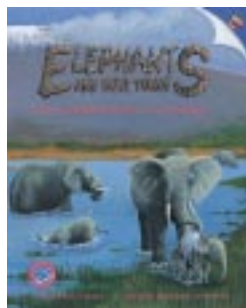


CORRELATION OF GEMS[®] TEACHER'S GUIDES TO THE NORTH CAROLINA SCIENCE STANDARD COURSE OF STUDY AND GRADE LEVEL COMPETENCIES



Elephants and Their Young

Grades K-1

With art, drama, and role-play, young children learn about the African elephant's unique body structure and fascinating social behaviors. Math and science concepts include measurement, weight, volume and comparisons of many kinds.

Note that those teacher's guides marked with an asterisk* provide especially strong support for the concepts and competency goals listed.

Kindergarten

His/Her World

The focus for kindergarten will center on students using all the five senses to make observations of events in both indoor and outdoor settings that make up their world. The strands provide a context for teaching the content throughout all goals.

Students will be actively involved in:

- * Exploring a variety of materials.
- * Utilizing observed data to make predictions.
- * Generating attributes and uses of common objects and organisms.

Strands: Nature of Science, Science as Inquiry, Science and Technology, Science in Personal and Social Perspectives

Competency Goal 1	
The learner will build an understanding of similarities and differences in plants and animals	
Objectives	GEMS Unit(s)
1.01 Identify the similarities and differences in plants: * Appearance. * Growth. * Change. * Uses.	<i>Hide a Butterfly*</i> ; <i>Terrarium Habitats</i> ; <i>Tree Homes*</i>
1.02 Identify the similarities and differences in animals: * Appearance. * Growth. * Change. * Purpose.	<i>Animal Defenses</i> ; <i>Ant Homes Under the Ground*</i> ; <i>Buzzing a Hive*</i> ; <i>Eggs Eggs Everywhere*</i> ; <i>Elephants and Their Young*</i> ; <i>Hide a Butterfly</i> ; <i>Ladybugs*</i> ; <i>Mother Opossum and Her Babies*</i> ; <i>Penguins and Their Young*</i> ; <i>Terrarium Habitats*</i> ; <i>Tree Homes*</i>
1.03 Observe the different ways animals move from place to place, and how plants move in different ways.	<i>Animal Defenses</i> ; <i>Ant Homes Under the Ground*</i> ; <i>Buzzing a Hive*</i> ; <i>Elephants and Their Young*</i> ; <i>Hide a Butterfly</i> ; <i>Ladybugs</i> ; <i>Mother Opossum and Her Babies*</i> ; <i>Penguins and Their Young*</i> , <i>Terrarium Habitats*</i> ; <i>Tree Homes*</i>
1.04 Observe the similarities of humans to other animals and their basic needs. Observe how humans grow and change.	<i>Elephants and Their Young*</i> ; <i>Mother Opossum and Her Babies*</i> ; <i>Penguins and Their Young*</i> ; <i>Tree Homes*</i>

Competency Goal 2 The learner will build an understanding of weather concepts.	
Objectives	GEMS Unit(s)
2.01 Observe daily weather changes throughout the year:	
2.02 Identify types of precipitation, variations in wind, sky conditions and day and night changes.	
2.03 Observe the seasonal and daily changes in weather: similarities and differences, temperature changes.	<i>Tree Homes</i>

Competency Goal 3 The learner will build an understanding of the properties/movement of common objects and organisms.	
Objectives	GEMS Unit(s)
3.01 Describe objects in terms of the materials they are made of (clay, metal, cloth, paper, etc.) their physical properties (color, size, shape, weight, texture, flexibility), and how they are used.	<i>Eggs Eggs Everywhere*</i> ; <i>Elephants and Their Young</i> ; <i>Investigating Artifacts*</i> ; <i>Penguins and Their Young</i> ; <i>Sifting Through Science*</i> ; <i>Terrarium Habitats</i>
3.02 Describe how objects look, feel, smell, taste, and sound using all the senses.	<i>Ant Homes Under the Ground*</i> ; <i>Buzzing a Hive*</i> ; <i>Eggs Eggs Everywhere*</i> ; <i>Elephants and Their Young*</i> ; <i>Investigating Artifacts*</i> ; <i>Mother Opossum and Her Babies*</i> ; <i>Penguins and Their Young</i> ; <i>Sifting Through</i>

	<i>Science*</i> ; <i>Terrarium Habitats</i> ; <i>Tree Homes*</i>
3.03 Describe motion when an object, a person, an animal, or anything goes from one place to another.	<i>Buzzing a Hive*</i> ; <i>Eggs Eggs Everywhere*</i> ; <i>Elephants and Their Young*</i> ; <i>Hide a Butterfly*</i> ; <i>Mother Opossum and Her Babies*</i> ; <i>Penguins and Their Young*</i> ; <i>Terrarium Habitats*</i>

