

2008-2009 Pacing Guide
Science 4th grade
First Nine Weeks

✓	Science 2001 Frameworks
1. Investigate the ability of living things to adapt to their environment. (L)	
	a. Compare food chains and food webs.
	b. Compare and contrast adaptations necessary for animals and plants to survive in different habitats.
2. Explore the interactions of components in living systems. (L)	
	c. Group animals as invertebrates or vertebrates.
	d. Explore the four requirements necessary for photosynthesis.
	e. Compare and contrast flowering and non-flowering plants.

✓	Science 2010 Frameworks
3. Develop and demonstrate an understanding of the characteristics, structures, life cycles, and environments of organisms.	
	c. Compare characteristics of organisms, including growth and development, reproduction, acquisition and use of energy, and response to the environment. (DOK 2) * Life cycles of various animals to include complete and incomplete metamorphosis * Plant or animal structures that serve different functions in growth, adaptation, and survival * Photosynthesis
	d. Distinguish the parts of plants as they relate to sexual reproduction and explain the effects of various actions on the pollination process (e.g., wind, water, insects, adaptations of flowering plants, negative impacts of pesticides). (DOK 2)
	e. Analyze food webs to interpret how energy flows from the sun. (DOK 2)

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✓	Science 2001 Frameworks
5. Discover the effects of external forces on the Earth's surface. (E)	
	a. Describe how external forces including heat, wind and water affect the Earth's surface.
	b. Using maps, students identify watershed and run-off patterns of local areas.
	c. Group landform examples by the forces that may have created them.
6. Explore changes that occur in the Earth's atmosphere. (E)	
	a. Analyze and predict the weather using the thermometer, anemometer, rain gauge, barometer and hygrometer.
	b. Recognize and collect data of extreme weather conditions.
7. Discover how environmental concerns relate to the hydrosphere, lithosphere, and atmosphere. (E, L)	
	a. Describe ways to protect the air we breathe.
	b. Recognize the need for conservation of water resources.
	c. Discuss the ways man can protect and manage organisms in the environment.


✓	Science 2010 Frameworks
1. Explain and use skills necessary to conduct scientific inquiry.	
	f. Explain why scientists and engineers often work in teams with different individuals doing different things that contribute to the results.
3. Analyze the characteristics, structures, life cycles, and environments of organisms.	
	<p>a. Describe the cause and effect relationships that explain the diversity and evolution of organisms over time. (DOK 2)</p> <ul style="list-style-type: none"> * Observable traits due to inherited or environmental adaptations * Variations in environment (over time and from place to place) * Variations in species as exemplified by fossils <p>Extinction of a species due to insufficient adaptive capability in the face of environmental changes</p>

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4. Develop an understanding of the properties of Earth materials, objects in the sky, and changes in Earth and sky.	
	a. Classify sedimentary, metamorphic, and igneous rocks. (DOK 2)
	<p>b. Compare and contrast Earth’s geological features and the changes caused by external forces. (DOK 2)</p> <ul style="list-style-type: none"> * Bodies of water, beaches, ocean ridges, continental shelves, plateaus, faults, canyons, sand dunes, and ice caps * External forces including heat, wind, and water * Movement of continental plates
	c. Investigate, record, analyze and predict weather by observing, measuring with simple weather instruments, and recording weather data (e.g., temperature, precipitation, sky conditions, weather events), and using past patterns to predict future patterns. (DOK 2)
	<p>d. Describe how human activities have decreased the capacity of the environment to support some life forms. (DOK 2)</p> <ul style="list-style-type: none"> * Reducing the amount of forest cover * Increasing the amount of chemicals released into the atmosphere * Farming intensively
	g. Summarize the process that results in deposits of fossil fuels and conclude why fossil fuels are classified as nonrenewable resources. (DOK 2)

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3. Communicate an understanding of the interaction of bodies in the solar system. (E, P)	
	a. Explain why the apparent size of an object depends on its distance from the observer.
	b. Describe the interaction between the Earth, Sun, Earth's moon, and planets of the solar system.
	c. Describe the apparent motion of constellations in the night sky (east to west throughout the night, east to west throughout the year).
4. Identify and describe the visual and telescopic appearance of planets and moons. (E, P)	
	a. Locate and identify planets as bright, shining bodies that move in front of the background of constellations.
	b. Explain the nature of telescopes as devices that collect light and enlarge the apparent size of distant objects to reveal otherwise unseen features.
	c. Describe the physical features of the moon (craters, plains, mountains) and the planets.
8. Investigate the changes in the states of matter. (P)	
	a. Observe that matter occupies space and has mass and volume.
	b. Demonstrate transformations of the states of matter.
	c. Explore and classify physical and chemical changes.
9. Examine the different forms of energy. (E, L, P)	
	a. Differentiate energy as potential or kinetic energy.
	b. Identify and explore forms of energy such as heat, sound, light, or electricity.
	c. Demonstrate the use of the sun as an energy source.

