

**Mc
Graw
Hill**

**Pilot Guide
High School**



Inspire Science

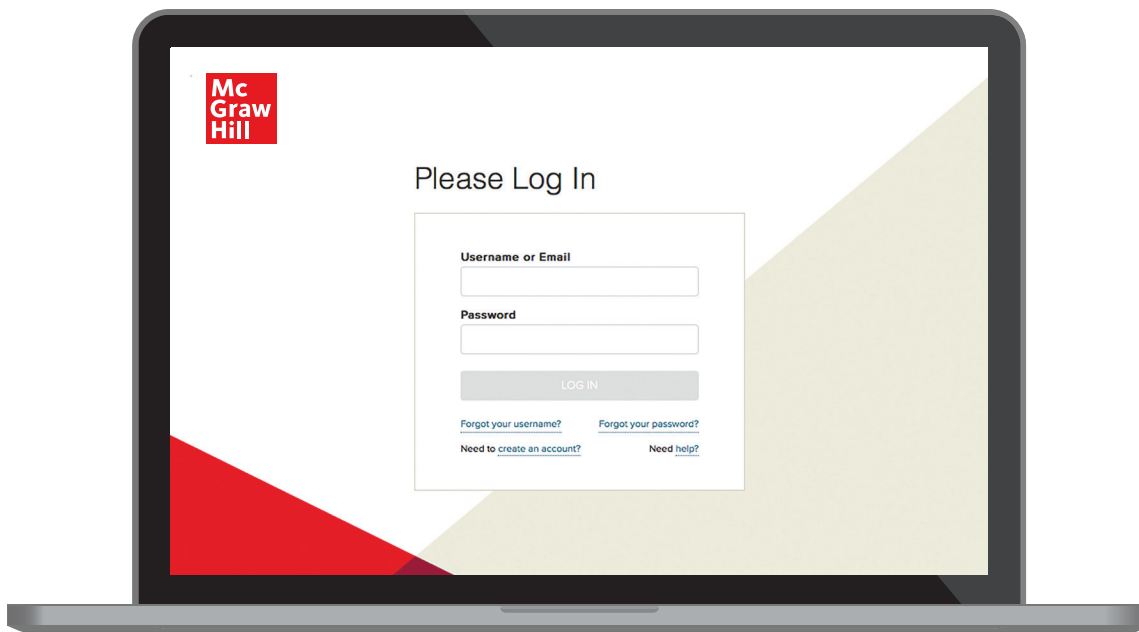
Explore Our Phenomenal World

inspire-science.com

Getting Started

GO ONLINE

Log onto **my.mheducation.com** to have full access to all of the **Inspire Science** High School series digital resources. Use your personal username and password to access your account. For a step-by-step guide to your pilot account, check out your **Inspire Science** High School series Digital Navigator found in your Pilot Pack or on the Pilot Landing Page.



QUESTIONS?

Our McGraw-Hill Education team is here to assist you throughout your pilot. For questions about **Inspire Science** High School series online, assistance setting up your account, forgotten login information or other technical issues, please contact your local pilot team representative at **(800) 836-1290** or email your questions to **clientservices@mheducation.com** and a representative will get back to you within 48 hours.

Welcome to Inspire Science

Dear Educator,

McGraw-Hill Education would like to thank you for piloting the **Inspire Science** High School series. We want to ensure your experience engages your students and meets your instructional needs, while allowing you to successfully review the curriculum for your district.

The **Inspire Science** High School series provides a phenomenon-driven, collaborative, learning experience designed to help spark your students' interests and empower them to ask questions.



By fostering student's innate **curiosity**, you elevate their critical thinking.



By facilitating hands-on **investigation**, you deepen their understanding.



By encouraging creative problem-solving, you inspire their **innovation**.

As you begin looking at your **Inspire Science** High School series materials, notice the rich print and digital resources available to you that will help you inspire your students, the next generation of innovators. As part of your pilot materials, you will receive an **Inspire Science** High School series Program Guide. Your Program Guide is the best place to get a complete overview of the program. The **Inspire Science** High School series is available to assist you throughout your pilot process!