Competency Goal 4 The learner will increase his/her understanding of how the world works by using tools.	
Objectives	GEMS Unit(s)
4.01 Describe the functions of tools.	<i>Investigating Artifacts*</i>
4.02 Determine the usefulness of tools to help people: scissors, pencils, crayons, paper clips, hammers, etc.	<i>Animal Defenses</i> ; <i>Ant Homes Under the Ground</i> ; <i>Buzzing a Hive</i> ; <i>Elephants and Their Young</i> ; <i>Hide a Butterfly</i> ; <i>Investigating Artifacts</i> ; <i>Ladybugs</i> ; <i>Mother Opossum and Her Babies</i> ; <i>Penguins and Their Young</i> ; <i>Sifting Through Science</i> ; <i>Tree Homes</i>
4.03 Apply nonstandard units of measure.	<i>Bubble Festival*</i> ; <i>Buzzing a Hive</i> ; <i>Elephants and Their Young*</i> ; <i>Investigating Artifacts</i> ; <i>Mother Opossum and Her Babies*</i> ; <i>Penguins and Their Young*</i>
4.04 Conclude that tools extend human capabilities.	<i>Investigating Artifacts*</i>



Liquid Explorations

Grades 1–3

A great way to introduce young students to the properties of liquids, and an excellent physical science unit for primary grades. Activities include classification, observation and experimentation

Grade One

Living and Nonliving Objects

The focus for first grade is on students using their senses to make observations based on their own rules for classification, and on experimenting to discover the properties of living and nonliving objects. The strands provide a context for teaching the content goals. Students will actively be involved in:

- * Exploring a variety of materials.
- * Using observed data to classify objects.
- * Identifying properties of common objects.

Strands: Nature of Science, Science as Inquiry, Science and Technology, Science in Personal and Social Perspectives

Competency Goal 1 The learner will build an understanding of the needs of living organisms.	
Objectives	GEMS Unit(s)
1.01 Determine the needs of plants: * Air. * Water. * Nutrients. * Light.	<i>Terrarium Habitats; Tree Homes</i>
1.02 Determine the needs of	<i>Ant Homes Under the</i>

<p>animals:</p> <ul style="list-style-type: none"> * Air. * Water. * Food. * Shelter. 	<p><i>Ground*</i>; <i>Buzzing a Hive*</i>; <i>Eggs Eggs Everywhere*</i>; <i>Elephants and Their Young*</i>; <i>Ladybugs*</i>; <i>Mother Opossum and Her Babies*</i>; <i>Penguins and Their Young*</i>; <i>Terrarium Habitats*</i>; <i>Tree Homes*</i></p>
<p>1.03 Identify environments that support various types of living organisms.</p>	<p><i>Ant Homes Under the Ground*</i>; <i>Buzzing a Hive*</i>; <i>Eggs Eggs Everywhere*</i>; <i>Elephants and Their Young*</i>; <i>Ladybugs*</i>; <i>Mother Opossum and Her Babies*</i>; <i>Penguins and Their Young*</i>; <i>Terrarium Habitats*</i>; <i>Tree Homes*</i></p>
<p>1.04 Identify local environments that support the needs of North Carolina plants and animals.</p>	<p><i>Mother Opossum and Her Babies</i>; <i>Tree Homes</i></p>

<p>Competency Goal 2 The learner will build an understanding of solid earth materials.</p>	
Objectives	GEMS Unit(s)
<p>2.01 Distinguish the size and shape of rocks, boulders, grains of sand and smaller materials.</p>	<p><i>Terrarium Habitats</i></p>
<p>2.02 Classify rocks and other earth materials according to their properties:</p> <ul style="list-style-type: none"> * Size. * Shape. * Color. * Texture. * Magnetism. * The ability to float or sink. 	<p><i>Investigating Artifacts*</i>; <i>Sifting Through Science*</i></p>
<p>2.03 Determine the properties</p>	<p><i>Terrarium Habitats*</i></p>

of soil: * Composition. * Capacity to retain water. * Color. * Texture. * Ability to support life.	
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Competency Goal 3 The learner will build an understanding of the properties and relationship of objects.	
Objectives	GEMS Unit(s)
3.01 Determine the many ways in which objects can be grouped or classified.	<i>Bubble Festival*</i> ; <i>Eggs Eggs Everywhere*</i> ; <i>Elephants and Their Young</i> ; <i>Investigating Artifacts*</i> ; <i>Secret Formulas</i> ; <i>Sifting Through Science*</i> ; <i>Terrarium Habitats</i> ; <i>Tree Homes*</i>
3.02 Classify solids according to their properties: * Color. * Texture. * Shape (ability to roll or stack). * Weight (float or sink).	<i>Eggs Eggs Everywhere*</i> ; <i>Elephants and Their Young</i> ; <i>Investigating Artifacts*</i> ; <i>Involving Dissolving</i> ; <i>Sifting Through Science*</i>
3.03 Determine the properties of liquids: * Color. * Ability to float or sink in water (buoyancy).	<i>Involving Dissolving*</i> ; <i>Penguins and Their Young*</i> ; <i>Secret Formulas</i>

