Program Overview

Miller & Levine

Biology

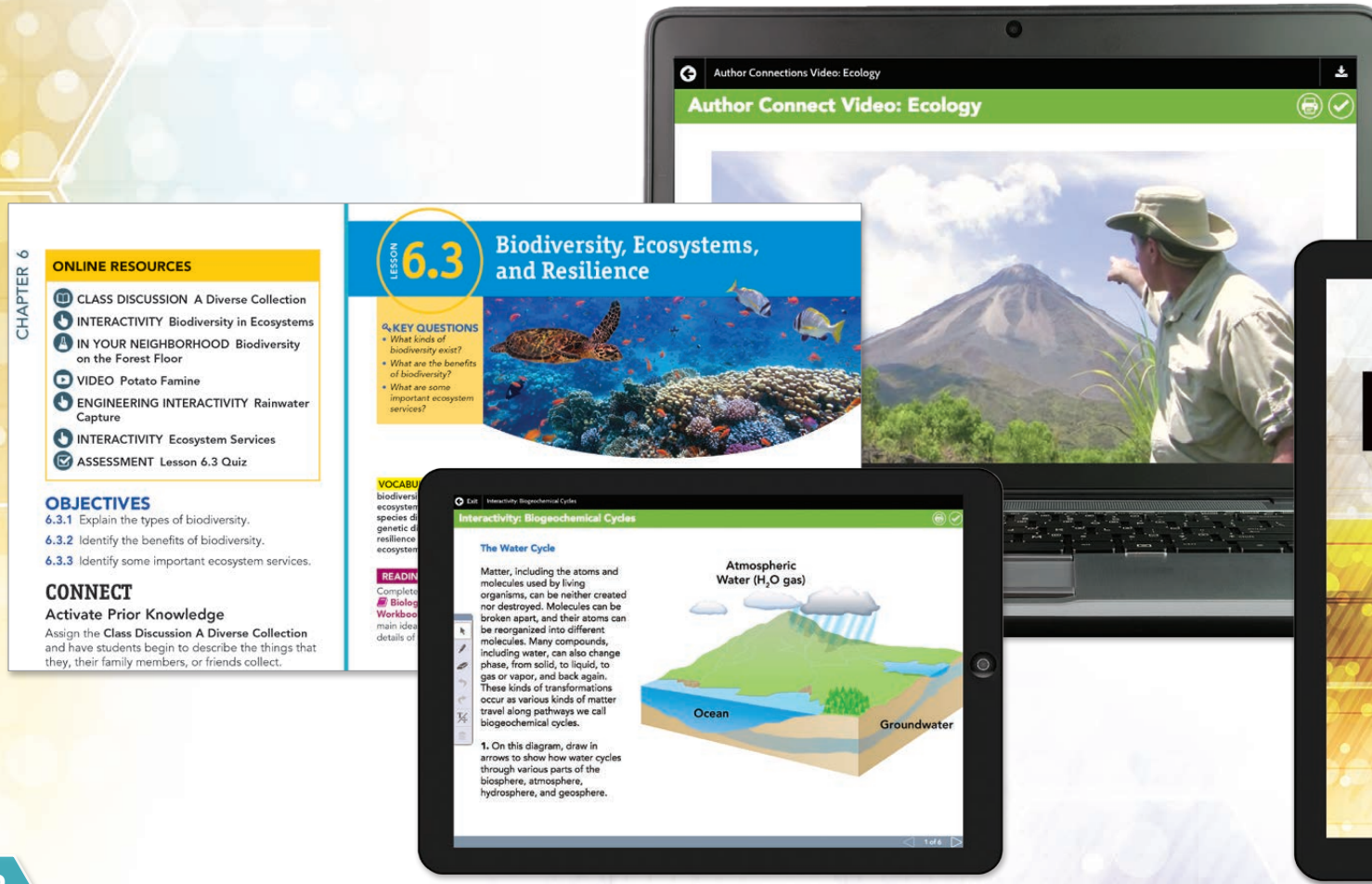
See life in a whole new way

Biology

Miller & Levine

Life, up close and personal

The new ***Miller & Levine Biology*** is here! Developed by preeminent biologists and passionate educators, Ken Miller and Joe Levine, this blended print and digital curriculum immerses students in biological inquiry. Students think, investigate, and talk about biology. They interact with natural phenomena through problem-based learning, research, and lab experiments.



See life in a whole new way

- **Ignite Curiosity**
  with authentic case studies and laboratory investigations.
- **Promote Understanding**
  with reading support, visual aids, ELD strategies, and student monitoring.
- **Inspire Learning**
  and a lifelong passion for science with real-world experiences and student-driven pedagogy.

MEET THE AUTHORS

Active scientists, passionate storytellers

Ken Miller

"You don't need a lab coat, degree, or laboratory to be a scientist. What you need is an inquiring mind, the patience to look at nature carefully, and the willingness to figure things out."

Joe Levine

"We want students to really understand biology—which means more than memorizing facts. We've worked hard to put the information together in ways that will help you understand why that information is important."

Made for exploring

Authentic Case Studies drive inquiry-based learning. Students directly engage in real-world problem solving, analysis, and critical thinking.

Case Studies

Dig into interesting biology phenomena and understand core scientific concepts. Each chapter begins with an authentic Case Study, a problem that drives scientific inquiry. Students conduct investigations around the case as they progress throughout the chapter. They test ideas, analyze evidence, and construct solutions from their work.

Case Study Connections

Inquiry leads to analogous problems, more questions, and drawing comparisons. Students analyze data and create models to support their solutions.

Secondary Succession When a disturbance affects an existing community but doesn't completely destroy it, a process of secondary succession occurs. Secondary succession proceeds faster than primary succession, in part because bits of the old community survive and can regrow rapidly. Secondary succession is shown in **Figure 6-8B**. On land, secondary succession often follows a wildfire, hurricane, or other natural disturbance. We think of these events as disasters, but many species are adapted to them. Although forest fires kill some trees, for example, other trees are spared, and fire can stimulate their seeds to germinate. Secondary succession can also follow human activities like logging and farming.

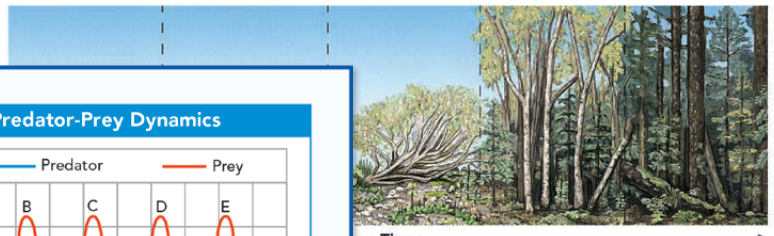
INTERACTIVITY

CASE STUDY

Figure 6-8

Primary and Secondary Succession

In both types of succession, one group of species replaces another group.



...faces. In Glacier Bay, ...er the course of ...k and spruce forest.

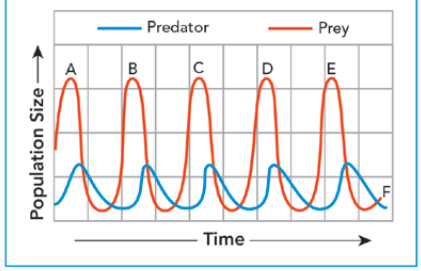
CASE STUDY Analyzing Data

Predator-Prey Dynamics

The relationships between predator and prey are often tightly intertwined, particularly in an environment in which each prey has a single predator and vice versa. The graph here shows an idealized computer model of changes in predator and prey populations over time.

1. **Use Computational Models** Suppose a bacterial infection kills off most of the prey at point B on the graph. How would this affect the predator and prey growth curves on this computer model at point C? At point D?
2. **Analyze Graphs** Suppose a sudden extended cold spell destroys almost the entire predator population at point F on the graph. How would the next cycle of the prey population appear on the graph?

Predator-Prey Dynamics



3. **Develop Possible Solutions** Suppose a viral infection kills all the prey at point D. What effect would this have on the predator and prey curves at point E? What will happen in future years to the predator population? What solution could ecologists develop to ensure the contin- ...ued survival of the predators?

...predators shape ...stem?

...opulations are small and endangered. ...ks are healthy—for now.

...ke Your Case

...ts and park rangers agree that reintroducing wolves to ...stone was a wise action to take. Happily, the wolves helped ...e the changes in Yellowstone and make it a much health- ...system. However, scientists are not convinced that the ... were the only cause of the improvements that Yellowstone ...enced.

...y Scientific Reasoning

...nduct Research Compare the Yellowstone wolf story with a situ- ...n in your region where human activity that affected one species, ...a couple of species, resulted in a trophic cascade. Which aspects ... similar to the Yellowstone story, and which are different? Have ...earchers offered and tested hypotheses to explain the changes? ...gage in Argument Develop an argument, supported by evidence, ...out ways to protect or restore the ... you think your solution will work ... certain parts of it? Compare a ... Yellowstone.

