Correlation of
Seeds of Science/Roots of Reading®
Integrated Science and Literacy Units

with the State of New Jersey
Science Standards
for Grades K-6

Created February 2011

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New Jersey Science Standards – 4th Grade	2nd- 3rd Grade				3rd- 4th Grade				4th - 5th Grade			
	Soil Habitats	Shoreline Science	Designing Mixtures	Gravity & Magnetism	Light Energy	Weather & Water	Variation and Adaptation	Digestion & Body Systems	Planets & Moons	Aquatic Ecosystems	Models of Matter	Chemical Changes
5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.												
A. Understand Scientific Explanations: Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world.												
5.1.4.A.1 Demonstrate understanding of the interrelationships among fundamental concepts in the physical, life, and Earth systems sciences.	••	••	•	•	•	••	•	•	•	••	•	•
5.1.4.A.2 Use outcomes of investigations to build and refine questions, models, and explanations.	•••	••	•••	••	••	•••	••	••	••	•••	••	•••
5.1.4.A.3 Use scientific facts, measurements, observations, and patterns in nature to build and critique scientific arguments.	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••
B. Generate Scientific Evidence Through Active Investigations: Students master the conceptual, mathematical, physical, and computational tools that need to be applied when constructing and evaluating claims.												
5.1.4.B.1 Design and follow simple plans using systematic observations to explore questions and predictions.	•••	•	•••	•	•	•	•	•	•	•••	•	•••
5.1.4.B.2 Measure, gather, evaluate, and share evidence using tools and technologies.	••	••	••	••	•••	•••	••	••	••	••	••	••
5.1.4.B.3 Formulate explanations from evidence.	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••
5.1.4.B.4 Communicate and justify explanations with	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••

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reasonable and logical arguments.												
C. Reflect on Scientific Knowledge: Scientific knowledge builds on itself over time.												
5.1.4.C.1 Monitor and reflect on one's own knowledge regarding how ideas change over time.	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••
5.1.4.C.2 Revise predictions or explanations on the basis of learning new information.	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••
5.1.4.C.3 Present evidence to interpret and/or predict cause-and-effect outcomes of investigations.	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••
D. Participate Productively in Science: The growth of scientific knowledge involves critique and communication, which aresocial practices that are governed by a core set of values and norms.												
5.1.4.D.1 Actively participate in discussions about student data, questions, and understandings.	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••	•••
5.1.4.D.2 Work collaboratively to pose, refine, and evaluate questions, investigations, models, and theories.	•••	••	••	••	••	•••	••	••	••	•••	••	•••
5.1.4.D.3 Demonstrate how to safely use tools, instruments, and supplies.	•	•	•••	•	•	•	•	•	•	•	•	•••
5.1.4.D.4 Handle and treat organisms humanely, responsibly, and ethically.	•••									•••		
5.2 Physical Science: All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.												

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A. Properties of Matter: All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia.												
5.2.2.A.1 Sort and describe objects based on the materials of which they are made and their physical properties.	••	••	•••	••	••	•			•		••	••
5.2.2.A.2 Identify common objects as solids, liquids, or gases.			••			•••			•		•••	•••
5.2.4.A.1 Identify objects that are composed of a single substance and those that are composed of more than one substance using simple tools found in the classroom.			•••								•••	••
5.2.4.A.2 Plan and carry out an investigation to distinguish among solids, liquids, and gasses.			•						•		••	••
5.2.4.A.3 Determine the weight and volume of common objects using appropriate tools.			•	•					•		•	•
5.2.4.A.4 Categorize objects based on the ability to absorb or reflect light and conduct heat or electricity.					•••	•					•	
5.2.6.A.1 Determine the volume of common objects using water displacement methods.											•	
5.2.6.A.2 Calculate the density of objects or substances after determining volume and mass.									•		•	•
5.2.6.A.3 Determine the identity of an unknown			••								••	••

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substance using data about intrinsic properties.												
B. Changes in Matter: Substances can undergo physical or chemical changes to form new substances. Each change involves energy.												
5.2.2.B.1 Generate accurate data and organize arguments to show that not all substances respond the same way when heated or cooled, using common materials, such as shortening or candle wax.						•					•	•
5.2.4.B.1 Predict and explain what happens when a common substance, such as shortening or candle wax, is heated to melting and then cooled to a solid.						••					••	
5.2.6.B.1 Compare the properties of reactants with the properties of the products when two or more substances are combined and react chemically.												•••
C. Forms of Energy: Knowing the characteristics of familiar forms of energy, including potential and kinetic energy, is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable.												
5.2.2.C.1 Compare, citing evidence, the heating of different colored objects placed in full sunlight.					•••	•						
5.2.2.C.2 Apply a variety of strategies to collect evidence that validates the principle that if there is no light, objects cannot be seen.					•••							
5.2.2.C.3 Present evidence that represents the relationship between a light source, solid object, and the resulting shadow.					••							