Competency Goal 4 The learner will build an understanding of the actions of objects.	
Objectives	GEMS Unit(s)
4.01 Observe the ways in which things move: * Straight.	<i>Buzzing a Hive</i> ; <i>Eggs Eggs Everywhere*</i> ; <i>Penguins and Their Young</i>

* Zigzag. * Round and round. * Back and forth. * Fast and slow.	
4.02 Describe motion of objects by tracing and measuring movement over time.	
4.03 Observe that movement can be affected by pushing or pulling.	<i>Eggs Eggs Everywhere*</i>
4.04 Observe that objects can move steadily or change direction.	<i>Eggs Eggs Everywhere*</i>



Bubble Festival

Grades K–6

These captivating, bubble-centric table-top learning stations are packed with math and science content. The unit includes detailed teacher assistance with classroom logistics, writing and literature extensions, and tips for setting up an all-school Bubble Festival.

Grade Two

Change

The focus for second grade centers on students analyzing collected data over a period of time to make predictions and understand change. Students are to look at heat as a way of changing properties of objects and motion as being related to position and time. The strands provide a context for teaching the content goals. Students will actively be involved in:

- * Conducting long term investigations to define changes.
- * Using tools to collect data.

* Looking at change in properties.

Strands: Nature of Science, Science as Inquiry, Science and Technology, Science in Personal and Social Perspectives

Competency Goal 1 The learner will build an understanding of plant and animal life cycles.	
Objectives	GEMS Unit(s)
1.01 Analyze the life cycle of plants: * Reproducing. * Developing into an adult. * Eventually dying.	<i>Terrarium Habitats</i>
1.02 Compare and contrast life cycles of different plants.	
1.03 Analyze the life cycle of animals * Being born. * Developing into an adult. * Reproducing. * Eventually dying.	<i>Aquatic Habitats*</i> ; <i>Buzzing a Hive</i> ; <i>Terrarium Habitats</i>
1.04 Compare and contrast life cycles of different animals.	<i>Aquatic Habitats</i> ; <i>Buzzing a Hive</i>

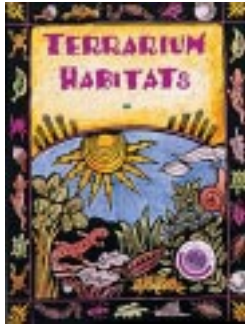
Competency Goal 2 The learner will build an understanding of the changes in weather.	
Objectives	GEMS Unit(s)
2.01 Describe weather by measurable quantities: * Temperature. * Wind direction. * Wind speed. * Precipitation.	
2.02 Assess weather changes	

from day to day and over the seasons.	
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Competency Goal 3 The learner will build an understanding of changes in properties.	
Objectives	GEMS Unit(s)
3.01 Determine three states of matter: * Solid. * Liquid. * Gas.	<i>Involving Dissolving*; Secret Formulas; Sifting Through Science</i>
3.02 Observe changes in state due to heating and cooling in common materials.	<i>Involving Dissolving*; Secret Formulas</i>
3.03 Determine what can be done to materials to change some of their properties. (buoyancy-float and sink)	<i>Sifting Through Science*</i>
3.04 Observe the change in position and motion of objects relative to the strength of the push or pull (force).	

Competency Goal 4 The learner will build an understanding of the concepts of sound.	
Objectives	GEMS Unit(s)
4.01 Discover how sounds are made by using a variety of instruments and "sound makers".	
4.02 Discover that sound is produced by vibrating objects.	
4.03 Determine the pitch of the sound by changing the rate of the vibration (how fast).	

4.04 Analyze the pitch produced by changing the size and shape of a variety of instruments.	
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Terrarium Habitats
 Grades K–6
 These exciting life-science activities bring the natural world into your classroom and deepen children’s understanding of and connection to all living things. Students investigate soil; design and populate terrariums; and observe and record changes over time.

Grade Three

Patterns and Systems

The focus for third grade is on students understanding regularities in systems and that a system is made up of an organized group of related objects or components. Such systems can consist of plants, soils, mineral particles, and the earth/moon/sun. The strands provide a context for teaching the content goals. Students will be actively involved in:

- * Exploring the properties of soil through plant investigations.
- * Observing and recording data to understand the sun's changes in position.
- * Generating data to support the period of time called a month.