Careers on the Case

Work Towards a Solution

National parks help preserve biodiversity, and they can provide useful evidence about the way ecosystems function. Park rangers work with scientists and government officials to help manage these parks.

Park Ranger

The U.S. National Park System covers more than 84 million acres. Rangers help educate visitors, protect park land and wildlife, and enforce laws. Many rangers are experts in specific fields of science, such as forestry, geology, and wildlife management.

Technology on the Case

Follow that Wolf!

How can researchers figure out where wolves spend their time? And how can rangers track wolves in a park as vast as Yellowstone? Technology provides the answers.

Data about which animals live in certain places can be gathered by hidden cameras. If animals are active at night, infra-red light and special sensors can take pictures in the dark.

Researchers also attach tracking devices onto animals. Some tracking devices are simple radio transmitters. Researchers locate these animals using receivers equipped with directional antennae to home in on the signal. Other devices use satellite-based global positioning systems (GPS)—the same sort of technology used in cars and smart phones.

Case Study Wrap-Up

How do changes at Yellowstone compare to a local ecosystem? Students cite evidence and apply scientific reasoning to develop argument-driven discussions.

Wrap-Up includes:

- Make Your Case
- Careers on the Case
- Technology on the Case or Society on the Case

Experience science phenomena

Do more inquiry! Guided, Open-Ended, and Argument-Driven Inquiry labs let students actively engage with natural phenomena. Students **investigate** key questions, **apply science and engineering practices**, and **interpret data** as part of their results.

Quick Lab Open-Ended Inquiry

Make a Model of Mitosis

1. With your partner, discuss a plan for modeling the stages of mitosis. Choose available materials, such as yarn, chenille stems, or candy pieces, to represent the chromosomes. Then describe how to use the materials to demonstrate each stage.
2. Carry out your plan. Make sketches or take photographs of each stage.
3. Organize the sketches or photos to show all the stages of mitosis in the proper order. Add labels or captions to create a flip book, slide show, or video presentation.

ANALYZE AND CONCLUDE

1. **Use Models** How many chromosomes did you include in your model?
2. **Evaluate Models** How accurately does your model show an original cell and the two daughter cells that are produced after mitosis? Compare your model with other representations of mitosis, such as those shown in the lesson.
3. **Use Models** Use your model to explain mitosis to your classmates.

Quick Labs

- Interact with chapter concepts
- Focus on science and engineering practices
- Complete in a short period of time

Chapter Labs

- Customize and edit online in Pearson Realize™
- Conduct in-depth laboratory investigations
- Make and use models
- Plan and conduct experiments
- Aggregate, interpret, and present results
- Use appropriate laboratory equipment and technologies

In Your Neighborhood Lab Open Ended Inquiry

Teacher Support

Chapter 4 Lab

The Effect of Fertilizer on Algae

Guided Inquiry • Develop a Solution Lab

Students plan and carry out an investigation that tests the effects of fertilizer concentration on algae growth. They determine the concentrations of fertilizer to test, measure the amounts of algal growth, and construct a graph to analyze their data.

Expected Outcome	The population of algae increases with the amount of fertilizer that their environment receives.
Group Size	Groups of 4
Safety	Before conducting the lab, review with the class the safety precautions presented on the student page. Then discuss any safety precautions that are specific to your science laboratory or classroom.

Alternate Materials

- A sunny windowsill may be used instead of a grow light. However, the number of days required to see results may vary.
- For best results, use a high nitrogen-content fertilizer with N-P-K rating of 24-8-16. Other fertilizers, such as those used for indoor plants, may be substituted.
- Use bottled spring water. Do not substitute with tap water or distilled water.

Advanced Preparation (30 minutes)

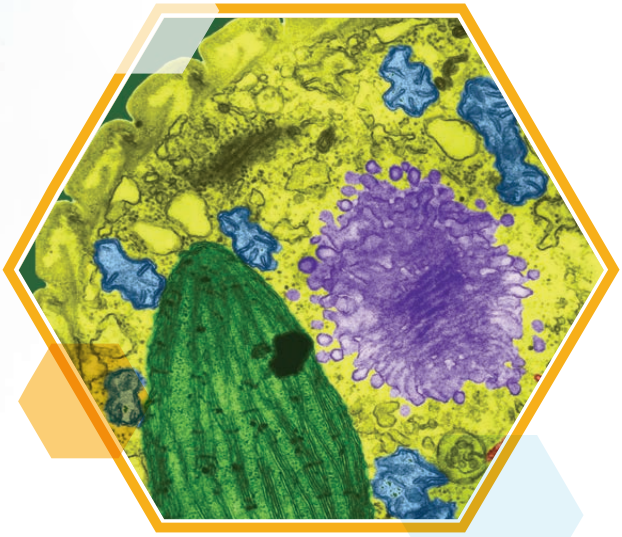
Develop a Solution Lab Guided Inquiry

The Effect of Fertilizer on Algae

Problem How do excess nutrients affect the growth of algae?

In this lab, you will plan and carry out an investigation that tests the effects of fertilizer concentration on algae growth. You will determine what concentrations of fertilizer to test, measure the amount of algal growth, and construct a graph to analyze your data.

You can find this lab in your digital course.



Virtual Labs

- Simulate the classroom lab experience
- Provide flexible, anytime online access
- Redo experiments quickly and easily
- Conduct a wider range of experiments
- No cleanup
- Render safety concerns obsolete

Biology beyond the classroom limits

Google Expeditions

Embark on 3D expeditions around the world.

LABSTER

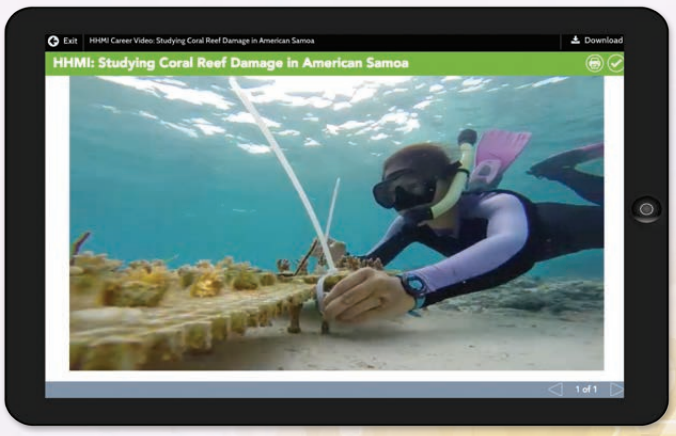
Test ideas in an award-winning, interactive virtual lab.

hhmi | Howard Hughes Medical Institute

Videos, animations, tutorials, and activities enrich the narrative and send students on an interactive journey.

HHMI Enrichment

Films and lectures include accompanying film guides, quizzes, hands-on activities, and lesson plans to increase their impact.

