

## Insects in Ecosystems ~ Grade 2

An interdisciplinary unit aligned with Next Generation Science Standards and ELA Standards.

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Time Frame:	<p>September - October 2015 (8 weeks): Building background knowledge and knowledge of insects, insect observations and research. Field investigations.</p> <p>December 2015 Insect sketching with Susan Sawyer - review body parts insect characteristics/adaptations. Build observation skills.</p> <p>April 2016 (2 weeks) Interdependence of plants &amp; insects, Pollination. Adaptations of plants and pollinators. Create a pollinator/plant pair - integrate artwork.</p> <p>May/June 2016 - Design and build a Pollinator Garden</p>
Goals:	<p>Students will develop a beginning understanding of the process of science: observing, recording, questioning, experimenting, reading, sharing through learning the:</p> <ul style="list-style-type: none"><li>● Needs of living things</li><li>● Where do insects live?</li><li>● Characteristics and life cycles of insects in our local ecosystem</li><li>● The importance of insects in our local ecosystem</li><li>● Harmful and beneficial effects of insects</li><li>● Interdependence of plants and insects</li><li>● Structures of pollinators and plants and the unique relationships</li></ul>
Human Resources	<p>Susan Sawyer, Naturalist Jim McCracken, Content Specialist Margie Bish, Green Team Coordinator, Hanover Street School Parent &amp; Community Volunteers</p>

Culminating Activity	<p>Collaboration with HSS staff and community members to design, create, and maintain a pollinator garden</p> <p>Information and pictures will be posted to the <a href="#">Lebanon Website</a></p>
Essential/Guiding Questions	<p>What is a Scientist?          What is an insect?          What part do insects play in our local ecosystem?          How are insects helpful and harmful in our ecosystem?</p>
Differentiation	<p>Combination of whole-class, flexible groups, and individual instruction will occur throughout the unit. Students will be engaged in small group, hands-on experiments and activities.</p> <p>A variety of materials &amp; consideration of different learning styles will guide this unit. Hands-on activities, small group interaction, whole group activities, writing journals, music, art and movement will be incorporated.</p> <p>Balance between teacher-assigned and student-selected activities.</p>
Students will understand	<p>What a Scientist Is.          Characteristics of an insect.          The Important role insects play in our local ecosystem?          How insects helpful and harmful in our ecosystem?          The relationship between plants and pollinators.</p>
Student will be able to:	<p>Use an individual science notebook          Through embedded instruction develop questioning / answering techniques          Read/listen to quality picture books (literature integration)          Design imaginary flower to attract a specific pollinator based on attributes          Participate with activities with naturalists and other community members          Conduct insect and habitat observations. Record observations          Develop sketching abilities          Examine plant parts and identify types of pollinators          Use technology to demonstrate learning          Learn nature journaling and observation techniques          Read &amp; write poetry (along with music &amp; art) to support interdisciplinary learning objectives          Participate in activities to build school-wide awareness to the importance of pollinators to our food supply.          Plant pollinator garden</p>
Students will know:	<p>Parts of an insect (vocabulary)</p>

	<p>Stages of insect life cycle (vocabulary)</p> <p>Common insects in our area (bee, ladybug, grasshopper, etc)</p> <p>The role of insects in our local ecosystem (pollinators, food sources, decomposers)</p> <p>The helpful and harmful effects of insects to our local ecosystem</p> <p>Parts of a flower</p> <p>How specific body characteristics of insects enable them to pollinate certain plants</p> <p>The unique relationship between plants and animals - plants depend on animals for pollination and many pollinators depend on plants for food</p> <p>How to create a model</p>
Assessment:	<p>Accurate labeling of the parts of an insect</p> <p>Creation of an accurate life cycle model</p> <p>Record of observations including scientific writing (diagrams/journaling) of insects in their natural habitat</p> <p>Model of food chain</p> <p>Insect report which includes insects' characteristics and role in ecosystem</p> <p>Flower model with appropriate parts to attract specific pollinator</p>
Resources	<p>Leveled non-fiction text</p> <p>Human resources: Susan Sawyer, Jim McCracken, farmer</p> <p>Videos</p> <p>Arts &amp; craft materials</p> <p>Observation tools hand lenses, collection boxes, nets, white sheets, sketch books</p>
21st Century Theme	Environmental Literacy
21st Century Skills	<p>Learning &amp; Innovation Skills</p> <p>Communication and Collaboration</p> <p>Use communication for a range of purposes (inform, instruct, motivate, persuade)</p> <p>Articulate thoughts and ideas effectively using oral, written, and nonverbal communication skills in a variety of forms and contexts</p> <p>Utilize multiple media and technologies</p> <p>Assume shared responsibility for collaborative work, and value the individual contributions made by each team member</p> <p>Work creatively with others</p> <p>Demonstrate ability to work effectively and respectfully with diverse teams</p> <p>synthesize and make connections between information</p> <p>interpret information and draw conclusions</p>