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5.2.4.C.1 Compare various forms of energy as observed in everyday life and describe their applications.					•••	•				••	•	•
5.2.4.C.2 Compare the flow of heat through metals and nonmetals by taking and analyzing measurements.					•							•
5.2.4.C.3 Draw and label diagrams showing several ways that energy can be transferred from one place to another.					•••	•				•••		•
5.2.4.C.4 Illustrate and explain what happens when light travels from air into water.					•••							
5.2.6.C.1 Predict the path of reflected or refracted light using reflecting and refracting telescopes as examples.					•••							
5.2.6.C.2 Describe how prisms can be used to demonstrate that visible light from the Sun is made up of different colors.					•••							
5.2.6.C.3 Relate the transfer of heat from oceans and land masses to the evolution of a hurricane.						•						
D. Energy Transfer and Conservation: The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another.												
5.2.2.D.1 Predict and confirm the brightness of a light, the volume of sound, or the amount of heat when given the number of batteries, or the size of batteries.												

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5.2.4.D.1 Repair an electric circuit by completing a closed loop that includes wires, a battery (or batteries), and at least one other electrical component to produce observable change.												
5.2.6.D.1 Use simple circuits involving batteries and motors to compare and predict the current flow with different circuit arrangements.												
E. Forces and Motion: It takes energy to change the motion of objects. The energy change is understood in terms of forces.												
5.2.2.E.1 Investigate and model the various ways that inanimate objects can move.												
5.2.2.E.2 Predict an object's relative speed, path, or how far it will travel using various forces and surfaces.				•								
5.2.2.E.3 Distinguish a force that acts by direct contact with an object (e.g., by pushing or pulling) from a force that can act without direct contact (e.g., the attraction between a magnet and a steel paper clip).				•••								
5.2.4.E.1 Demonstrate through modeling that motion is a change in position over a period of time.												
5.2.4.E.2 Identify the force that starts something moving or changes its speed or direction of motion.				••								
5.2.4.E.3 Investigate and categorize materials based on				•••								

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their interaction with magnets.												
5.2.4.E.4 Investigate, construct, and generalize rules for the effect that force of gravity has on balls of different sizes and weights.				•					••			
5.2.6.E.1 Model and explain how the description of an object's motion from one observer's view may be different from a different observer's view.												
5.2.6.E.2 Describe the force between two magnets as the distance between them is changed.				•••								
5.2.6.E.3 Demonstrate and explain the frictional force acting on an object with the use of a physical model.				•								
5.2.6.E.4 Predict if an object will sink or float using evidence and reasoning.												
5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.												
A. Organization and Development: Living organisms are composed of cellular units (structures) that carry out functions required for life. Cellular units are composed of molecules, which also carry out biological functions.												
5.3.2.A.1 Group living and nonliving things according to the characteristics that they share.	•••						•			•••		
5.3.4.A.1 Develop and use evidence-based criteria to determine if an unfamiliar object is living or nonliving.	••											

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5.3.4.A.2 Compare and contrast structures that have similar functions in various organisms, and explain how those functions may be carried out by structures that have different physical appearances.	•••						•••	•		•		
5.3.4.A.3 Describe the interactions of systems involved in carrying out everyday life activities.	•							•••		••		
5.3.6.A.1 Model the interdependence of the human body's major systems in regulating its internal environment.								•••				
5.3.6.A.2 Model and explain ways in which organelles work together to meet the cell's needs.							•					
B. Matter and Energy Transformations: Food is required for energy and building cellular materials. Organisms in an ecosystem have different ways of obtaining food, and some organisms obtain their food directly from other organisms.												
5.3.2.B.1 Describe the requirements for the care of plants and animals related to meeting their energy needs.	•••									•••		
5.3.2.B.2 Compare how different animals obtain food and water.	•••									•••		
5.3.2.B.3 Explain that most plants get water from soil through their roots and gather light through their leaves.	•••									••		
5.3.4.B.1 Identify sources of energy (food) in a variety	••									•••		