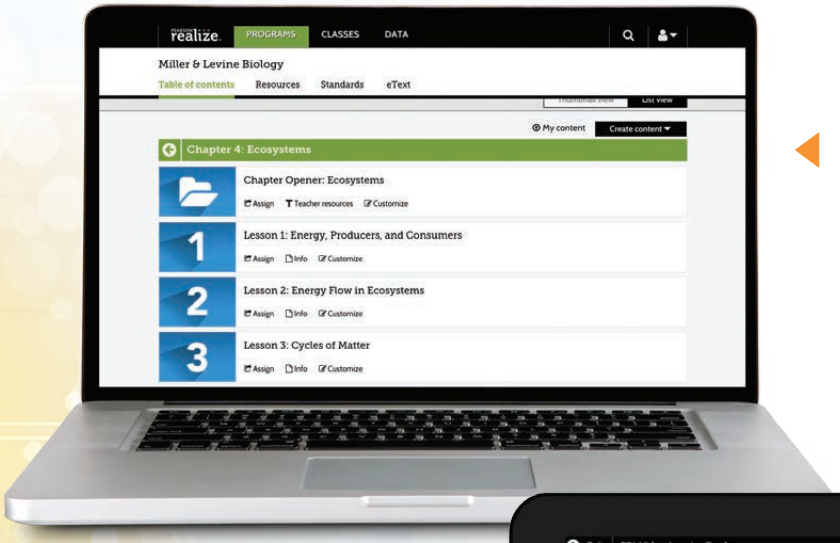


Realize a better way

PEARSON realize™

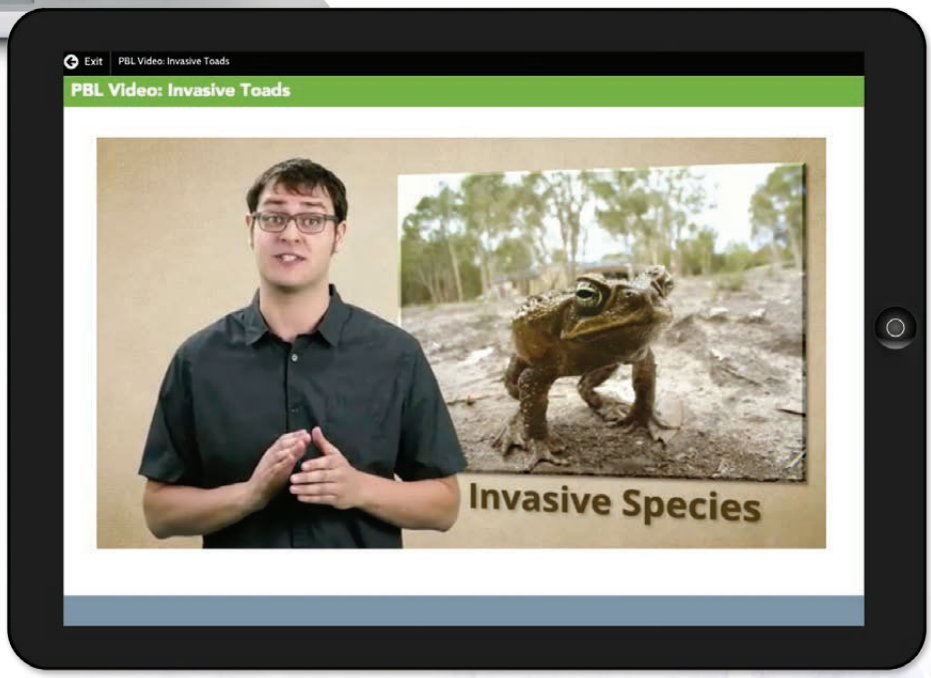
Realize.com is your online destination for ***Miller & Levine Biology***. A single sign-on provides access to all content, management tools, and real-time student data. Realize partners with edtech providers to create a seamless digital experience.

Register for a free trial at PearsonRealize.com.



Make It Your Own

Realize is fully customizable. Reorder chapters and lessons and upload, link, and edit your own resources. Find content quickly by Standard or Keyword.

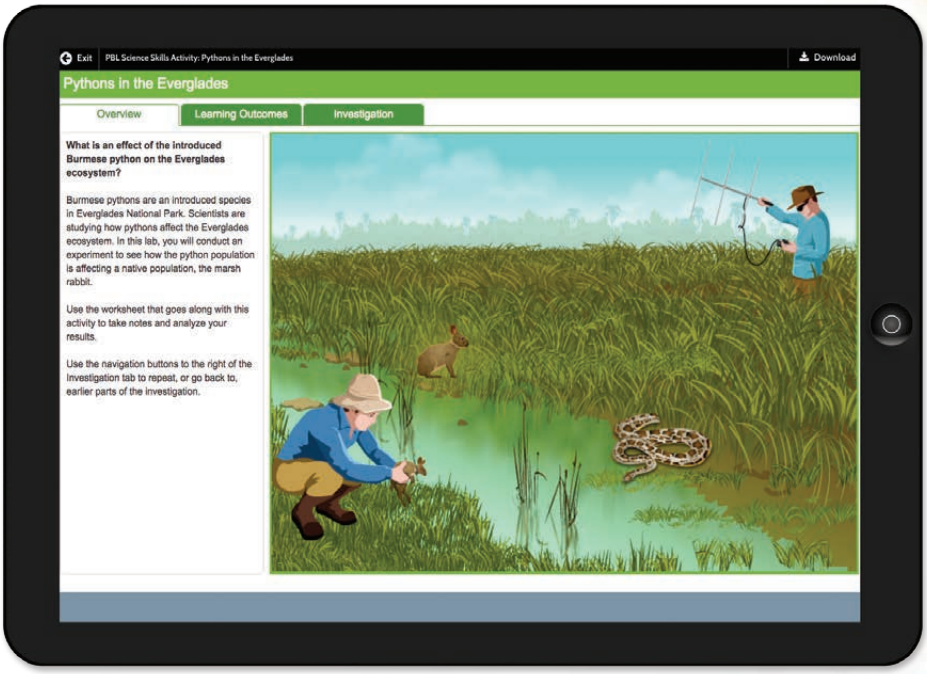


Online, Offline, Anytime!

The **Biology Student Edition eText** gives students access to assignments, content, and multimedia both online and offline. Everything syncs up when reconnected to the Web.

Access Student Data

Are students mastering New Standards? Get mastery reports, as well as real-time data on actual student activity. Monitor their progress and usage.



Interactive Learning

Students interact with digital art, videos, and animations through prompts or questions—making ***Miller & Levine Biology*** relevant to their lives.

Google® + PEARSON realize™

Add content to Google Classroom. Submit Google Drive documents to Realize. Seamless integration is in sync with teachers, students, and schools.

OpenEd

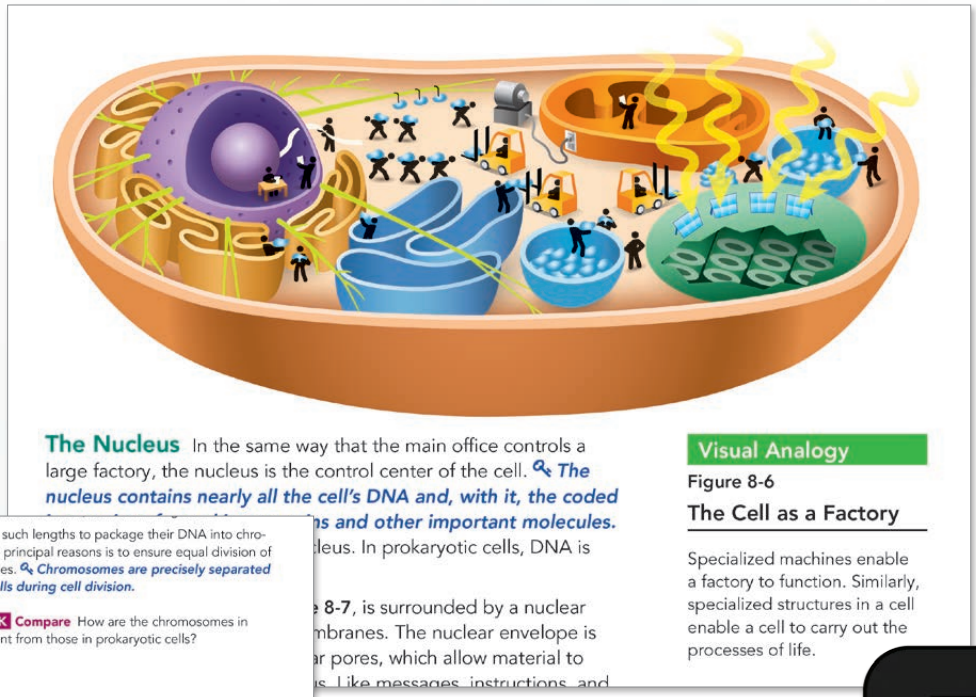
Search OpenEd resources and assign them with one click. Single sign-on, single-click assignments make it easy to add thousands of reliable, vetted resources.

Get the big picture

Are students stuck on memorizing facts? ***Miller & Levine Biology*** lets students "experience" science. **Visuals**, **interactivity**, and **built-in support** help students unpack information, ask questions, build understanding, and stay interested.

Visual Content

Visual Analogies, dynamic photos, illustrations, tables, and graphs help students understand each chapter's core ideas.



The Nucleus In the same way that the main office controls a large factory, the nucleus is the control center of the cell. *The nucleus contains nearly all the cell's DNA and, with it, the coded ...s and other important molecules.* ...leus. In prokaryotic cells, DNA is ...8-7, is surrounded by a nuclear ...mbranes. The nuclear envelope is ...r pores, which allow material to ...s. Like messages, instructions, and

Visual Analogy

Figure 8-6

The Cell as a Factory

Specialized machines enable a factory to function. Similarly, specialized structures in a cell enable a cell to carry out the processes of life.

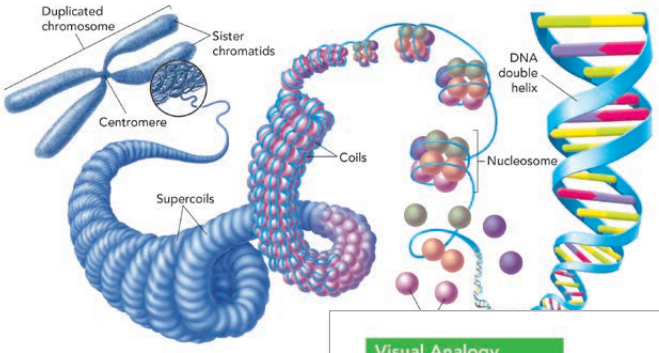
Figure 11-7

Eukaryotic Chromosome

As a eukaryotic cell prepares for division, each chromosome coils more and more tightly to form a compact structure.

