces, and Energy Conceptual Understanding: Newton's Laws describe forces and motion affecting substances in various environments and situations. Motion is determined by the amount of force applied. Focusing on magnetic, frictional, and gravitational forces will provide an understanding of the relationship between distance and contact forces.	
P.6.6	**Students will demonstrate an understanding of Newton's laws of motion using real world models and examples.**	
P.6.6.1	*Use an engineering design process to create or improve safety devices (e.g., seat belts, car seats, helmets) by applying Newton's Laws of motion. Use an engineering design process to define the problem, design, construct, evaluate, and improve the safety device.**	
P.6.6.2	*Use mathematical computation and diagrams to calculate the sum of forces acting on various objects.*	
P.6.6.3	*Investigate and communicate ways to manipulate applied/frictional forces to improve movement of objects on various surfaces (e.g., athletic shoes, wheels on cars).*	
P.6.6.4	*Compare and contrast magnetic, electric, frictional, and gravitational forces*	
P.6.6.5	*Conduct investigations to predict and explain the motion of an object according to its position, direction, speed, and acceleration.*	
P.6.6.6	*Investigate forces (gravity, friction, drag, lift, thrust) acting on objects (e.g., airplane, bicycle helmets). Use data to explain the differences between the forces in various environments.*	
P.6.6.7	*Determine the relationships between the concepts of potential, kinetic, and thermal energy*	

FOURTH NINE WEEKS

Comp./ Obj. #	Student Objective	Date Mastered
	E.6.8 Earth and Universe Conceptual Understanding: The hierarchical organization of the universe is the result of complex structure and function. Current theories suggest that time began with a period of extremely rapid expansion. Presently, Earth's solar system consists of the Sun and other objects that are held in orbit by the Sun's gravitational force. The interactions of the Earth, the Moon, and the Sun have effects that can be observed on Earth. Various technologies have aided in our understanding of Earth's place in the universe.	
E.6.8	**Students will demonstrate an understanding of Earth's place in the universe and the interactions of the solar system (sun, planets, their moons, comets, and asteroids) using evidence from multiple scientific resources to explain how these objects are held in orbit around the Sun because of its gravitational pull.**	
E.6.8.1	*Obtain, evaluate, and summarize past and present theories and evidence to explain the formation and composition of the universe.*	
E.6.8.2	*Use graphical displays or models to explain the hierarchical structure (stars, galaxies, galactic clusters) of the universe.*	
E.6.8.3	*Evaluate modern techniques used to explore our solar system's position in the universe.*	
E.6.8.4	*Obtain and evaluate information to model and compare the characteristics and movements of objects in the solar system (including planets, moons, asteroids, comets, and meteors).*	
E.6.8.5	*Construct explanations for how gravity affects the motion of objects in the solar system and tides on Earth.*	
E.6.8.6	*Design models representing motions within the Sun-Earth-Moon system to explain phenomena observed from the Earth's surface (positions of celestial bodies, day and year, moon phases, solar and lunar eclipses, and tides).*	
E.6.8.7	*Analyze and interpret data from the surface features of the Sun (e.g., photosphere, corona, sunspots, prominences, and solar flares) to predict how these features may affect Earth.*	

All Inquiry skills will be taught in the appropriate performance objectives in the new standards. Students will use various Science and Engineering Practices (SEPs) to learn the content. All science skills should be included as needed.

Science and Engineering Practices (SEPs)

1. *Ask Questions (science) and Define Problems (engineering)*
2. *Develop and Use Models*
3. *Plan and Conduct Investigations*
4. *Analyze and Interpret Data*
5. *Use Mathematical and Computational Thinking*
6. *Construct Explanations (science) and Design Solutions (engineering)*
7. *Engage in Scientific Argument from Evidence*
8. *Obtain, Evaluate, and Communicate Information*