Thank you again for your participation in this pilot. We are here to support you every step of the way. Please do not hesitate to reach out to your pilot team for support at any time. You can also visit the Pilot Landing page at any time for **Inspire Science** High School series support.

We hope this experience is inspiring for both you and your students.

Sincerely,

Your Pilot Support Team

Inspire Science

Explore Our Phenomenal World

Learning begins with curiosity. The *Inspire Science* High School series is designed to help you spark students’ interest and empower them to ask more questions, think more critically, and generate innovative ideas. Students bring solutions to everyday challenges through inquiry-based, hands-on investigations of real-world phenomena. The *Inspire Science* High School series is built with the proven 5E instructional framework and provides an in-depth, collaborative, evidence-based, and project-based learning experience to help you put your K–12 Science students on the path to career and college readiness.

Are you ready to inspire the next generation of innovators?

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Teacher's Edition: NGSS Success

The **Inspire Science** High School series is intentionally designed to gradually build knowledge and skills in all three dimensions. As students progress through the program, their knowledge builds from simpler concepts to more sophisticated ones. Learning progressions are specifically designed to build on prerequisite skills to mastery of Performance Expectations.

Next Generation Science Standards are designed to help you prepare students for career and college readiness through a more innovative approach to K–12 science education. This new approach requires a few shifts in science instruction and learning, and The **Inspire Science** High School series is designed to support you through each one.

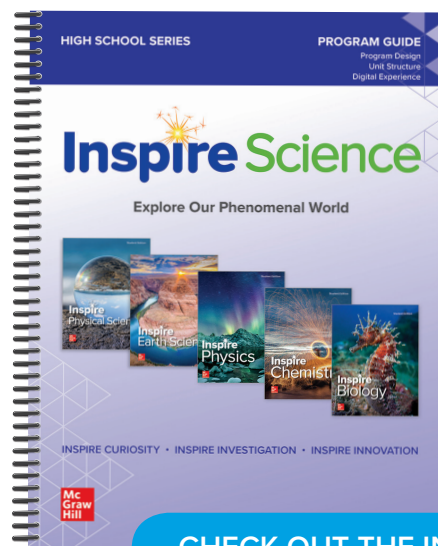


Example Student Edition



Key Shifts for NGSS Success:

- Three-Dimensional Learning
- Phenomena-Driven, Inquiry-Based, Hands-On Learning
- Evaluating Performance Over Testing Knowledge
- Integrated Engineering
- Depth Over Breadth
- Progressive Learning



CHECK OUT THE INSPIRE SCIENCE HIGH SCHOOL SERIES PROGRAM GUIDE FOR MORE INFORMATION ON NGSS SUCCESS

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Teacher's Edition: Module Planner

The Module pages provide a high-level look at what students will use to learn including key activities, resources in the module, as well as pacing recommendations to master the Performance Expectations.



Example Teacher's Edition

ASSESSMENT TOOLS

Preview the different types of Assessment Tools that are available throughout each module.

SUGGESTED PACING

Suggested pacing provides teachers with the ability to plan each and every lesson throughout the Inspire Science High School series.

INQUIRY ACTIVITIES

Labs and Investigations found in each lesson as well as a STEM Unit Project summary are clearly identified to encourage hands-on inquiry throughout the Inspire Science High School series.

Module Planner
 GO ONLINE to curate your presentations, interactive content, additional resources, and media library, and find answer keys, materials lists, rubrics, differentiated instruction, and more.