Why do cells go to such lengths to package their DNA into chromosomes? One of the principal reasons is to ensure equal division of DNA when a cell divides. *Chromosomes are precisely separated into two daughter cells during cell division.*

READING CHECK **Compare** How are the chromosomes in eukaryotic cells different from those in prokaryotic cells?



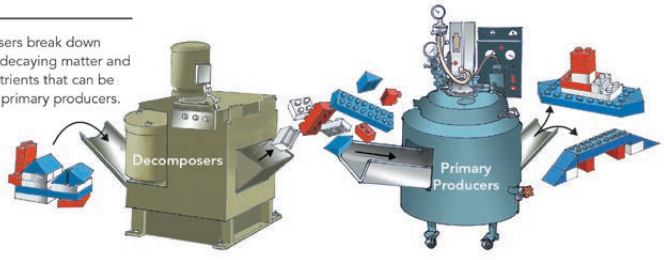
Visual Analogy

Figure 4-4

Earth's Recycling Center

Decomposers break down dead and decaying matter and release nutrients that can be reused by primary producers.

READING CHECK **Explain** How are food chains and food webs related?



VOCABULARY

habitat • tolerance
niche • resource
competitive exclusion principle • predation
keystone species
symbiosis • commensalism
mutualism • parasitism

READING TOOL

Identify each main idea and the supporting details under each heading as you read. Complete the chart in your **Biology Foundations Workbook.**

READING CHECK **Infer** What are the possible consequences to an organism when the temperature becomes colder than the lower limit of tolerance for a species?

Reading Support

Highlighted vocabulary and in-text definitions make content easier to digest. Scaffolds support close reading.

Find More in the Multilingual Glossary

English Language Development

Teaching strategies at point of use support language proficiency and ELD/ELA standards.

ENGLISH LANGUAGE DEVELOPMENT

Writing Students work in pairs to explain primary and secondary succession.

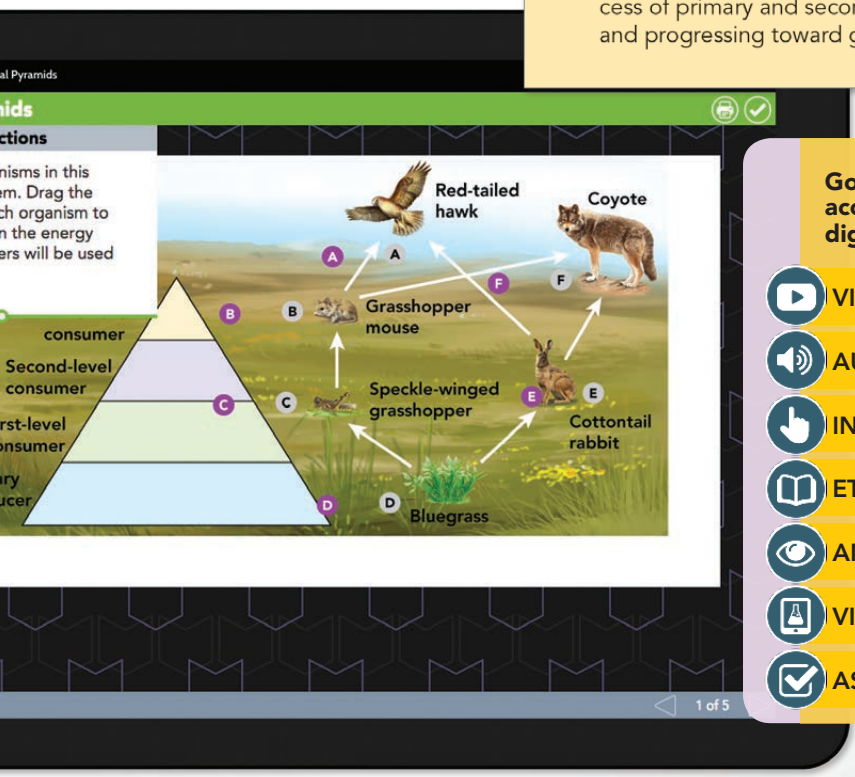
Entering Have students draw and add general labels to the illustrations in **Figure 6-8**.

Emerging Have one partner write sentences that combine successive steps in primary succession. The other partner completes the exercise for secondary succession.

Developing Have one partner write a one or two sentence precise and clear description of what primary succession is. Have the other partner do the same for secondary succession. Peer edit.

Expanding Have students write a summary in their own words of the processes of primary and secondary succession. Peer edit.

Bridging Have students write a brief explanation in their own words of the process of primary and secondary succession beginning with a general overview and progressing toward greater detail.



Go Online to access your digital course.

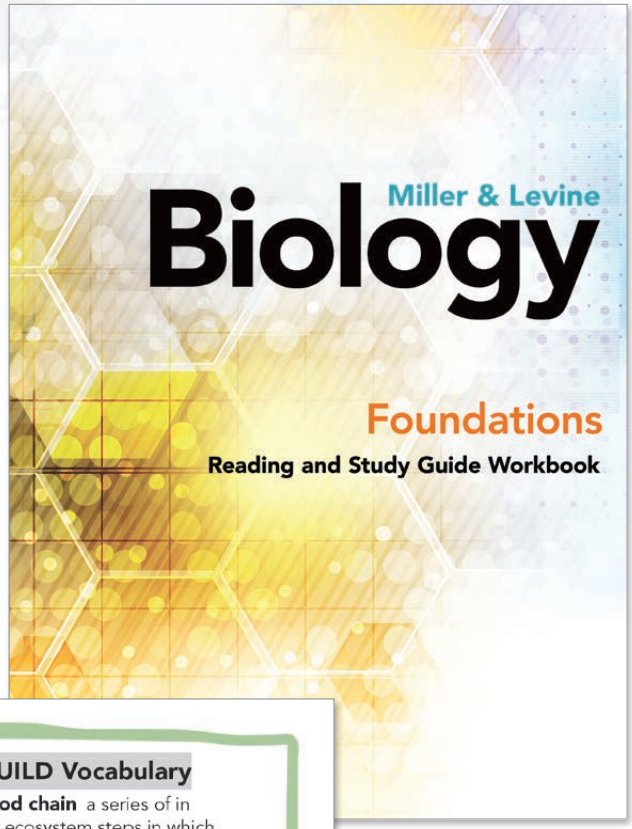
- VIDEO
- AUDIO
- INTERACTIVITY
- ETEXT
- ANIMATION
- VIRTUAL LAB
- ASSESSMENT

Interactive Content

The online digital course provides multiple ways to unlock core ideas and keep the interest level high.

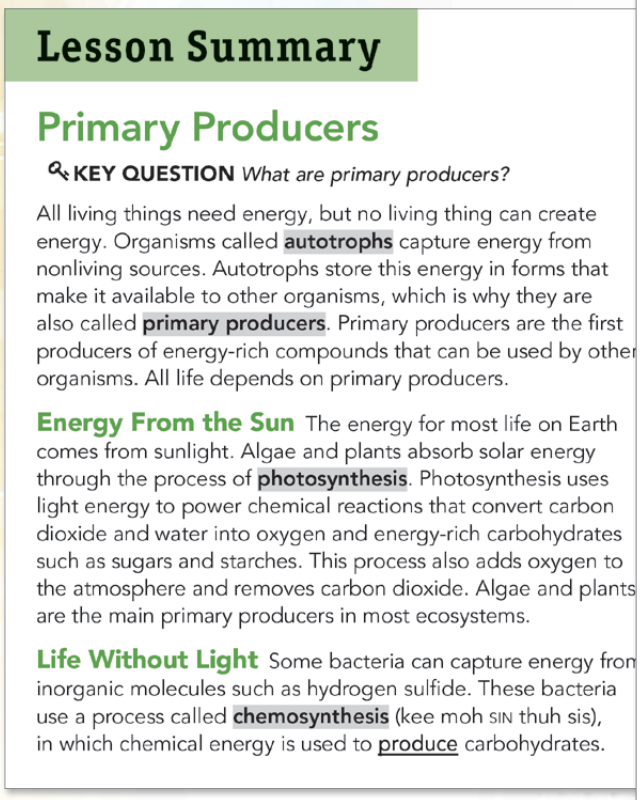
Literacy and accessibility

Science texts can challenge many students. The ***Biology Foundations: Reading and Study Guide Workbook*** provides lesson summaries, vocabulary help, and reading tools and strategies. Build science literacy and improve students' abilities to read complex scientific text and comprehend abstract concepts.



Lesson Summaries

Summaries help students recall key chapter content. A great study aid for the big exam!