Strands: Nature of Science, Science as Inquiry, Science and Technology, Science in Personal and Social Perspectives

Competency Goal 1 The learner will build an understanding of plant growth and adaptations.	
Objectives	GEMS Unit(s)

1.01 Determine that the quantities and qualities of nutrients, light, and water in the environment affect plant growth.	<i>Terrarium Habitats</i>
1.02 Observe how environmental conditions can determine how well plants grow and survive in a particular environment.	<i>Schoolyard Ecology;</i> <i>Terrarium Habitats</i>
1.03 Analyze plant structures for specific functions: * Growth. * Survival. * Reproduction.	<i>On Sandy Shores</i>
1.04 Determine that new plants can be generated from: * Seeds. * Tubers. * Bulbs. * Cuttings.	<i>Terrarium Habitats*</i>
1.05 Determine that the number of seeds a plant can produce depends on variables such as light, water, nutrients, and degree of pollination.	

Competency Goal 2	
The learner will build an understanding of soil concepts.	
Objectives	GEMS Unit(s)
2.01 Differentiate the properties of soil such as color, texture, and capacity to retain water.	<i>Terrarium Habitats</i>
2.02 Analyze the ability of soil to support the growth of many plants, including those in our food supply.	
2.03 Identify various types of	<i>Terrarium Habitats*</i>

soil: * Sand. * Clay. * Humus.	
2.04 Evaluate composting to show how plant and animal material can be broken down to form soil.	

Competency Goal 3 The learner will build an understanding of the earth/moon/sun system.	
Objectives	GEMS Unit(s)
3.01 Using shadows, observe the movement of the sun in the sky during the day.	
3.02 Observe the angular position of the sun at noon over several months and relate to seasons.	
3.03 Observe the change in shape of the moon from day to day over several months to determine a pattern.	<i>Earth, Moon, and Stars*</i>
3.04 Observe that stars in the night sky appear as tiny points of light.	<i>Earth, Moon, and Stars*</i>

Competency Goal 4 The learner will build an understanding of light and heat concepts.	
Objectives	GEMS Unit(s)
4.01 Analyze the reflection of light.	
4.02 Determine the nature of light through the use of shadows.	
4.03 Analyze conduction (the movement of heat from one	

object to another).	
4.04 Evaluate the ability of different materials to conduct heat.	
4.05 Determine that heat is produced from decaying plants in a compost pile.	



Mystery Festival

Grades 2–8

This extremely popular forensic-science unit features two imaginative and compelling mysteries, one for younger and one for older children. Students learn to distinguish evidence from inference, and conduct such crime-lab investigations as thread tests, powder tests, DNA comparisons, chromatography and fingerprinting.

Grade Four

Analyzing Systems

The focus for fourth grade students is thinking and analyzing in terms of systems. This helps students keep track of objects, organisms, and events. The strands provide a context for teaching the content throughout all goals. Students will actively investigate concepts by:

- * Predicting, observing, and recording results of simple experiments.
- * Observing and examining structural characteristics and behavior of animals.
- * Generating ideas to solve simple problems.

Strands: Nature of Science, Science as Inquiry, Science and Technology, Science in Personal and Social Perspectives

Competency Goal 1 The learner will build an understanding of animal growth and adaptation.	
Objectives	
1.01 Relate structural characteristics and behavior of a variety of animals to the environment in which they are typically found.	<i>Aquatic Habitats*</i> ; <i>On Sandy Shores</i> ; <i>Schoolyard Ecology</i> ; <i>Terrarium Habitats*</i>
1.02 Determine animal behaviors and body structures that have specific growth and survival functions in a particular habitat.	<i>Aquatic Habitats*</i> ; <i>On Sandy Shores</i> ; <i>Schoolyard Ecology*</i> ; <i>Terrarium Habitats*</i>
1.03 Evaluate living and nonliving things that affect animal life: * Other animals. * Plants. * Climate. * Water. * Air. * Location.	<i>Aquatic Habitats*</i> ; <i>On Sandy Shores</i> ; <i>Schoolyard Ecology*</i> ; <i>Terrarium Habitats*</i>

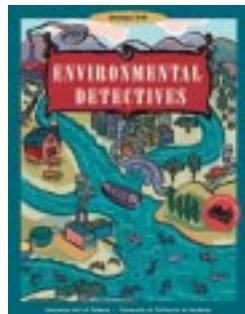
Competency Goal 2 The learner will build an understanding of the composition and uses of rocks and minerals.	
Objectives	GEMS Unit(s)
2.01 Describe the composition of a mineral. (Each mineral has a definite chemical composition and structure resulting in definite physical properties.)	<i>Stories in Stone*</i>
2.02 Analyze the mineral composition of rocks.	<i>Stories in Stone*</i>
2.03 Assess the uses of rocks and minerals.	<i>Stories in Stone*</i>

2.04 Classify rocks using student-devised rules.	<i>Stories in Stone*</i>
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Competency Goal 3 The learner will build an understanding of electricity and magnetism.	
Objectives	GEMS Unit(s)
3.01 Design an electric circuit as a complete pathway with an energy source, energy receiver, and energy conductor.	<i>Electric Circuits*</i>
3.02 Determine the ability of electric circuits to produce light, heat, sound, and magnetic effects.	<i>Electric Circuits*</i>
3.03 Analyze the parts of a light bulb.	<i>Electric Circuits</i>
3.04 Assess the pull of magnets on all materials made of iron and the pushes or pulls on other magnets.	
3.05 Measure magnetic effects over distance or through substances such as glass and paper.	

