

PLANNING

UNIT AT A GLANCE

Activity	Time to Complete	Questions	Phenomena	Summary: Students Will...
1 The Oxpecker and the Hippo	Preparation: 35 min. Activity 1: 6 days Lesson 1A: 50–55 min., 2 days Lesson 1B: 50–55 min. Lesson 1C: 50–55 min., 2 days Lesson 1D: 50–55 min.	How are organisms in an ecosystem connected by the food they eat? What is the relationship between the hippopotamus and the oxpecker?	Oxpecker birds on the backs of hippos pecking at their hides. Carp cleaning the hides and teeth of the hippo.	<ul style="list-style-type: none"> • Make observations of the oxpecker and the hippopotamus. • Ask questions about the relationship between the oxpecker and hippopotamus. • Obtain information about the relationship among animals from video and text. • Read a chapter book, <i>Birdbrain Amos</i>, to obtain information about the African lakes and rivers ecosystem. • Develop and revise models of their thinking about the African lakes and rivers ecosystem.
2 Interdependence Within an Ecosystem	Preparation: 40 min. Activity 2: 6 days Lesson 2A: 50–55 min., 2 days Lesson 2B: 50–55 min., 2 days Lesson 2C: 50–55 min., 2 days	How do living things interact and depend on each other for survival? What roles do different organisms play to balance an ecosystem?	Oxpecker birds on the backs of hippos pecking at their hides. Carp cleaning the hides and teeth of the hippo.	<ul style="list-style-type: none"> • Complete the reading of the chapter book <i>Birdbrain Amos</i> and complete addition of information to their models. • Ask “what would happen if” questions about the balance in a bottle ecosystem model. • Build a bottle ecosystem and make observations of changes over time. • Read the book <i>How Ecosystems Work</i> to obtain information about balance and energy and matter in an ecosystem.
3 More About Plants	Preparation: 40 min. Activity 3: 6 days Lesson 3A: 50–55 min. Lesson 3B: 50–55 min., 2 days Lesson 3C: 50–55 min., 2 days Lesson 3D: 50–55 min.	What is the role of plants in an ecosystem? What do plants use to make food for growth and repair?	Manchineel tree goes to extremes to survive. Poisonous sap helps the tree to survive. The giant sequoia tree can grow to more than 275 feet (84 m) in height and 26 feet (8 m) around.	<ul style="list-style-type: none"> • Collect plants from the schoolyard. • Make observations of plant parts and determine the function of the parts. • Read informational text about the adaptations of some plants to get food. • Read about Jean van Helmont’s experiment with plants.

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Students Figure Out How to:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> • Develop a model that demonstrates why the oxpecker rides on the back of the hippo. • Determine the main idea and supporting details from information obtained through video and text. • Identify scientific information from fiction. • Use new information to revise models of the relationship among organisms in the African lakes and rivers ecosystem. • Develop a model of a food web. • Collaborate to develop a consensus model of a food web. 	<p>Asking Questions and Defining Problems</p> <p>Developing and Using Models</p> <p>Constructing Explanations and Designing Solutions</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Systems and System Models</p>	<p>PE at Lesson Level: Develop an initial model that explains the relationship between the oxpecker and the hippo.</p> <p>Formative Assessment initial models, Activity Page, revised models, consensus model, Science Talk, Journal Entry</p>
<ul style="list-style-type: none"> • Develop a bottle ecosystem investigation based on their “what would happen if” questions. • Use the Engineering Design Plan to design an ecosystem in a bottle to determine how living and nonliving things balance in an ecosystem. • Use text to obtain information on ecosystems and how matter and energy cycle in a system. • Determine the main idea and supporting details from information obtained from text. • Determine that the observations of their bottle ecosystems reflect changes and a balanced or unbalanced system. 	<p>Constructing Explanations and Designing Solutions</p> <p>Planning and Carrying Out Investigations</p> <p>Analyzing and Interpreting Data</p> <p>Systems and System Models</p> <p>Energy and Matter</p>	<p>PE at Lesson Level: Plan and carry out an investigation that answers a “what would happen if . . .” question in a bottle ecosystem.</p> <p>Formative Assessment Bottle Ecosystem Investigation Proposal, investigation questions, and ecosystems</p> <p>Summative Assessment <i>Data Table: Ecology</i> handout, Science Talk, Journal Entry</p>
<ul style="list-style-type: none"> • Ask questions about the function of plant parts and how plants get food for growth and repair. • Develop and revise a model with new information that explains how plants get food. 	<p>Obtaining, Evaluating, and Communicating Information</p> <p>Constructing Explanations and Designing Solutions</p> <p>Asking Questions and Defining Problems</p> <p>Developing and Using Models</p> <p>Energy and Matter</p>	<p>PE at Lesson Level: Obtain information about plants and how they get their food from other scientists and observations.</p> <p>Formative Assessment Activity Page, Science Talk</p> <p>Summative Assessment Activity Pages, Science Talk, group models, revised models</p>