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of settings (farm, zoo, ocean, forest).												
5.3.6.B.1 Describe the sources of the reactants of photosynthesis and trace the pathway to the products.	•									•		•
5.3.6.B.2 Illustrate the flow of energy (food) through a community.	••									•••		
C. Interdependence: All animals and most plants depend on both other organisms and their environment to meet their basic needs.												
5.3.2.C.1 Describe the ways in which organisms interact with each other and their habitats in order to meet basic needs.	•••									•••		
5.3.2.C.2 Identify the characteristics of a habitat that enable the habitat to support the growth of many different plants and animals.	•••									••		
5.3.2.C.3 Communicate ways that humans protect habitats and/or improve conditions for the growth of the plants and animals that live there, or ways that humans might harm habitats.	••	•								•••		
5.3.4.C.1 Predict the biotic and abiotic characteristics of an unfamiliar organism's habitat.	•••									•••		
5.3.4.C.2 Explain the consequences of rapid ecosystem change (e.g., flooding, wind storms, snowfall, volcanic eruptions), and compare them to consequences of gradual ecosystem change (e.g., gradual increase or										••		

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decrease in daily temperatures, change in yearly rainfall).												
5.3.6.C.1 Explain the impact of meeting human needs and wants on local and global environments.										•••		
5.3.6.C.2 Predict the impact that altering biotic and abiotic factors has on an ecosystem.	•									•••		
5.3.6.C.3 Describe how one population of organisms may affect other plants and/or animals in an ecosystem.	••									•••		
D. Heredity and Reproduction: Organisms reproduce, develop, and have predictable life cycles. Organisms contain genetic information that influences their traits, and they pass this on to their offspring during reproduction.												
5.3.2.D.1 Record the observable characteristics of plants and animals to determine the similarities and differences between parents and their offspring.	•						•••			•		
5.3.2.D.2 Determine the characteristic changes that occur during the life cycle of plants and animals by examining a variety of species, and distinguish between growth and development.	•									•		
5.3.4.D.1 Compare the physical characteristics of the different stages of the life cycle of an individual organism, and compare the characteristics of life stages among species.	••									••		
5.3.6.D.1 Predict the long-term effect of interference							•			•		

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with normal patterns of reproduction.												
E. Evolution and Diversity: Sometimes, differences between organisms of the same kind provide advantages for surviving and reproducing in different environments. These selective differences may lead to dramatic changes in characteristics of organisms in a population over extremely long periods of time.												
5.3.2.E.1 Describe similarities and differences in observable traits between parents and offspring.							•••					
5.3.2.E.2 Describe how similar structures found in different organisms (e.g., eyes, ears, mouths) have similar functions and enable those organisms to survive in different environments.	••						•••					
5.3.4.E.1 Model an adaptation to a species that would increase its chances of survival, should the environment become wetter, dryer, warmer, or colder over time.	•						•••			•		
5.3.4.E.2 Evaluate similar populations in an ecosystem with regard to their ability to thrive and grow.										•••		
5.3.6.E.1 Describe the impact on the survival of species during specific times in geologic history when environmental conditions changed.							••			•		
5.4 Earth Systems Science: All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.												
A. Objects in the Universe: Our universe has been expanding and evolving for 13.7 billion years under the influence of gravitational and nuclear forces.												

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As gravity governs its expansion, organizational patterns, and the movement of celestial bodies, nuclear forces within stars govern its evolution through the processes of stellar birth and death. These same processes governed the formation of our solar system 4.6 billion years ago.												
5.4.2.A.1 Determine a set of general rules describing when the Sun and Moon are visible based on actual sky observations.									••			
5.4.4.A.1 Formulate a general description of the daily motion of the Sun across the sky based on shadow observations. Explain how shadows could be used to tell the time of day.									•			
5.4.4.A.2 Identify patterns of the Moon's appearance and make predictions about its future appearance based observational data.									•••			
5.4.4.A.3 Generate a model with explanatory value that explains both why objects roll down ramps as well as why the Moon orbits Earth.				•					••			
5.4.4.A.4 Analyze and evaluate evidence in the form of data tables and photographs to categorize and relate solar system objects (e.g., planets, dwarf planets, moons, asteroids, and comets).									•••			
5.4.6.A.1 Generate and analyze evidence (through simulations) that the Sun's apparent motion across the sky changes over the course of a year.									••			

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5.4.6.A.2 Construct and evaluate models demonstrating the rotation of Earth on its axis and the orbit of Earth around the Sun.									•••			
5.4.6.A.3 Predict what would happen to an orbiting object if gravity were increased, decreased, or taken away.									•			
5.4.6.A.4 Compare and contrast the major physical characteristics (including size and scale) of solar system objects using evidence in the form of data tables and photographs.									•••			
B. History of Earth: From the time that Earth formed from a nebula 4.6 billion years ago, it has been evolving as a result of geologic, biological, physical, and chemical processes.												
5.4.4.B.1 Use data gathered from observations of fossils to argue whether a given fossil is terrestrial or marine in origin.							•					
5.4.6.B.1 Interpret a representation of a rock layer sequence to establish oldest and youngest layers, geologic events, and changing life forms.												
5.4.6.B.2 Examine Earth's surface features and identify those created on a scale of human life or on a geologic time scale.		•										
5.4.6.B.3 Determine if landforms were created by		•••					•					

