

Unit 3: Plants and animals interact



In this introductory study of ecology, students will learn about the ecology and climate of Barro Colorado Island (BCI), Panama and the ecology and climate of Milwaukee, Wisconsin. Within this context students will review how ecosystem and climate are determined, examine the importance of healthy ecosystems, study how organisms meet their basic survival needs, consider how organisms have evolved, demonstrate ecosystem interactions, analyze the relationship between omnivores and herbivores and justify the importance of forest conservation.

Students will also engage in learning about how humans understand and explain the natural world through an interactive web-based resource that was built with interviews of scientists and students working on BCI during the summer of 2010. They will realize their ability to pose questions and conduct research, in the same way scientists do on BCI, by participating in a performance task that assesses student understanding of climate and species diversity in partnership with the Urban Ecology Center (UEC) in Milwaukee, WI.

Students will develop and apply inquiry-based research to make comparisons between Milwaukee and BCI. In a culminating performance task, students will present their understanding of the similarities and differences of the climate and biodiversity of BCI and Milwaukee. Students and teachers will work with Urban Ecology Center staff to census the flora and fauna of Riverside Park and compare that data to what they have learned and what is published about BCI. The product will clearly display similarities and differences between a temperate climate, flora and fauna, and a tropical climate, flora and fauna. Each student will also have the opportunity to conduct a student driven inquiry project that may be inspired by the work they have done in the unit or scientists they have learned about from BCI. The unit concludes with students persuading their peers of the importance of habitat conservation.

Curricular Goals

National Science Content Standard:
C. Life Science (Characteristics of Organisms, Life Cycles, Organisms and Environments)

WI State Standard
F.4.2 Investigate how organisms, especially plants, respond to both internal cues (the need for water) and external cues (changes in the environment):

Essential Questions: How do living and non-living things interact within a dynamic ecosystem? Why is the relationship between omnivores and herbivores important to the structure of a forest?

Students will understand that...

- competition, niche differentiation, and the ways species differ in their abilities to exploit resources. (Organisms interact with living and non living parts of their environment.)
- the forces of predation and herbivory structure in forests.

Students will know. . .

- the roles of producers, consumers, decomposers, predators, prey and how they interact.

Students will be able to. . . (skills)

- describe interactions between and among plants and animals on Barro Colorado Island and in Milwaukee, WI.
- discuss food webs and the importance of species diversity.

performance task

- How do living and non-living things interact within a dynamic ecosystem? Why is the relationship between omnivores and herbivores important to the structure of a forest?
- Students will remove a species from their food web and explain the consequences in a mock interview or news story.

other evidence

- pre / post test
- science notebook
- Kidspiration food web activity on computer
- mock newscast / interview

Assessment Task Blueprint (for teacher use only)

Understandings or goals will be assessed through this task:

•Students will remove a species from their food web and explain the consequences in a mock interview or news story.

Criteria are implied in the standards and understandings, regardless of the task specifics. Qualities student work must demonstrate to signify that standards were met.

Authentic performance task for students to demonstrate understanding: (task overview)

You have explored plant and animal interactions in class, online, in videos, and with the BCI species cards. First diagram a food web using the BCI species cards. In the community you created, there has been a lot of work in the name of 'progress' causing local extinction due to over-harvesting and habitat destruction. Your teacher will tell you which species population has become locally extinct before you continue. Then consider the effects of not having that organism as part of the food web in that community. In a paragraph identify the species that would be affected and then predict how each of their populations would change as a result of the missing species. You will explain your work to a peer reviewer and then have a chance to revise your work before turning it in to be scored. Proficient work will include 7 or more species in the web and show accurate interactions. It will also make reasonable predictions about the effects on each species population when one is removed.

Student products and performances to provide evidence of desired understandings:

food web diagram

Criteria by which student products and performances be evaluated:

Students include seven or more species in their food web.

Students accurately indicate plant/animal interactions.

Students are able to establish reasonable predictions of the effects due to local extinctions.

Students write a grammatically correct paragraph in the form of a mock interview or news story.

Please find 3-5th grade version of this assessment as separate document.

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Learning Activities

Lesson number	WHERE TO	activity, learning objective
3.1	Hook and Hold	What do you eat? Are you an herbivore, carnivore, omnivore ? Where does our food come from? How do we get our nutrients? Define consumer and producer. Share photo albums from 2010 and 2011 on picasa pages
3.2	Engage	Introduce BCI species cards and invite partners or groups to explore the information on them and organize them in some way. Prepare for a 'museum walk' to see and hear about other groups' organization. Be ready to explain your method of organization. If there is time, give students opportunity to reorganize their cards after hearing from other groups as a formative assessment of the work accomplished thus far.
3.3	Engage	Students do research in library books and on internet to find out more about food chains, webs and trophic interactions (movement of energy within a system). Play species cards games to practice finding interactions and become more familiar with species.
3.4	Reflect and Rethink	As a whole class, consider the effects of removing a species from web. Discuss possible outcomes and make predictions. Use an analogy that relates to students' experience.
3.5	Reflect and Rethink	Set up a situation in which climate change may factor into how a community and relationships of plants and animals might be affected. Talk about this with students. Make predictions. Find examples of places where this has happened from print or online resources, including current events.
3.6	Evaluate	Students create model food web. Students interview each other in the role of a news reporter conducting and interview. They should include the following questions: How do living and non-living things interact? Describe relationship between omnivores and herbivores and why is this relationship important to a forest?

3.7	extend	<p>Some ideas include:</p> <p>Create deck of species cards for Milwaukee WI and similar temperate environments</p> <p>Continue work on model of rainforest that was begun in unit 2</p> <p>Practice more with species cards with variety of games and added information.</p>
3.8	evaluate	<p>performance task</p> <p>You have explored plant and animal interactions in class, online, in videos, and with the BCI species cards. First diagram a food web using the BCI species cards. In the community you created, there has been a lot of work in the name of 'progress' causing local extinction due to over-harvesting and habitat destruction. Your teacher will tell you which species population has become locally extinct before you continue. Then consider the effects of not having that organism as part of the food web in that community. In a paragraph identify the species that would be affected and then predict how each of their populations would change as a result of the missing species. You will explain your work to a peer reviewer and then have a chance to revise your work before turning it into be scored. Proficient work will include 7 or more species in the web and show accurate interactions. It will also make reasonable predictions about the effects on each species population when one is removed.</p>
key vocabulary		<p>trophic levels, interact, energy, producer, consumer, decomposer, omnivore, herbivore, carnivore</p>
print resources		<p>Additional activities can be found in the JASON XV curriculum. See page 54 for Green and Brown Foodwebs and page 63 for litter sampling with a Berlese Funnel.</p>
online resources		<p>http://bcipanama.blogspot.com/ http://panamatrees.blogspot.com/</p>