Module Resources

	Module Launch	Lesson 1	Lesson 2	Lesson 3	Module Wrap-Up
Pacing (min)	45	100	100	90	45
CER Claim, Evidence, Reasoning	Encounter the Phenomenon Make Your Claim	Collect Evidence	Collect Evidence	Collect Evidence	Revisit the Phenomenon Go Further: Data Analysis Lab
Labs and Investigations	LL: Problems in <i>Drosophila</i> World?	BioLab: Explore Habitat Size and Species Diversity VI: Model Ecosystems	QI: Construct a Food Web	QI: Test for Nitrates	
Media & OER				Beyond the Classroom: Google Expedition PT: Cycles	
Assess	Module Pretest	Lesson Check	Lesson Check	Lesson Check	Module Vocabulary Practice Module Test
Applying Practices			Ecological Pyramids HS-LS2-4	The Cycling of Matter and Flow of Energy in Aerobic and Anaerobic Conditions HS-LS2-3	

KEY: LL: Launch Lab QI: Quick Investigation VI: Virtual Investigation PT: Personal Tutor

Three-Course Model
 GO ONLINE If teaching a 3-course model, go online to find associated Earth and Space Science content.

EARTH AND SPACE SCIENCE
 Module: Relationships Between Humans and Earth
 • Earth's Surface Processes can be integrated after lesson 3 of this Module.

Module 2 • Principles of Ecology 228

THREE-COURSE MODEL

Inspire Science High School series meets your needs by incorporating and highlighting the nature of Earth and Space Sciences as an interdisciplinary pursuit within each high school program: *Inspire Biology*, *Inspire Chemistry*, and *Inspire Physics*.

Teacher Edition

A Driving Question Board (DQB) is a great way to foster inquiry in the classroom and encourage students to take charge of their learning.

Summary Tables provide students with records of the evidence they have gathered and the experiences carried out during the exploration of each unit. Students should explain their reasoning, describe the connection to the Unit and Module Phenomena, and identify the questions answered.



Example Teacher's Edition

Unit 1: Ecology

Student-Led Learning
Students can use Science Probes, Phenomenon-Driven Learning, Driving Question Boards, Summary Tables, and their Science Journals to collect evidence to answer their questions and apply to their Unit Projects.

SCIENCE PROBES Formative Assessment
How does energy move through ecosystems?
CCC Energy and Matter
Use this Science Probe to uncover student preconceptions about how energy flows from the Sun, to autotrophs, to heterotrophs, and then to decomposers. Some common preconceptions include that food webs are finite; ecosystems never come back; the number of people the Earth can withstand is infinite; humans do not impact the environment.

GO ONLINE to the Unit Resources for a printable student probe and teacher notes.

Phenomenon-Driven Learning
Use the Encounter the Phenomenon questions as the basis for the Driving Question Board.

ENCOUNTER THE PHENOMENON
UNIT 1: What might happen to the plants that are covered by kudzu?

MODULE 2: Why would a bird build a nest in a tree with thorns?
FOCUS QUESTIONS:
Lesson 1: What relationships among organisms might exist with a bird nest built in a thorny tree?
Lesson 2: How does energy flow through an ecosystem?
Lesson 3: How does matter flow through an ecosystem?

MODULE 3: Why would you grow a garden in a city?
FOCUS QUESTIONS:
Lesson 1: What is an ecological community?
Lesson 2: What characteristics do scientists consider when they are describing different regions of the world?
Lesson 3: What are some examples and characteristics of aquatic communities?

MODULE 4: Why are some populations declining?
FOCUS QUESTIONS:
Lesson 1: What are characteristics of populations and how are they determined?
Lesson 2: How can the decline of a single species affect an entire ecosystem?
Lesson 3: What methods are used to conserve biodiversity?

MODULE 5: What happens to this ecosystem if the river is destroyed?
FOCUS QUESTIONS:
Lesson 1: Why is biodiversity important?
Lesson 2: How can the decline of a single species affect an entire ecosystem?
Lesson 3: What methods are used to conserve biodiversity?

20A Unit 1 • Ecology

Preparing for the Unit

Implement the Driving Question Board

1 ASK QUESTIONS
Have students write any questions they have on sticky notes and place the sticky notes on the Driving Question Board (DQB). At the beginning of each Module, add the Module Encounter the Phenomenon Question to the DQB. Have students place the questions they think will be answered in the module underneath.

