

Unit: Comparative Life Cycles

Essential Question: How do organisms cycle over time? How are life cycles alike and different?

VOCABULARY: insect, complete/incomplete metamorphosis, life cycle, egg, nymph, adult, larvae, pupa, predict, organism, structure, function, claim, evidence

National Standards or Core Standards

- Organisms have structures and functions that facilitate their life processes, growth and reproduction.
- Organisms pass traits from one generation to the next.
- Organisms depend on their environment to meet their basic needs.

Guiding Questions	Big Ideas of Science	Assessments of Knowledge and Skills	Teaching Resources & Technology
<p>What are the basic stages of the life cycle?</p> <p>How do insects meet their basic needs? How is this alike and different from other organisms you have investigated?</p> <p>How can we distinguish one organism from another?</p> <p>How do structures help organisms function in their environment?</p> <p>Can organisms survive when they are removed from their environments?</p> <p>How are insect life cycles alike and different?</p> <p>How are complete and incomplete metamorphoses alike and different?</p>	<ul style="list-style-type: none"> ▪ Organisms have life cycles that include, being born, developing into adults, reproducing and dying. ▪ Living things have predictable characteristics at different stages of development. ▪ All animals have offspring. ▪ Animals and plants meet their needs for survival in different ways. ▪ Living things have characteristics that can be recognized and described (example: insects have six legs, three body parts and a set of antennae). ▪ Insects have unique structures that help them function. ▪ Organisms can survive only in environments where their needs are met. ▪ Insects' life cycles are not all the same (complete/incomplete metamorphosis). 	<p>Formative Understandings</p> <p>Identify stages of complete and incomplete metamorphosis</p> <p>Compare and contrast insect cycles</p> <p>Apply basic research skills</p> <p>Identify insect body parts.</p> <p>Draw and label an insect.</p> <p>Compare and contrast anatomically correct and incorrect insects.</p> <p>Build an anatomically correct insect.</p>	<p>CORE MATERIALS:</p> <p>FOSS Insects</p> <p>National Geographic Life by a Bay Life in a Garden Life in a Forest Why Don't Crocodiles Make Good Pets? A Butterfly's Favorite Whose Babies Are These Life Cycles of Animals Concept Book The Amazing Silkworm Tadpole Rescue</p>

Unit: Light and Sound**Essential Question:** How can I predict changes in my world?**VOCABULARY:** translucent, transparent, opaque, refraction, reflection, pattern, claim, evidence, data, predict , pitch, vibration, volume, wave**National Standards or Core Standards**

- Our understanding of wave properties, together with appropriate instrumentation, allows us to use waves, particularly electromagnetic and sound waves.
 - Sound makes matter vibrate, and vibrating matter makes sound (e.g. violin string, drum head).
 - You can only see objects when light is available to light them up.
 - Some materials allow light to pass through them, some allow only some light through, others block all the light and create a dark shadow on the surface where the light can't reach.
 - The study of the designed world is the study of designed systems, processes, materials and products and of the technologies and the scientific principles by which they function.
 - Everything that people make, needs to be designed and needs engineering processes to make them.
 - Designs can change over time to make things work better.
- People design and make things to meet their needs and desires.

Guiding Questions	Big Ideas of Science	Assessments of Knowledge and Skills	Teaching Resources & Technology
<p>What is sound?</p> <p>How can we describe sounds?</p> <p>How can we change pitch and volume?</p> <p>How can we use our understanding of pitch to create musical instruments?</p> <p>What patterns can we find as we investigate sound and light and how can we use those patterns to make predictions?</p> <p>What words can we use to describe properties of light?</p> <p>How does light travel?</p> <p>What is the relationship between light and color?</p>	<p>Sound</p> <p>Sound is vibration.</p> <p>Pitch and volume are properties of sound that can be changed.</p> <p>Sound has multiple properties.</p> <p>Sound travels through materials in different ways.</p> <p>Properties of sound can be observed by conducting fair tests.</p> <p>Light</p> <p>Light allows us to see.</p> <p>Some materials allow light to pass through them, some allow only some light through; others block all the light and create a dark shadow on the surface where the light can't reach.</p> <p>Light is a wave that travels in a straight line.</p> <p>Light has multiple properties.</p>	<p>Light Formative Understandings</p> <p>Distinguish between reflection and refraction.</p> <p>Distinguish between transparent, translucent and opaque.</p> <p>Conduct fair tests</p> <p>Identify what is needed to make a shadow (light source, reflective surface, opaque object)</p> <p>Sound Formative Understandings</p> <p>Conduct fair tests to determine pitch and volume.</p> <p>Propose a solution (prototype)</p> <p>Design prototype</p> <p>Build prototype</p> <p>Test prototype</p> <p>Evaluate prototype</p> <p>Modify design</p>	<p>STC</p> <p>Building Blocks of Science® Light Unit</p> <p>STC Sound Unit Kit</p> <p>KIDS DISCOVER: The 5 Senses</p> <p>Literacy Enhancement: Sound</p>

Unit: Sun, Moon, Earth**Essential Question:** How can I predict changes in my world?**VOCABULARY:** Sun, moon, earth, solar system, appears, day, night, cycle, rotate, revolve, year, phase, pattern, claim, evidence, data, predict**National Standards or Core Standards**

- Humans are a small part of a vast Universe; planet earth is part of the Solar System, which is part of the Milky Way galaxy.
- Our Sun is a star that appears larger and brighter than all the rest because it is much closer to us than any other star.
- Light from the sun helps keep earth's surface warm, gives us light and allows plants to grow.
- The sun appears in different places in the sky throughout the day.
- The Moon also appears in different places in the sky.
- A small telescope shows that the Moon looks different when seen "up close."
- People have walked on the moon.