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processes of erosion (e.g., wind, water, and/or ice) based on evidence in pictures, video, and/or maps.												
5.4.6.B.4 Describe methods people use to reduce soil erosion.		•••										
C. Properties of Earth Materials: Earth's composition is unique, is related to the origin of our solar system, and provides us with the raw resources needed to sustain life.												
5.4.2.C.1 Describe Earth materials using appropriate terms, such as hard, soft, dry, wet, heavy, and light.	•••	•••										
5.4.4.C.1 Create a model to represent how soil is formed.	•••											
5.4.4.C.2 Categorize unknown samples as either rocks or minerals.												
5.4.6.C.1 Predict the types of ecosystems that unknown soil samples could support based on soil properties.	••									•		
5.4.6.C.2 Distinguish physical properties of sedimentary, igneous, or metamorphic rocks and explain how one kind of rock could eventually become a different kind of rock.												
5.4.6.C.3 Deduce the story of the tectonic conditions and erosion forces that created sample rocks or rock formations.												
E. Energy in Earth Systems: Internal and external sources of energy drive Earth systems.												

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5.4.2.E.1 Describe the relationship between the Sun and plant growth.	•									••		
5.4.4.E.1 Develop a general set of rules to predict temperature changes of Earth materials, such as water, soil, and sand, when placed in the Sun and in the shade.					•	••						
5.4.6.E.1 Generate a conclusion about energy transfer and circulation by observing a model of convection currents.					•	••						
F. Climate and Weather: Earth's weather and climate systems are the result of complex interactions between land, ocean, ice, and atmosphere.												
5.4.2.F.1 Observe and document daily weather conditions and discuss how the weather influences your activities for the day.						•••						
5.4.4.F.1 Identify patterns in data collected from basic weather instruments.						•••						
5.4.6.F.1 Explain the interrelationships between daily temperature, air pressure, and relative humidity data.						••						
5.4.6.F.2 Create climatographs for various locations around Earth and categorize the climate based on the yearly patterns of temperature and precipitation.						••						
G. Biogeochemical Cycles: The biogeochemical cycles in the Earth systems include the flow of microscopic and macroscopic resources from one reservoir in the hydrosphere, geosphere, atmosphere, or biosphere to another, are driven by Earth's internal and external sources of energy, and are impacted by human activity.												

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New Jersey Science Standards – 4th Grade	2nd- 3rd Grade				3rd- 4th Grade				4th - 5th Grade			
	Soil Habitats	Shoreline Science	Designing Mixtures	Gravity & Magnetism	Light Energy	Weather & Water	Variation and Adaptation	Digestion & Body Systems	Planets & Moons	Aquatic Ecosystems	Models of Matter	Chemical Changes
5.4.2.G.1 Observe and discuss evaporation and condensation.						●●●					●●●	
5.4.2.G.2 Identify and use water conservation practices.						●				●		
5.4.2.G.3 Identify and categorize the basic needs of living organisms as they relate to the environment.	●●●									●●●		
5.4.2.G.4 Identify the natural resources used in the process of making various manufactured products.										●		
5.4.4.G.1 Explain how clouds form.						●●●						
5.4.4.G.2 Observe daily cloud patterns, types of precipitation, and temperature, and categorize the clouds by the conditions that form precipitation.						●●●						
5.4.4.G.3 Trace a path a drop of water might follow through the water cycle.						●●●						
5.4.4.G.4 Model how the properties of water can change as water moves through the water cycle.						●●●					●	
5.4.6.G.1 Illustrate global winds and surface currents through the creation of a world map of global winds and currents that explains the relationship between the two factors.						●						
5.4.6.G.2 Create a model of ecosystems in two different locations, and compare and contrast the living and nonliving components.										●●●		

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	Soil Habitats	Shoreline Science	Designing Mixtures	Gravity & Magnetism	Light Energy	Weather & Water	Variation and Adaptation	Digestion & Body Systems	Planets & Moons	Aquatic Ecosystems	Models of Matter	Chemical Changes
5.4.6.G.3 Describe ways that humans can improve the health of ecosystems around the world.										•••		

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