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4 Investigating What Plants Use for Food	Preparation: 25 min. Activity 4: 6 days Lesson 4A: 50–55 min., 2 days Lesson 4B: 50–55 min., 2 days Lesson 4C: 50–55 min., 2 days	How do plants get food? What do plants use for food?	The giant sequoia tree can grow to more than 275 feet (84 m) in height and 26 feet (8 m) around.	<ul style="list-style-type: none"> • Carry out investigations into plants' need for air and sunlight. • Share their results from their investigations
5 When Something Happens to the Balance	Preparation: 15 min. Activity 5: 8 days Lesson 5A: 55–60 min., 2 days Lesson 5B: 55–60 min., 2 days Lesson 5C: 55–60 min., 2 day Lesson 5D: 55–60 min., 2 days	What is the effect of changes in the environment on the food web of an ecosystem?	Hippopotamus waste can cause change in the river. Rats are accidentally introduced into the ecosystems in Hawaii.	<ul style="list-style-type: none"> • Review how the hippopotamus deposits its waste in the lakes and rivers. • Obtain information from video about the effect of the waste of hippos in the lakes and rivers. • Select an ecosystem and develop a skit that demonstrates balance in the ecosystem. • Conduct research on a Michigan invasive species. • Write a letter to the governor of Michigan about the invasive species problem in Michigan.

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Students Figure Out How to:	Practices	Performance Expectations (PE) at Lesson Level and Assessment
<ul style="list-style-type: none"> Plan and carry out an investigation into how plants need air and sunlight. Discuss findings of investigations to reach a conclusion that plants acquire material from air and water to make food. Use data from investigations to write a scientific explanation of how plants get food. Reach a consensus to answer the question "What do plants use for food?" based on investigation results and informational text. 	<p>Planning and Carrying Out Investigations</p> <p>Analyzing and Interpreting Data</p> <p>Engaging in Argument from Evidence</p>	<p>PE at Lesson Level: Plan and carry out investigations to determine what plants use for food.</p> <p>Formative Assessment Activity Page</p> <p>Summative Assessment Activity Page, Questions 2 and 3, Journal Entry, Science Talk, revised African lakes and rivers models</p>
<ul style="list-style-type: none"> Develop a model to explain how changes in the environment can cause a change in the food web of an ecosystem. Develop a skit as a model to demonstrate a balanced and unbalanced ecosystem. Use information from research to construct an argument that an invasive species causes change in an ecosystem and the food web. Propose an opinion of what needs to be done about invasive species and their effect on ecosystems in Michigan. 	<p>Developing and Using Models</p> <p>Constructing Explanations and Designing Solutions</p> <p>Asking Questions and Defining Problems</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Cause and Effect</p> <p>Systems and System Models</p>	<p>PE at Lesson Level: Use models to explain how changes in the environment can cause a change in the food web of an ecosystem.</p> <p>Summative Assessment Ecosystem skits, Activity Page, Science Talk, group presentations, Journal Entry, What We Think chart, group research, presentations, Journal Entry</p>