English / Language Arts	Activities:
Ask and Answer Questions	<p>Create a question board or area for students to post questions</p> <p>Deliberate activities designed to promote questioning (flower cards, and texts.</p> <p>Embedded instruction using leveled text (small groups, partners)</p>
Text Features: Analyze photographs and captions	Non-Fiction Texts. Whole group, small group, and individual. Opportunity for assessment.
Text-dependent questions	<p>Non-Fiction Texts. Whole group, small group, and individual.</p> <p>Opportunity for assessment.</p> <p>Resources: Reading A-Z, Scholastic News, leveled texts</p>
Next Generation Science:	Activities
Constructing explanations and designing solutions	Create flower model, pollinator garden
Structure and function Interdependent relationships in ecosystems	<p>Examination of pollinators &amp; plant structures.</p> <p>Observation of insect samples / sketching</p> <p>Dissection of flowers.</p> <p>Identifying, labeling, learning about parts of plants.</p> <p>Body characteristics of insects</p>

Investigation 1	Classroom Instruction	Science & Engineering Practice	Crosscutting Concept	ELA Standards	Activity
What is an insect?	<p>Instruction using books, video clips, teacher hand-outs to define characteristics of insects</p> <p>All insects have head, thorax, abdomen, six legs attached to thorax. Other parts vary among species (antennae, eyes, wings)</p> <p>Website: <a href="http://bugguide.net">bugguide.net</a></p>	<p><u>Analyzing and Interpreting Data</u></p> <p>Students make observations and/or measurements to produce data to serve as the basis for an explanation of a phenomenon.</p>	<p><u>Patterns</u></p> <p>Patterns in the natural world can be observed, used to describe phenomena, and used as evidence</p>	<p>Notebook entries</p> <p>Speaking &amp; listening</p> <p>Literacy Connections (non-fiction)</p> <p>Guiding questions</p> <p>Recording data</p> <p>Participate in collaborative conversations with diverse partners</p>	<p>Sorting activity (partners)</p> <p>Sort plastic animals into insect/not insect.</p> <p>Discuss ways to further sort insects (students identify additional ways - may include physical characteristics such as color, big/small)</p>
<p>Technology Resources:</p> <p>Online Game (find insects): <a href="http://archive.fossweb.com/modulesK-2/InsectsandPlants/activities/insecthunt.html">http://archive.fossweb.com/modulesK-2/InsectsandPlants/activities/insecthunt.html</a></p> <p>Introduction to insects: <a href="http://extension.illinois.edu/insects/02.html">http://extension.illinois.edu/insects/02.html</a></p> <p>Classify insects: <a href="http://teacher.scholastic.com/activities/explorations/bug/index.htm">http://teacher.scholastic.com/activities/explorations/bug/index.htm</a></p> <p>Information: <a href="http://www.insects.org">www.insects.org</a></p> <p>Amateur Entomologist: <a href="http://www.amentsoc.org/insects/">http://www.amentsoc.org/insects/</a></p>					
Bugs on the Move (or other similar text)	<p>How do insects move?</p> <p>Caterpillar, ant, ladybug, grasshopper, etc.</p>			<p>Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.</p> <p>Know and use various text features (captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in text efficiently</p> <p>Explain how specific</p>	<p>Write about how insects move.</p> <p>Personal Narrative (wordless Dragonfly book)</p>