Competency Goal 4 The learner will build an understanding of technological designs.	
Objectives	GEMS Unit(s)
4.01 Assess the invention of tools and techniques to solve problems.	<i>Electric Circuits*;</i> <i>Investigating Artifacts*;</i> <i>Microscopic Explorations;</i> <i>Moons of Jupiter</i>
4.02 Observe the many tools	<i>Investigating Artifacts;</i>

that are based on designs found in nature.	<i>Microscopic Explorations</i>
4.03 Determine how people use simple machines to solve problems.	<i>Electric Circuits; Moons of Jupiter; Oobleck</i>
4.04 Evaluate the attributes of simple machines that can be manipulated or combined to affect outcomes.	<i>Electric Circuits*</i>
4.05 Assess the natural resources necessary to construct machines and tools.	



Environmental Detectives

Grades 5–8

In this challenging unit, built around a fictional environmental-damage scenario, students learn of the interconnectedness of the natural world and the complexity of many environmental problems. Students consider pollution from many sources, perform chemical and biological tests to finger the “culprit(s)” and track changes in predator-prey relationships.

Grade Five

Energy Interactions

Fifth grade students focus on energy as a property of substances, its function within the earth and its environment, and its effect on the earth's processes and atmospheric movement. The standards provide a context for the teaching the content throughout all goals. Students will be actively involved in:

- * Exploring energy interactions.
- * Creating and maintaining a model ecosystem.
- * Recognizing the forms of energy.

Strands: Nature of Science, Science as Inquiry, Science and Technology, Science in Personal and Social Perspectives

Competency Goal 1	
The learner will build an understanding of the interdependence of plants and animals.	
Objectives	GEMS Unit(s)
1.01 Assess a variety of ecosystems (communities of organisms and their interaction with the environment).	<i>Aquatic Habitats*</i> ; <i>Environmental Detectives*</i> ; <i>Life through Time; Terrarium Habitats; Only One Ocean*</i> ; <i>Schoolyard Ecology*</i>
1.02 Determine the function of organisms within the population of the ecosystem: producers, consumers, and decomposers.	<i>Aquatic Habitats*</i> ; <i>Terrarium Habitats*</i>
1.03 Evaluate the variety of organisms an ecosystem can support.	<i>Aquatic Habitats*</i> ; <i>Environmental Detectives*</i> ; <i>Life through Time; Only One Ocean*</i> ; <i>Schoolyard Ecology*</i>
1.04 Relate the role of light, range of temperatures, and soil composition to an ecosystem's capacity to support life.	<i>Aquatic Habitats</i> ; <i>Environmental Detectives</i> ; <i>Life through Time</i> ; <i>Moons of Jupiter</i> ; <i>Terrarium Habitats</i>
1.05 Evaluate the major source of energy for ecosystems (sunlight) and how it is passed from organism to organism in food webs.	<i>Aquatic Habitats*</i> ; <i>Life through Time</i>
1.06 Assess the interaction of organisms within an ecosystem.	<i>Aquatic Habitats*</i> ; <i>Environmental Detectives*</i> ; <i>Life through Time; Only One Ocean</i> ; <i>Terrarium Habitats</i>

Competency Goal 2 The learner will build an understanding of forms and sources of energy.	
Objectives	GEMS Unit(s)
2.01 Assess the sources and forms of energy (heat, light, electricity, mechanical motion, and sound).	<i>Color Analyzers*</i> ; <i>Hot Water and Warm Homes From Sunlight*</i> ; <i>Moons of Jupiter</i>
2.02 Assess the needs, benefits, distribution, pollution, and cost associated with society's use of energy.	<i>Environmental Detectives*</i> ; <i>Hot Water and Warm Homes From Sunlight*</i> ; <i>Moons of Jupiter</i> ; <i>River Cutters</i>
2.03 Analyze the interaction and transformation of the forms of energy.	<i>Environmental Detectives</i> ; <i>Hot Water and Warm Homes From Sunlight</i>

Competency Goal 3 The learner will build an understanding of landforms.	
Objectives	GEMS Unit(s)
3.01 Summarize changes to the earth caused by erosion, weathering, and mass wasting.	<i>Environmental Detectives</i> ; <i>River Cutters*</i> ; <i>Stories in Stone*</i>
3.02 Compare and contrast the stages of stream erosion and the valleys they produce.	<i>River Cutters*</i> ; <i>Stories in Stone*</i>
3.03 Compare and contrast the rock structure and relief of plains, plateaus, and mountains.	<i>River Cutters*</i> ; <i>Stories in Stone*</i>

Competency Goal 4 The learner will build an understanding of weather and climate.	
Objectives	GEMS Unit(s)
4.01 Analyze the water cycle: * Evaporation.	