Guiding Questions	Big Ideas of Science	Assessments of Knowledge and Skills	Teaching Resources & Technology
<p>Why is the sun important to us?</p> <p>How big are the sun, moon and earth?</p> <p>What patterns of change do you see in the daytime and nighttime sky?</p> <p>How do shadows change throughout the day?</p> <p>How can we use our observations of the moon over time to make predictions?</p>	<ul style="list-style-type: none"> ▪ Sun is essential to life and it provides us with heat and light. ▪ The sun, moon, and earth are different sizes. ▪ Things look smaller when they are farther away. ▪ There are patterns we see in the sky during the day and night. ▪ The rotation of the earth causes the day/night cycle. ▪ The Moon appears in different places in the sky. ▪ The sun can be seen only at the daytime, but the moon can be seen sometimes at night, and sometimes during the day. ▪ The Sun appears in different places in the sky during the day. ▪ Shadows change depending on where the sun is in the sky. ▪ The moon has phases. It looks different every day but looks the same about every four weeks. 	<p>Formative Understandings</p> <p>Describe the following patterns: Day/Night, Seasons, Moon Phases, Shadows</p> <p>Observe, record, and sequence the phases of the moon</p> <p>Predict moon phase based on observation of a pattern</p> <p>Observe and record the apparent path of the sun in the daytime sky</p> <p>Observe and compare shadows at different times of day</p> <p>Describe why we need the sun. (Heat/Light)</p> <p>Compare the size of the sun, moon, and earth</p> <p>Connect rotation of the earth with day and night</p> <p>Connect revolution of the earth with annual cycle.</p> <p>Compare day and nighttime sky</p> <p>Describe the following patterns: Day/Night, Seasons, Moon, Phases, Shadows</p> <p>Observe and record the apparent path of the sun in the daytime sky</p> <p>Observe and compare shadows at different times of day</p>	<p>Core Materials</p> <p>National Geographic Sun, Moon, and Stars Classroom Set with Science Inquiry Kit</p> <ul style="list-style-type: none"> ▪ Gr 2 Science Methods & Process Skills Big Book ▪ Gr 2 Science Methods & Process Skills Teacher's Guide

Guiding Questions	Scientific, Technological, and Engineering Practices	CONNECTED/ 21st Century Learning
<p>How can I design and carry out a fair test to investigate insect metamorphosis?</p> <p>What is the nature of scientific inquiry?</p> <p>How do scientists go about their work?</p> <p>How do theories become accepted or refuted?</p> <p>What is the relationship of scientific claims to evidence?</p> <p>What is technology and how does technological development shape our world?</p> <p>How is technology created?</p> <p>How are technological problems defined and researched?</p> <p>How can a problem be stated so that it can be solved?</p> <p>How have others solved similar problems?</p> <p>What are technological systems and how can they best be modeled and improved?</p> <p>How can drawings be used to show the way things fit together?</p> <p>How can creative solutions be developed, clearly expressed, and evaluated?</p> <p>How can the best possible solution be developed to solve a technological problem?</p> <p>Why are controls needed?</p>	<p>Scientists begin a fair test with a question.</p> <p>Scientists make predictions based upon their observations, experiences, and things they read.</p> <p>Scientists only change one thing in a fair test. They keep all the other things the same.</p> <p>Scientists develop a plan to follow.</p> <p>Scientists observe, record, measure, and analyze data to acquire evidence. Scientists value the role of computation and estimation in their work.</p> <p>Scientists use tables and graphs to identify patterns and relationships within data. Scientists keep honest/unbiased, clear and accurate records, value hypotheses and understand that more than one explanation can be given for the same evidence.</p> <p>Scientists develop claims based on their evidence. Scientists question claims based on vague attributions and are skeptical of arguments based on small data samples.</p> <p>Scientists embrace unexpected results.</p> <p>Scientific inquiry is a dynamic process that is not limited to one scientific method.</p> <p>Science is an imaginative endeavor that is subject to modification as new information challenges current theories. It involves the collection of data, the use of logical reasoning, argumentation and the devising of hypotheses and explanations informed by evidence.</p> <p>Scientists use a variety of tools to inform their observations.</p> <p>Inquiry engages learners in asking scientifically oriented questions, gathering and prioritizing evidence, formulating explanations, making connections to scientific knowledge and communicating and justifying explanations.</p> <p>Inquiry leads to new questions.</p> <p>Technology is a class of designed systems, products, or processes. The designed world is constantly changing as new technologies, tools, and materials are developed.</p> <p>Anyone can modify a technology, invent a new application of technology or make a new product (e.g. invent a new toy, make a dollhouse, or paper airplane) by thinking about what they want to do, gathering the right knowledge and skills, and trying different ways of working until they succeed.</p> <p>The first step to solving technological problems is to define the problem in terms of criteria and constraints or limits. It is important to find out how others have solved similar problems and to learn more about the nature of the problem itself.</p> <p>Systems analysis and modeling are key tools in designing, troubleshooting and maintaining technological systems.</p> <p>The more clearly a technological problem is stated in this way the easier it is to design and compare possible solutions.</p> <p>Working together and expressing ideas in words, sketches, and models are helpful in coming up with different solutions to technological problems.</p>	<p>Evolving our Teaching Styles, Learning Processes and Learning Environment:</p> <ul style="list-style-type: none"> field trips manipulatives with anatomically correct/incorrect insects fair tests/hands-on learning with insects Conduct fair tests with instruments Inquiry based learning with instrument design and implementation <p>Cultivating Collaboration:</p> <ul style="list-style-type: none"> small group work with insects <p>Communication: expository paragraphs on how to make a shadow; writing an expository piece</p> <p>Technology-graph the phases of the moon</p>