				images contribute to and clarify a text	
Non-Fiction Texts	<p>Explore the many and varied texts available about insects</p> <p>Focus: Bees &amp; Ants Jobs, special skills</p> <p>View working beehive, ant colony</p> <p>Montshire Museum</p>			<p>Speaking &amp; Listening</p> <p>Comprehension</p> <p>Collaboration</p> <p>Text-Dependent questions.</p>	<p>Participate in discussions (whole group/small groups)</p> <p>Demonstrate discussion skills (listening, taking turns, questioning)</p> <p>Summarize &amp; describe details from texts</p> <p>Complete Insect Chart including insect name, what it eats, where it lives, interesting fact</p> <p>Uses available resources to research an insect of choice and answer text-dependent questions such as:</p> <p>How does "insect" protect itself?</p> <p>What traits does "insect" have to help it survive?</p> <p>What is the food source for "insect).</p> <p>Describe the habitat of "insect"</p>
Observing and Sketching	<p>What does it mean to observe? Use of senses, notice details (size, color, shape...)</p> <p>Use of magnifying glass</p>			<p>Use Graphic Organizer (Observations Organizer Writing Frame)</p> <p>Compare and Contrast</p>	<p>Field observation</p> <p>Choose a spot to sit and observe. Sit quietly - no talking for 5-10 minutes. Focus on what you can</p>

	<p>Scientific drawing = to record and communicate details and information</p>				<p>hear, see, feel.</p> <p>Did you see/hear any insects</p> <p>Choose a location - how many and what kinds of insects might we find? Where should we look?</p> <p>Use of sweep nets and containers.</p> <p>Sketch &amp; record insects found &amp; habitat. Discuss findings, observations.</p> <p>Complete Insect Observation sheet with labeled drawing, observations</p>
Assessment	<p>Overview of project guidelines Incorporation of art, technology, science, and ELA</p>				<p>Students create a poster including habitat, insect, and haiku</p>
What insect am I	<p>Familiarize students with different insects, improve observation skills, build compare/contrast skills</p>				<p>Have insect samples or pictures on display. Describe each and have students guess which insect you are describing. For example: I have large eyes, two pairs of wings that can be clear etc</p> <p>Further observation &amp; discussion continues after game.</p>

How do insects grow and develop?	Life cycles of various insects	<p>Students make and record observations of the needs of living things in their science notebooks.</p> <p>Add to this throughout the investigation. Students share &amp; discuss their thinking and findings.</p> <p>Analyze observations/data and develop conceptual understanding of results</p> <p>Use language of observation, recording, compare and contrast, making predictions</p>	<p>Discuss changes insects go through during their lifecycle.</p> <p>Use language to support identifying patterns, noticing change, predicting rate of change, similarities and differences in life cycles (all include birth, growth, reproduction, death)</p>	<p>Compare &amp; Contrast (using Venn Diagram) life cycles of 2 insects</p> <p>Understanding the differences and similarities in the changes that occur (some slow/others rapid)</p> <p>Compare &amp; Contrast Writing Frame</p>	<p>Life cycle models</p> <p>Compare &amp; Contrast life cycles of different insects</p> <p>Students predict what the adult insect will look like based on previous observations.</p>
Butterflies	Facilitate discussion about what a claim is (a claim answers a question).	Students make a claim supported by evidence that young butterflies have structures (antennae to sense, cocoon to protect, wings to move, etc)	Students use observations and information from readings as evidence to support their claim		Use this information later when students create an insect - what structures does your insect have to ensure survival?
Design & Create	<p>Culmination of learning. Goals of project.</p> <p>Planning sheets to note body parts, structures, elements of habitat.</p> <p>Explore adaptations.</p>	Design an imaginary insect and habitat. Students will draw, label and describe their insect, its life cycle and habitat in terms of how its structure relates to function. If time allows, students build a model of habitat and place their insect.	<p><u>Structure and Function</u></p> <p>Shape and stability of structures of natural and designed objects are related to their functions</p>	Integration of information and observation	<p>Use an engineering design process to create an insect.</p> <p>Source: Invent an Insect. California Academy of Sciences <a href="http://www.calacademy.org/educators/lesson-plans/invent-an-insect">www.calacademy.org/educators/lesson-plans/invent-an-insect</a></p>