* Condensation. * Precipitation. * Ground water.	
4.02 Analyze the formation of clouds and their relation to weather systems.	
4.03 Relate global atmospheric movement patterns to local weather.	
4.04 Compile weather data to establish climate trends.	
4.05 Evaluate oceans' effect on weather and climate.	



Dry Ice Investigations

Grades 6–8

The intriguing behavior of dry ice ushers students into understandings of inquiry and essential concepts of matter, gases, and chemistry. Provides compelling experience in scientific investigation while introducing the particulate theory of matter, phase change, the nature of gases and the history of science.

Grade 6

Patterns and Cycles

Learners study the patterns of natural and technological systems. The strands provide a context for teaching content throughout all goals. In-depth studies include:

Lithosphere.

Matter and Energy Flow in an Ecosystem.

Solar System.

Energy Transfer.

Strands: The Nature of Science, Science as Inquiry, Science and Technology, Science in Personal and Social Perspectives.

Competency Goal 1	
The learner will build an understanding of the lithosphere.	
Objectives	GEMS Unit(s)
1.01 Determine how physical and biological agents and processes form soil and affect soil characteristics.	<i>Acid Rain*</i> ; <i>Environmental Detectives*</i>
1.02 Analyze soil properties that can be observed and measured to predict soil quality: * Horizon profile. * Infiltration. * Soil temperature. * Structure. * Consistency. * Texture. * Particle size. * Soil pH. * Fertility. * Soil moisture.	<i>Acid Rain*</i> ; <i>Environmental Detectives*</i> ; <i>Stories in Stone</i> ; <i>Terrarium Habitats</i>
1.03 Evaluate ways in which human activities have affected Earth's pedosphere and the measures taken to control the impact: * Ground cover. * Farming. * Land use. * Nutrient balance.	<i>Acid Rain</i> ; <i>Environmental Detectives*</i> ; <i>River Cutters</i>

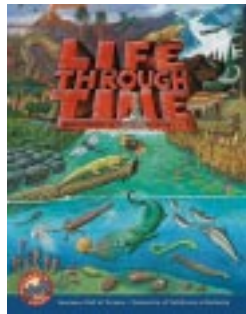
Competency Goal 2 The learner will investigate the characteristics of matter and energy flow through an ecosystem.	
Objectives	GEMS Unit(s)
2.01 Examine evidence that plants convert light energy into stored energy which the plant, in turn, uses to carry out its life processes.	<i>Acid Rain; Life through Time; Environmental Detectives</i>
2.02 Differentiate between the interconnected terrestrial and aquatic global food webs.	<i>Only One Ocean</i>
2.03 Describe ways in which organisms interact with each other and with non-living parts of the environment: *Limiting factors. * Coexistence/ Cooperation/ Competition. *Symbiosis.	<i>Aquatic Habitats; Environmental Detectives*; Life through Time; Only One Ocean*</i>
2.04 Evaluate the consequences of disrupting food webs.	<i>Acid Rain*; Aquatic Habitats*; Environmental Detectives*; Only One Ocean*</i>

Competency Goal 3 The learner will build understanding of the Solar System.	
Objectives	GEMS Unit(s)
3.01 Interpret scientific theories concerning the components, patterns, and cycles of the solar system.	<i>Earth, Moon, and Stars*; Invisible Universe*; Living With a Star*; Messages From Space*; Moons of Jupiter*; Real Reasons for Seasons*</i>
3.02 Compare and contrast the Earth to other planets in terms of: * Size. * Composition. * Relative distance from the sun.	<i>Earth, Moon, and Stars; Messages From Space*; Moons of Jupiter*; Real Reasons for Seasons</i>

* Ability to support life.	
3.03 Relate the influence of the sun and the moon's orbit to the gravitational effects produced on Earth.	<i>Messages From Space</i>
3.04 Associate the revolution of Earth around the sun and the tilt of Earth's axis with the seasons.	<i>Real Reasons for Seasons*</i>
3.05 Identify technologies used to explore space.	<i>Invisible Universe*; Living With a Star*; Messages From Space*; Moons of Jupiter*; Oobleck*; Real Reasons for Seasons*</i>
3.06 Analyze the spin-off benefits generated by space exploration technology.	<i>Invisible Universe*; Living With a Star*; Moons of Jupiter</i>

Competency Goal 4	
The learner will investigate the characteristics of energy transfer.	
Objectives	GEMS Unit(s)
4.01 Determine how convection and radiation transfer energy.	<i>Convection: A Current Event*; Hot Water and Warm Homes From Sunlight*; Invisible Universe*; Real Reasons for Seasons*</i>
4.02 Analyze heat flow through materials or across space from warm objects to cooler objects until both objects are at equilibrium.	<i>Convection: A Current Event*; Hot Water and Warm Homes From Sunlight*; Ocean Currents</i>
4.03 Conclude that vibrating materials generate waves that transfer energy.	<i>Invisible Universe*</i>
4.04 Evaluate data for qualitative and quantitative relationships associated with energy transfer and/or	<i>Convection: A Current Event*; Hot Water and Warm Homes From Sunlight*; Invisible Universe*; Ocean Currents*;</i>

transformation.	<i>Real Reasons for Seasons*</i>
4.05 Analyze the physical interactions of light and matter: * Absorption. * Scattering. * Color perception.	<i>Bubble-ology; Color Analyzers*; Crime Lab Chemistry; Hot Water and Warm Homes From Sunlight*; Living With a Star; Microscopic Explorations; More Than Magnifiers</i>
4.06 Examine the law of conservation of energy.	