Lesson Summary

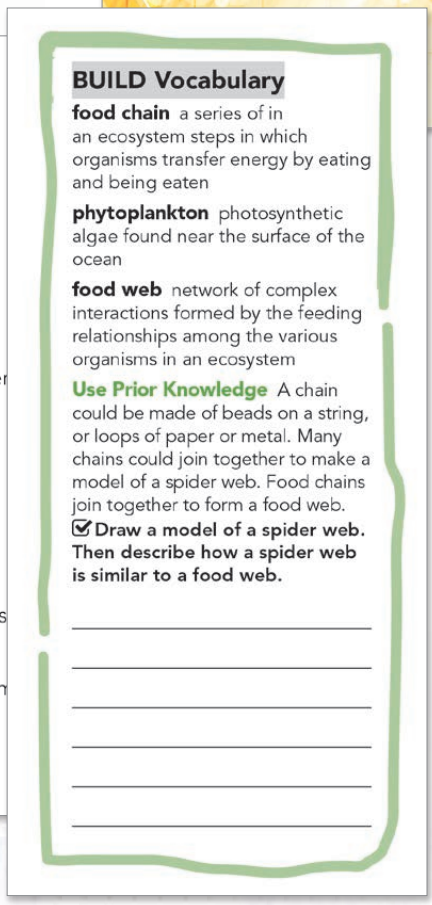
Primary Producers

KEY QUESTION *What are primary producers?*

All living things need energy, but no living thing can create energy. Organisms called **autotrophs** capture energy from nonliving sources. Autotrophs store this energy in forms that make it available to other organisms, which is why they are also called **primary producers**. Primary producers are the first producers of energy-rich compounds that can be used by other organisms. All life depends on primary producers.

Energy From the Sun The energy for most life on Earth comes from sunlight. Algae and plants absorb solar energy through the process of **photosynthesis**. Photosynthesis uses light energy to power chemical reactions that convert carbon dioxide and water into oxygen and energy-rich carbohydrates such as sugars and starches. This process also adds oxygen to the atmosphere and removes carbon dioxide. Algae and plants are the main primary producers in most ecosystems.

Life Without Light Some bacteria can capture energy from inorganic molecules such as hydrogen sulfide. These bacteria use a process called **chemosynthesis** (kee moh SIN thuh sis), in which chemical energy is used to produce carbohydrates.



BUILD Vocabulary

food chain a series of in an ecosystem steps in which organisms transfer energy by eating and being eaten

phytoplankton photosynthetic algae found near the surface of the ocean

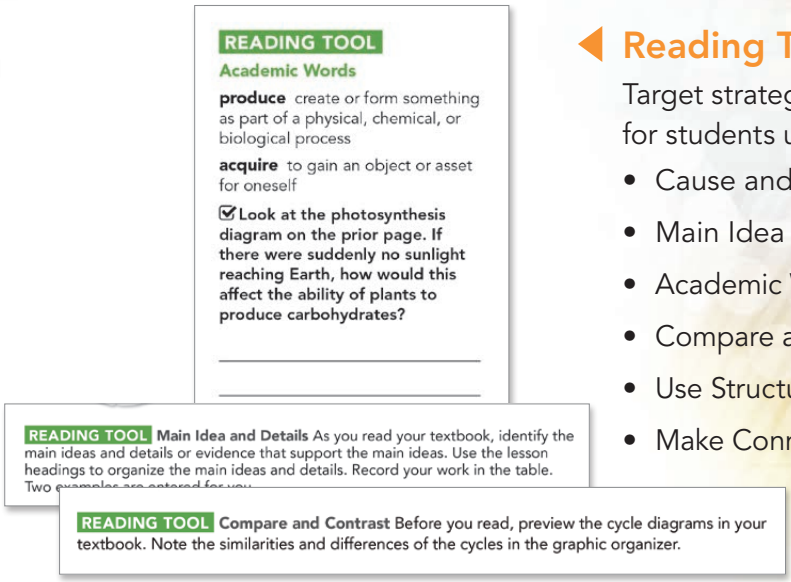
food web network of complex interactions formed by the feeding relationships among the various organisms in an ecosystem

Use Prior Knowledge A chain could be made of beads on a string, or loops of paper or metal. Many chains could join together to make a model of a spider web. Food chains join together to form a food web.

☑ **Draw a model of a spider web. Then describe how a spider web is similar to a food web.**

Science Vocabulary

Put the spotlight on new words and pronunciation to help students learn the language of biology. Extend practice for vocabulary development.


READING TOOL
Academic Words
produce create or form something as part of a physical, chemical, or biological process
acquire to gain an object or asset for oneself
☑ **Look at the photosynthesis diagram on the prior page. If there were suddenly no sunlight reaching Earth, how would this affect the ability of plants to produce carbohydrates?**
READING TOOL **Main Idea and Details** As you read your textbook, identify the main ideas and details or evidence that support the main ideas. Use the lesson headings to organize the main ideas and details. Record your work in the table. Two examples are entered for you.
READING TOOL **Compare and Contrast** Before you read, preview the cycle diagrams in your textbook. Note the similarities and differences of the cycles in the graphic organizer.

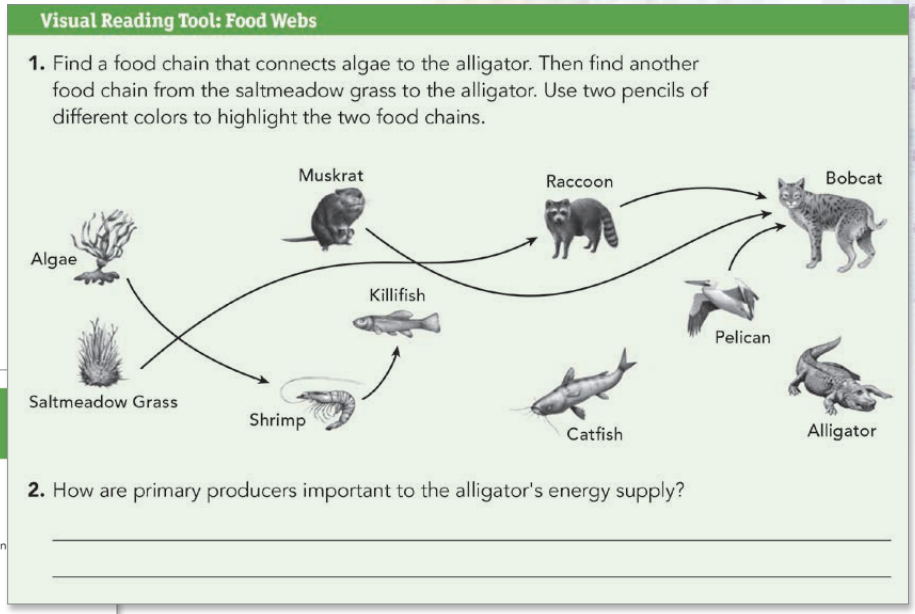
Reading Tools

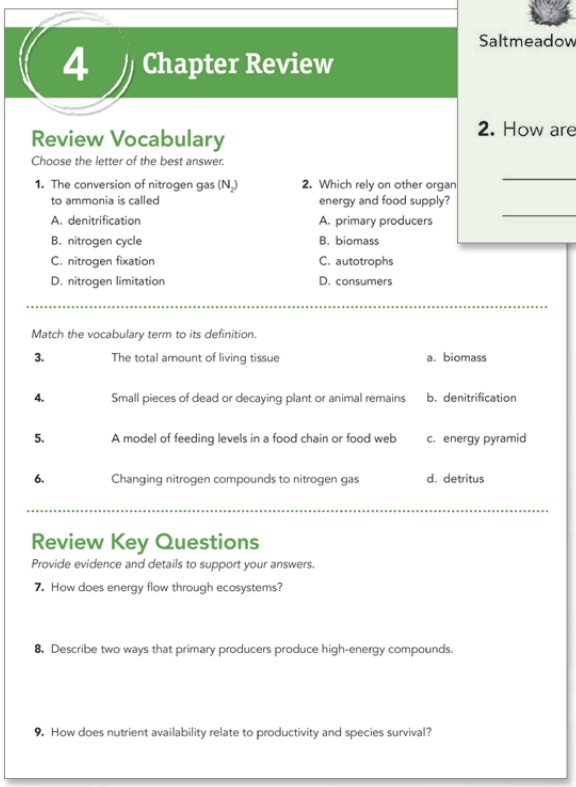
Target strategies to support reading comprehension for students using features such as:

- Cause and Effect
- Main Idea and Details
- Academic Words
- Compare and Contrast
- Use Structure
- Make Connections

Visual Reading Tools

Support difficult concepts with interactive visuals and alternative practice opportunities.


Visual Reading Tool: Food Webs
1. Find a food chain that connects algae to the alligator. Then find another food chain from the saltmeadow grass to the alligator. Use two pencils of different colors to highlight the two food chains.
Muskrat
Raccoon
Bobcat
Algae
Killifish
Pelican
Saltmeadow Grass
Shrimp
Catfish
Alligator
2. How are primary producers important to the alligator's energy supply?