	Science 2010 Frameworks
2. Use the properties of objects and materials, position and motion of objects, and transfer of energy to develop an understanding of physical science concepts.	
	a. Recognize that materials may be composed of parts that are too small to be seen without magnification. (DOK 1)
	b. Distinguish between physical and chemical changes and between objects composed of a single substance from those composed of more than one substance. (DOK 2)

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	<p>c. Determine the causes and effects of forces on motion. (DOK 2)</p> <ul style="list-style-type: none"> * Force exerted over a distance causes work to be done and that the result (work) is the product of force and distance * Friction on moving objects and actions that increase or decrease friction * Momentum and inertia
	<p>d. Explain how energy flowing through an electrical circuit can be converted from electrical energy to light, sound, or heat energy. (DOK1)</p> <ul style="list-style-type: none"> * Parts of an electric circuit and resulting actions when circuits are opened or closed * Construction and uses of electromagnets * Energy transferred through an electrical circuit to a bulb or bell to its surroundings as light, sound, and heat (thermal) energy
	<p>e. Describe how light behaves (travels in a straight line, is absorbed, reflected, refracted, or appears transparent or translucent). (DOK 1)</p>
	<p>f. Investigate and draw conclusions about the relationship between the rate of vibrating objects and the pitch of the sound. (DOK 3)</p>
	<p>g. Describe how heat flows from a warm object to a cold one and categorize examples of materials that may or may not be used as insulators. (DOK 2)</p>
<p>4. Develop an understanding of the properties of Earth materials, objects in the sky, and changes in Earth and sky.</p>	
	<p>e. Compare and contrast the seasons and explain why seasons vary at different locations on Earth. (DOK 2)</p>
	<p>f. Describe objects in the universe including their movement. (DOK 2)</p> <ul style="list-style-type: none"> * Physical features of the moon (craters, plains, mountains) * Appearance and movement of Earth and its moon (e.g., waxing/waning of the moon and lunar/solar eclipses) * Why a planet can be seen in different constellations (locations) at different times

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2. Explore the interactions of components in living systems. (L)	
	a. Identify parts and basic functions of various body systems (circulatory, respiratory, digestive, skeletal and nervous systems).
	b. Analyze the circulatory system.
10. Develop the process of measurement and the concepts related to units of measurement. (L, E, P) *	
	a. Measure a given object using specified scientific measurement (English and/or metric).
	b. Select, use, compare and convert within the appropriate standard (English and metric) system of measurement. *
	c. Identify the attributes of length, weight, capacity/volume, mass, time and temperature using English and metric units of measurement. *
	d. Calculate and solve problems with elapsed time. *

✓	Science 2010 Frameworks
1. Explain and use skills necessary to conduct scientific inquiry.	
	a. Form hypotheses and predict outcomes of problems to be investigated. (DOK 3)
	b. Use the senses and simple tools to gather qualitative information about objects or events (size, shape, color, texture, sound, position, change). (DOK 1)
	c. Demonstrate the accurate use of simple tools to gather and compare information (DOK 1) * Tools (English rulers [to the nearest eighth of an inch], metric rulers [to the nearest centimeter], thermometers, spring scales, hand lenses, balances, microscopes, calculators, clocks, anemometers, rain gauges) * Types of data (height, mass/weight, temperature, length, distance, volume, area, perimeter)
	d. Use simple sketches, diagrams, tables, charts, and writing to draw conclusions and communicate data results. (DOK 2)
	e. Interpret and describe patterns of data using drawings, diagrams, charts, tables, graphs, and maps. (DOK 2)
	f. Explain why scientists and engineers often work in teams with different individuals doing different things that contribute to the results. (DOK 2)

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	g. Draw conclusions about important steps (e.g., making observations, asking questions, trying to solve a problem, etc.) that led to inventions and discoveries. (DOK 3)
3. Analyze the characteristics, structures, life cycles, and environments of organisms.	
	b. Classify the organs and functions of the nervous, circulatory, and respiratory systems of the body. (DOK 1)