Life through Time

Grades 6–8

This groundbreaking guide plunges students into the unifying theme in life science: evolutionary change. Through the exciting concept of time travel, evolutionary time is captured in evolving dioramas and rotating station activities that introduce students to the concepts of adaptation, relatedness and “deep time.”

Grade Seven

Interactions and Limits

Learners study the interactions and limiting factors of natural and technological systems. The strands provide a context for teaching content throughout all goals. In-depth studies include:

- * Atmosphere.
- * Cell Theory.
- * Genetics/Heredity.
- * Matter.

Strands: Nature of Science, Science as Inquiry, Science and Technology, Science in Personal and Social Perspectives.

Competency Goal 1	
The learner will build an understanding of the atmosphere.	
Objectives	GEMS Unit(s)
1.01 Explain the composition, properties, and structure of the atmosphere.	<i>Global Warming & The Greenhouse Effect</i>
1.02 Analyze the properties that can be observed and measured to predict air quality: * Particulate matter. * Ozone. * Pollen. * Temperature inversions.	<i>Global Warming & The Greenhouse Effect</i>
1.03 Examine evidence that atmospheric properties can be studied to predict atmospheric conditions and weather hazards: * Humidity. * Temperature. * Wind speed and direction. * Air pressure. * Precipitation (pH).	<i>Environmental Detectives</i>
1.04 Evaluate human impact on the atmosphere.	<i>Environmental Detectives*</i> , <i>Global Warming & The Greenhouse Effect*</i>
1.05 Assess the use of technology in predicting, monitoring, and recording atmospheric phenomena.	<i>Global Warming & The Greenhouse Effect*</i>

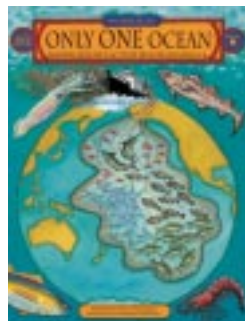
Competency Goal 2 The learner will build an understanding of cell theory.	
Objectives	GEMS Unit(s)
2.01 Analyze structures, functions, and processes within plant and animal cells: * Capture and release energy. * Feedback information. * Dispose of wastes. * Reproduction. * Enable movement. * Specialized.	
2.02 Compare life functions of protists.	
2.03 Analyze human body systems: * Form to function. * Interrelationships.	
2.04 Relate disease to biological hazards: * Pollen. * Viruses. * Bacteria. * Parasites.	

Competency Goal 3 The learner will build an understanding of heredity and genetics.	
Objectives	GEMS Unit(s)
3.01 Explain the significance of chromosomes, genes, and DNA in cell reproduction and their relationship to inherited characteristics.	
3.02 Analyze the role of probability in the study of heredity.	
3.03 Explain how, during	

reproduction, the sorting and recombination of parents' genetic material produces potential variation among offspring.	
3.04 Summarize the genetic transmittance of disease.	
3.05 Analyze the issues raised by selective breeding and biomedical research.	

Competency Goal 4 The learner will build an understanding of the general properties and interactions of matter.	
Objectives	GEMS Unit(s)
4.01 Classify substances based on their properties: * Elements. * Compounds. * Mixtures.	<i>Stories in Stone</i>
4.02 Relate state of matter to the arrangement and motion of atoms or molecules.	<i>Dry Ice Investigations*; Global Warming & The Greenhouse Effect; Ocean Currents</i>
4.03 Analyze the suitability of materials for use in technological design: * Conductivity. * Density. * Magnetism. * Solubility. * Rigidity. * Flexibility.	<i>Hot Water and Warm Homes From Sunlight</i>
4.04 Classify objects based on characteristics: * Density. * Boiling/Melting points. * Solubility.	<i>Discovering Density*; Ocean Currents*; Of Cabbages and Chemistry; Oobleck</i>
4.05 Describe and measure	<i>Chemical Reactions*; Dry Ice</i>

quantities related to chemical/physical changes within a system: * Temperature. * Volume. * Mass. * Precipitate. * Gas production.	<i>Investigations*</i> ; <i>Ocean Currents; Of Cabbages and Chemistry</i>
4.06 Evaluate evidence to support the law of conservation of matter.	