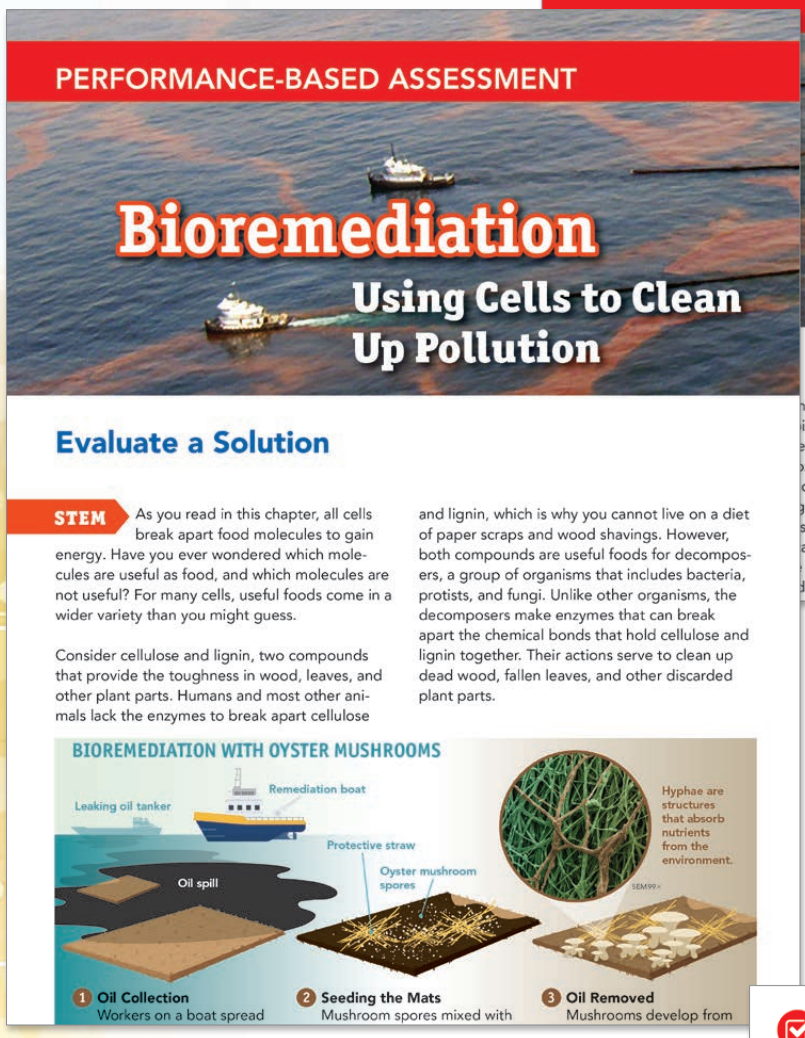

4 Chapter Review
Review Vocabulary
Choose the letter of the best answer.
1. The conversion of nitrogen gas (N_2) to ammonia is called
A. denitrification
B. nitrogen cycle
C. nitrogen fixation
D. nitrogen limitation
2. Which rely on other organ energy and food supply?
A. primary producers
B. biomass
C. autotrophs
D. consumers
Match the vocabulary term to its definition.
3. The total amount of living tissue — a. biomass
4. Small pieces of dead or decaying plant or animal remains — b. denitrification
5. A model of feeding levels in a food chain or food web — c. energy pyramid
6. Changing nitrogen compounds to nitrogen gas — d. detritus
Review Key Questions
Provide evidence and details to support your answers.
7. How does energy flow through ecosystems?
8. Describe two ways that primary producers produce high-energy compounds.
9. How does nutrient availability relate to productivity and species survival?

Chapter Review

The Chapter Review features open-response questions that require students to show an understanding of concepts using their own words.

Layers of insight

The practice-focused assessments in ***Miller & Levine Biology*** address multiple Depth of Knowledge levels, reflect three-dimensional learning, and utilize multi-question scenarios and performance-based tasks. Multiple and varied assessments occur in every chapter.



PERFORMANCE-BASED ASSESSMENT

Bioremediation

Using Cells to Clean Up Pollution

Evaluate a Solution

STEM As you read in this chapter, all cells break apart food molecules to gain energy. Have you ever wondered which molecules are useful as food, and which molecules are not useful? For many cells, useful foods come in a wider variety than you might guess.

Consider cellulose and lignin, two compounds that provide the toughness in wood, leaves, and other plant parts. Humans and most other animals lack the enzymes to break apart cellulose and lignin, which is why you cannot live on a diet of paper scraps and wood shavings. However, both compounds are useful foods for decomposers, a group of organisms that includes bacteria, protists, and fungi. Unlike other organisms, the decomposers make enzymes that can break apart the chemical bonds that hold cellulose and lignin together. Their actions serve to clean up dead wood, fallen leaves, and other discarded plant parts.

BIOREMEDIATION WITH OYSTER MUSHROOMS

ENGINEERING PROJECT

neers are finding new
ilities of bacteria, pro-
ese uses is the clean-
xic wastes! The term
describe any clean-up
things. Some bacteria
s food. Fungi are use-
ause of the powerful
enzymes can break
d toxic byproducts from

3. **Conduct Research** Look online for more information about the use of bioremediation, either to clean up oil spills or for other purposes. Compare the benefits and drawbacks of a bioremediation solution to other types of solutions that engineers proposed or considered.
4. **Communicate** Write a one-page essay or develop a computer presentation to share your findings. Address the following questions, as well as other questions that you researched.

Performance-Based Assessments

Authentic assessments of STEM learning allow students to demonstrate mastery of the chapter concepts and new standards.

Embedded Assessments

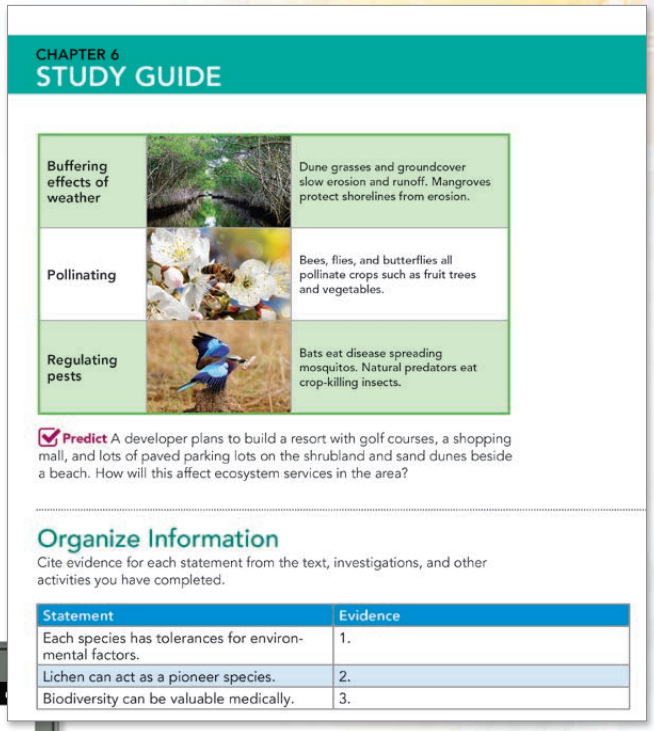
Formative assessments assist teachers in clarifying misconceptions and adjusting instruction as necessary.

ASSESS ON THE SPOT

Tell students that a biologist collected all the seeds from a meadow. When the seeds were compared, they showed a range of sizes all the way from 1 mm to 10 mm. Draw a range of seed sizes on the board. The biologist knows that there are 10 bird species that eat seeds from the meadow. What is the most likely relationship between bird species and seed size eaten that the biologist will find? Invite students to suggest patterns. (*Sample answer: Different species are likely to eat different sizes of seeds with very little overlap.*)

Chapter Study Guide

Summaries, graphic organizers, concept maps, and evidence-based questions create a reliable system of support.



CHAPTER 6
STUDY GUIDE

Buffering effects of weather		Dune grasses and groundcover slow erosion and runoff. Mangroves protect shorelines from erosion.
Pollinating		Bees, flies, and butterflies all pollinate crops such as fruit trees and vegetables.
Regulating pests		Bats eat disease spreading mosquitos. Natural predators eat crop-killing insects.

Predict A developer plans to build a resort with golf courses, a shopping mall, and lots of paved parking lots on the shrubland and sand dunes beside a beach. How will this affect ecosystem services in the area?

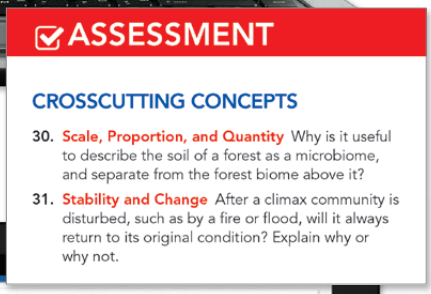
Organize Information

Cite evidence for each statement from the text, investigations, and other activities you have completed.