Only One Ocean

Grades 5–8

This comprehensive companion to *Ocean Currents* interweaves the concepts of connected ocean basins, animal adaptation, and sustainable fisheries. Its highlight, a classroom squid dissection conducted by student pairs, leads to activities about ocean fisheries and diminishing resources. Students brainstorm and present possible solutions in a “world conference.”

Grade Eight

Constancy and Change

Learners will study the constancy and change of natural and technological systems. The strands provide a context for teaching content throughout all goals. In-depth studies include:

- * Hydrosphere.
- * Population Dynamics.

- * Evolution Theory.
- * Motion and Forces.

Strands: Nature of Science. Science as Inquiry, Science and Technology, Science in Personal and Social Perspectives.

Competency Goal 1 The learner will build an understanding of the hydrosphere.	
Objectives	GEMS Unit(s)
1.01 Explain the composition, properties, and structure of the hydrosphere.	
1.02 Analyze hydrospheric data over time to predict the health of a water system: * Temperature. * Dissolved oxygen. * pH. * Alkalinity. * Nitrates.	<i>Mapping Fish Habitats</i>
1.03 Evaluate evidence that Earth's oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms.	<i>Ocean Currents*; Only One Ocean*</i>
1.04 Assess human impact on water quality.	<i>Acid Rain*; Environmental Detectives*; River Cutters*</i>
1.05 Evaluate the effects of point and non-point sources of pollution on North Carolina water.	<i>Environmental Detectives; River Cutters</i>

Competency Goal 2 The learner will build an understanding of population dynamics.	
Objectives	GEMS Unit(s)
2.01 Evaluate data related to	<i>Environmental Detectives*;</i>

<p>population growth, along with problems and solutions:</p> <ul style="list-style-type: none"> * Waste disposal. * Food supplies. * Disease control. * Resource availability. * Transportation. 	<p><i>Global Warming & The Greenhouse Effect*</i></p>
<p>2.02 Conclude that some ecosystem resources are finite.</p>	<p><i>Environmental Detectives*; Global Warming & The Greenhouse Effect; Hot Water and Warm Homes From Sunlight, Mapping Fish Habitats</i></p>
<p>2.03 Explain how changes in habitat may affect organisms.</p>	<p><i>Environmental Detectives*; Global Warming & The Greenhouse Effect; Mapping Fish Habitats</i></p>
<p>2.04 Analyze practices that affect the use, availability, and management of natural resources:</p> <ul style="list-style-type: none"> * Land use. * Urban growth. * Manufacturing. 	<p><i>Environmental Detectives*; Hot Water and Warm Homes From Sunlight</i></p>

<p>Competency Goal 3 The learner will build an understanding of evidence of change or constancy in organisms and landforms over time.</p>	
Objectives	GEMS Unit(s)
<p>3.01 Interpret ways in which rocks, fossils, and ice cores record Earth's geologic history and the evolution of life.</p>	<p><i>Life through Time*</i></p>
<p>3.02 Evaluate evolutionary theories and processes:</p> <ul style="list-style-type: none"> * Biological. * Geological. * Technological. 	<p><i>Life through Time*</i></p>
<p>3.03 Examine evidence that the</p>	<p><i>Life through Time*</i></p>

<p>movement of continents has had significant global impact:</p> <ul style="list-style-type: none"> * Distribution of living things. * Major geological events. 	
<p>3.04 Evaluate the forces which shape the lithosphere:</p> <ul style="list-style-type: none"> * Constructive. * Destructive. * Earthquakes. 	<i>Life through Time*</i> ; <i>Plate Tectonics*</i> ; <i>River Cutters*</i>
<p>3.05 Analyze information from technology used to monitor Earth from space.</p>	<i>Plate Tectonics</i>
<p>3.06 Analyze factors that determine Earth's climate.</p>	<i>Life through Time</i>

Competency Goal 4	
The learner will build an understanding of motion and forces.	
Objectives	GEMS Unit(s)
4.01 Analyze gravity as a universal force.	<i>Earth, Moon, and Stars*</i> ; <i>Experimenting With Model Rockets</i> ; <i>Moons of Jupiter*</i>
4.02 Demonstrate ways that simple machines can change force.	
4.03 Analyze simple machines for mechanical advantage and efficiency.	
4.04 Determine how the force of friction retards motion.	
4.05 Develop an understanding that an object's motion is always judged relative to some other object or point.	<i>Experimenting With Model Rockets</i> ; <i>Moons of Jupiter</i>
4.06 Describe and measure quantities that characterize moving objects and their	<i>Experimenting With Model Rockets</i>

interactions within a system: * Time. * Distance. * Mass. * Force. * Velocity. * Center of mass.	
4.07 Apply Newton's Laws of Motion to the way the world works: * Inertia. * Acceleration. * Gravitation. * Action/Reaction	
4.08 Investigate electricity and magnetism as universal forces: * Basic properties. * Relationship between. * Technological applications.	

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