Statement	Evidence
Each species has tolerances for environmental factors.	1.
Lichen can act as a pioneer species.	2.
Biodiversity can be valuable medically.	3.

Editable Assessments

Online tools allow teachers to edit, assign, and print quizzes and tests.



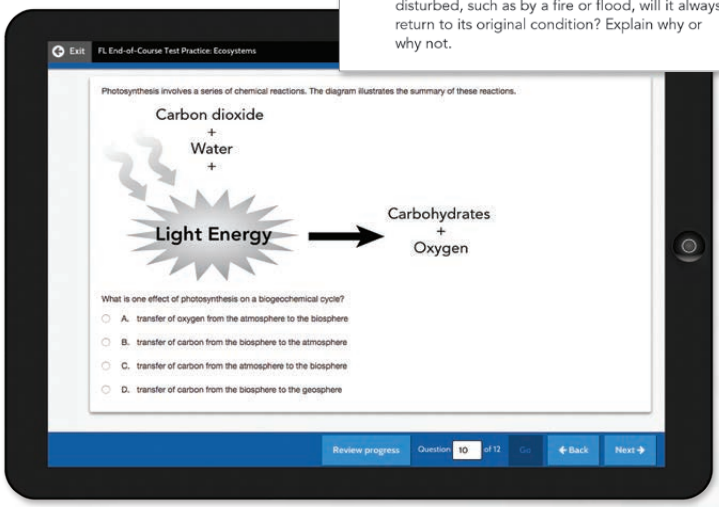
ASSESSMENT

CROSSCUTTING CONCEPTS

30. **Scale, Proportion, and Quantity** Why is it useful to describe the soil of a forest as a microbiome, and separate from the forest biome above it?
31. **Stability and Change** After a climax community is disturbed, such as by a fire or flood, will it always return to its original condition? Explain why or why not.

Three-Dimensional Assessments

Assessment tasks integrate science and engineering practices, crosscutting concepts, and disciplinary core ideas.



End-of-Course Test Practice

Students prepare for end-of-course exams with practice tests in every chapter and online in Pearson Realize™.

What's the problem?

Problem-based learning (PBL) poses a complex challenge that requires asking questions, making choices, and finding solutions. ***Miller & Levine Biology*** inspires learning with a student-centered pedagogy built around a PBL unit framework.

Digital Explorer's Journal: Problem-Based Learning Workbook

Define problems, make observations, record data, and brainstorm solutions! This interactive science workbook helps students navigate each unit's PBL activities.

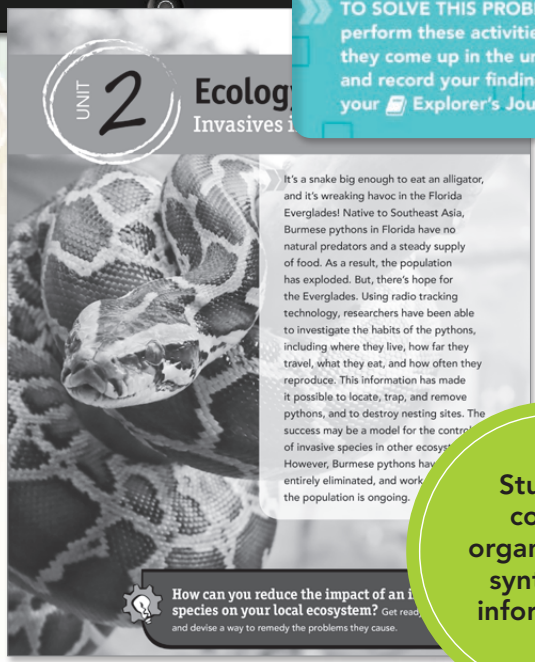
Path to problem solving

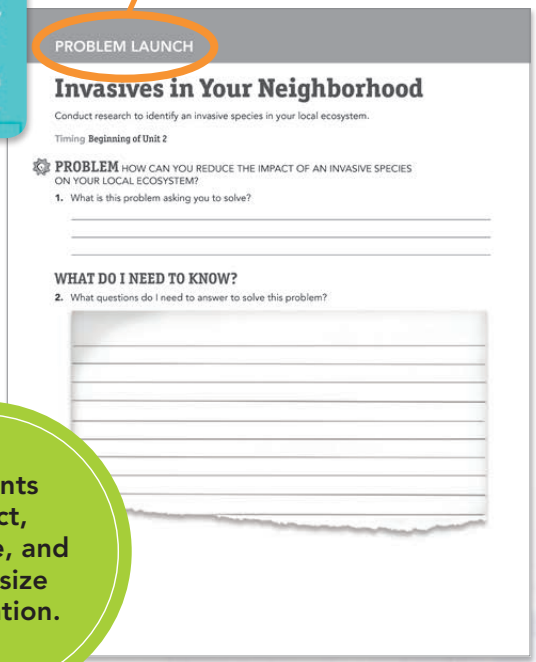
PROBLEM: How can you reduce the impact of an invasive species on your local ecosystem?

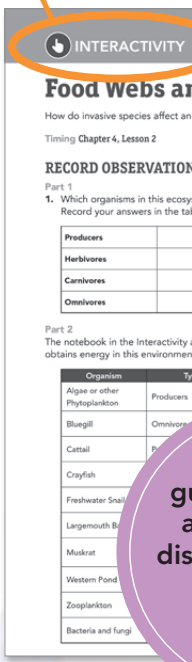
TO SOLVE THIS PROBLEM, perform these activities as they come up in the unit and record your findings in your Explorer's Journal.

PROBLEM LAUNCH
Choose an invasive species in your local ecosystem to focus on.

INTERACTIVITY
Explore invasive species' effects with an interactive food web.



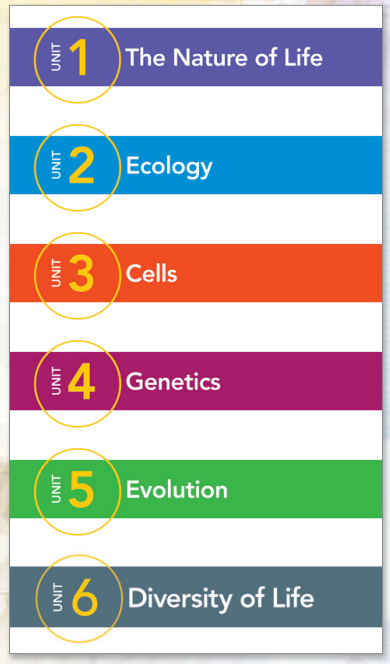




Students collect, organize, and synthesize information.

Problems that impact people

- **Unit 1 Problem:** How can you make fresh water from salt water?
- **Unit 2 Problem:** How can you reduce the impact of an invasive species on your local ecosystem?
- **Unit 3 Problem:** How can we maximize the production of useful biomass by micro-algae in bio-factories?
- **Unit 4 Problem:** For what purposes should humans genetically modify animals?
- **Unit 5 Problem:** What can a fossil from your region tell you about life long ago?
- **Unit 6 Problem:** How can you develop a species recovery plan?



VIRTUAL ACTIVITY

onduct a virtual estigation on how urmese pythons ct the Everglades ecosystem.

STEM PROJECT

Design a solution to help control the population of a local invasive species.

AUTHENTIC READING

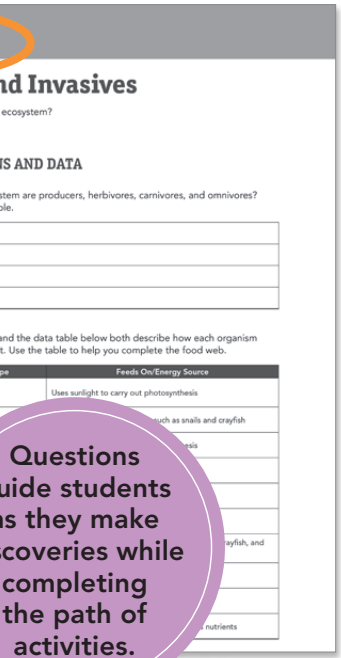
Read about how an invasive species is changing hemlock forests in the Smoky Mountains.

VIRTUAL ACTIVITY

Virtually test different strategies for controllong an invasive frog in the Southwest.

PROBLEM WRAP-UP

Present your findings, and propose a solution for reducing the impact of a local invasive species.


nd Invasives

ecosystem?

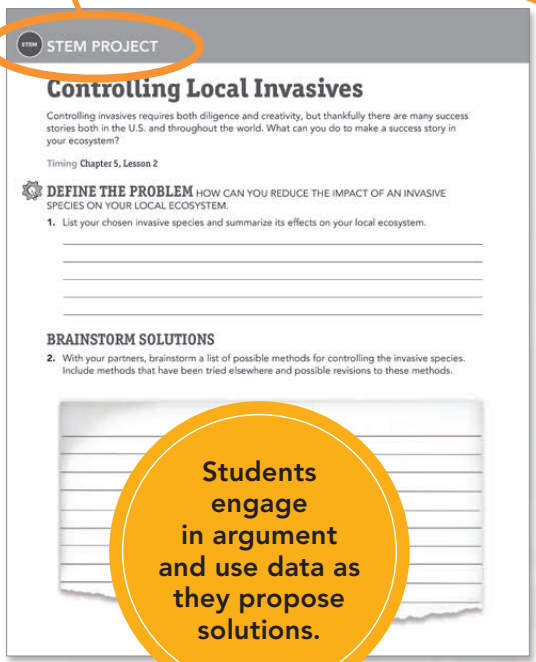
IS AND DATA

stem are producers, herbivores, carnivores, and omnivores?
ole.

nd the data table below both describe how each organism t. Use the table to help you complete the food web.

pe	Feeds On/Energy Source
	Uses sunlight to carry out photosynthesis
	uch as snails and crayfish
	nsels
	ayfish, and
	s nutrients

Questions guide students as they make discoveries while completing the path of activities.


STEM PROJECT

Controlling Local Invasives

Controlling invasives requires both diligence and creativity, but thankfully there are many success stories both in the U.S. and throughout the world. What can you do to make a success story in your ecosystem?

Timing Chapter 5, Lesson 2

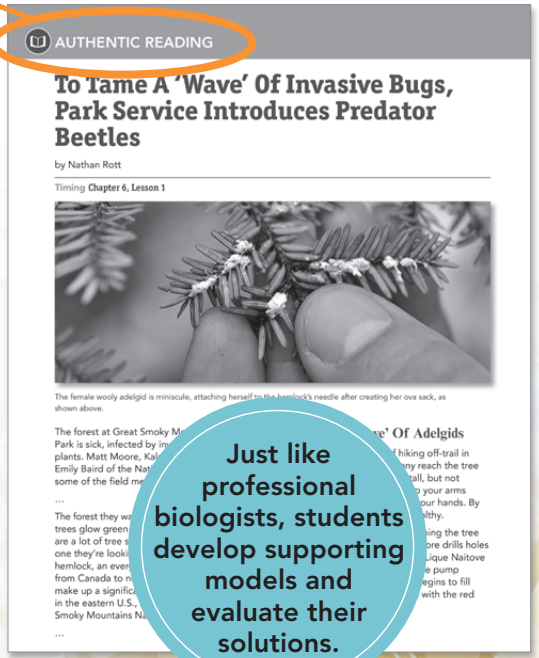
DEFINE THE PROBLEM HOW CAN YOU REDUCE THE IMPACT OF AN INVASIVE SPECIES ON YOUR LOCAL ECOSYSTEM.

1. List your chosen invasive species and summarize its effects on your local ecosystem.

BRAINSTORM SOLUTIONS

2. With your partners, brainstorm a list of possible methods for controlling the invasive species. Include methods that have been tried elsewhere and possible revisions to these methods.

Students engage in argument and use data as they propose solutions.


AUTHENTIC READING

To Tame A 'Wave' Of Invasive Bugs, Park Service Introduces Predator Beetles

by Nathan Rott

Timing Chapter 6, Lesson 1

The female wooly adelgid is miniscule, attaching herself to the hemlock's needle after creating her ova sack, as shown above.

The forest at Great Smoky M
Park is sick, infected by in
plants. Matt Moore, Kal
Emily Baird of the Nat
some of the field me

...

The forest they w
trees glow green
are a lot of tree s
one they're looki
hemlock, an ever
from Canada to n
make up a signific
in the eastern U.S.,
Smoky Mountains N

...

e' Of Adelgids

f hiking off-trail in
ny reach the tree
tall, but not
your arms
our hands. By
lthy.
ing the tree
ore drills holes
ique Naitove
e pump
egins to fill
with the red

Just like professional biologists, students develop supporting models and evaluate their solutions.

Future and forward thinking

Miller & Levine Biology prepares students for STEM-related fields and the modern workplace—for **college and careers**. A next-generation instructional model requires complex thinking skills, understanding crosscutting concepts, and STEM practices.

Next-Generation Instructional Model

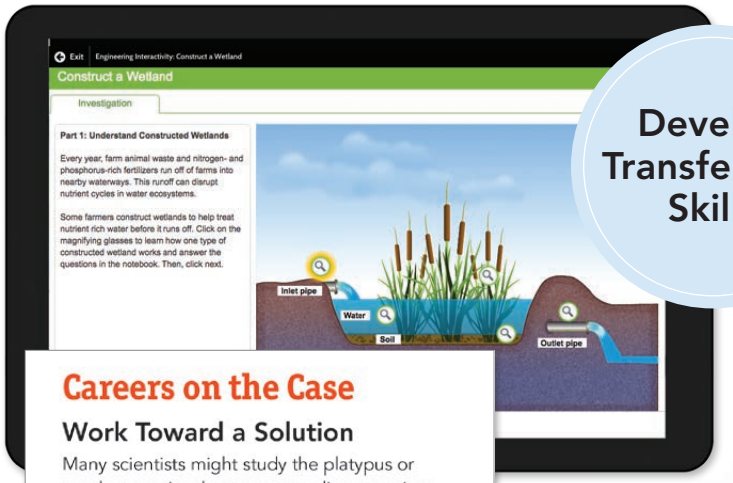
5E LEARNING
Intersects with 21st Century Competencies

CONNECT	INVESTIGATE	SYNTHESIZE	DEMONSTRATE
ENGAGE the mind with phenomena, linking what students know to their own personal experiences.	**EXPLORE** concepts and ideas while constructing knowledge and building meaning.	**EXPLAIN** and **ELABORATE** understanding by formulating ideas, arguments, and solutions using evidence.	**ELABORATE** and **EVALUATE** arguments by applying newly formed understandings and transferring knowledge to new situations.
ENGAGE	EXPLORE	EXPLAIN	ELABORATE / EVALUATE

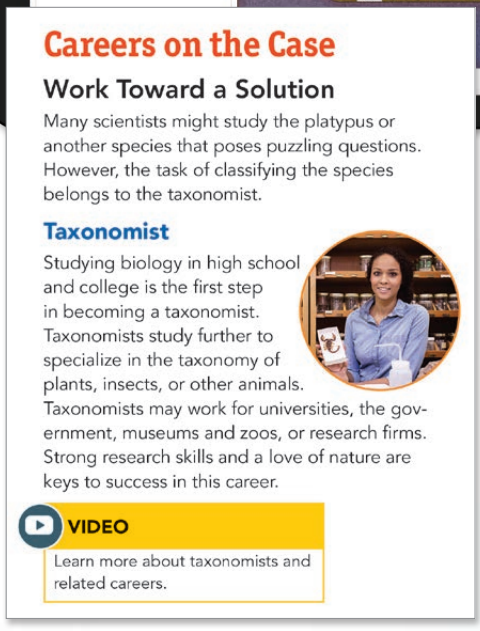
Miller & Levine Biology integrates **5E learning** in a new CISD Instructional Model (Connect, Investigate, Synthesize, Demonstrate). This model emphasizes the science and engineering practices that include obtaining, synthesizing, and communicating information.

Crosscutting Concepts

Students experience crosscutting concepts, such as stability and change, and systems and system models. These broader, related ideas transcend biology.



Develop Transferable Skills



STEM Opportunities

Miller & Levine Biology is a STEM curriculum aimed at inspiring students to pursue careers in science, engineering, math, and technology fields.

Focus on complex thinking skills

For College and Career Readiness

- Analyze and Interpret Data
- Apply Scientific Reasoning
- Ask Questions
- Cite Textual Evidence
- Construct an Argument
- Construct an Explanation
- Define the Problem
- Develop Models
- Draw Conclusions
- Evaluate and Use Models
- Evaluate Claims
- Form a Hypothesis
- Identify Variables
- Interpret Graphs
- Plan an Investigation
- Predict
- Summarize
- Support Claims
- Synthesize Information
- Write Procedures

Biology

Miller & Levine

Ignite Curiosity

Promote Understanding

Inspire Learning

For Students:

- Student Edition
- Student Edition eText
- Digital Explorer's Journal Problem-Based Learning Workbook
- Biology Foundations: Reading and Study Guide Workbook
- Pearson Realize™

For Teachers:

- Teacher Edition
- Teacher Edition eText
- Digital Explorer's Journal: Problem-Based Learning Workbook Teacher Edition
- Digital Biology Foundations: Reading and Study Guide Workbook Teacher Edition
- Exam*View*® Test Bank
- Pearson Realize™

PearsonSchool.com/MillerLevine

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PearsonRealize.com

Contact Your Pearson Representative

Answer your questions, set up a personal walkthrough, and learn about additional support.

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