2 MAKE A SUMMARY TABLE
For each activity or reading the class does, have students record the evidence they find in the Summary Table. They should explain their reasoning, describe the connection to the Unit and Module Phenomena, and identify the questions they answered. Provide them with a space to add new questions that arise during their research.

Activity Model	Observation Evidence	Explanation Reasoning	Connection to Phenom	Questions Answered	New Questions
Applying Phenomena: The Cycling of Matter and Flow of Energy of Aquatic Communities	Some organisms die in the absence of oxygen.	There is a hierarchy with a food web with secondary consumers being towards the top.	Unit: Primary producers hold the most biomass in an ecosystem. Module: The loss of a species affects the entire ecosystem.		What would happen to an ecosystem if the primary consumers die off?

3 APPLY EVIDENCE
Students should use their evidence to carry out their unit project. They may also need to do additional research. This additional research may also answer some of their questions.

UNIT PROJECT	
Evidence	Answered Questions
	What would happen to an ecosystem if the primary consumers die off?

Unit 1 • Ecology 20B

PHENOMENON-DRIVEN LEARNING:

- Keep track of students learning as the unit progresses.
- Develop additional questions that lead students to answer the anchoring unit phenomenon question.
- Build knowledge of Performance Expectations that will be applied in the STEM Unit Project.

THE DRIVING QUESTION BOARD SUPPORTS THE STEPS:

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Instructional tools like this support project-based learning and inquiry by having students organize and focus on the evidence-based, iterative processes at the core of authentic science and engineering practices.

SUMMARY TABLES

- A Summary Table can consist of: Activities completed.
- Patterns or observations.
- Cause of the patterns.
- Connections to the phenomenon.

As students complete the activities in the unit, they will gather more evidence to complete the Summary Table. The evidence from the Summary Table can then be used to complete the STEM Unit Projects.

Formative Assessment Science Probes

One of the most effective ways to support conceptual learning is through formative assessment. That is why the **Inspire Science** High School series begins every unit with a formative assessment science probe to assess students' prior knowledge.

Science Probes present a real-world phenomenon or a core concept to promote student thinking and discussion, revealing commonly-held preconceptions and initial ideas that student bring to their learning. The **Inspire Science** High School series program guide provides numerous Professional Development opportunities from our Science Probe authors.

Check out the Pilot Landing Page for more information on Science Probes from our authors Page Keeley, M.Ed and Joyce Tugel.

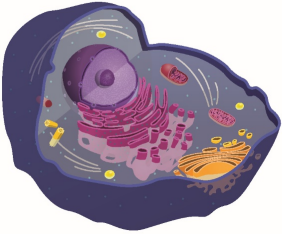


CHECK OUT THE PROGRAM GUIDE

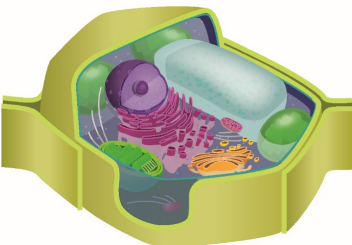
FOUND ONLINE ONLY 

Where does the energy go?

Animal Cell



Plant Cell




All living cells use energy to carry out biological processes. Put an X next to any of the ways that energy is used in plant and animal cells.

- A. Animal cells use respiration to release and store energy.
- B. Plant cells use respiration to release and store energy.
- C. Animal cells capture light energy and convert it to chemical energy.
- D. Plant cells capture light energy and convert it to chemical energy.
- E. Energy is stored in chemical bonds in cells.
- F. Some energy is lost and no longer exists when chemical reactions take place in cells.
- G. Energy is converted to matter when chemical reactions take place in cells.

ADDITIONAL RESOURCE

Science Probe



INSPIRE TIP:

Resist the temptation to give students the answer to the Science Probe! Student preconceptions are revealed as they use evidence and reasoning to support their answers. Students' own preconceptions might lead them to the wrong answer, but they will revisit the probe throughout the lesson to see how their thinking has changed.

GO ONLINE

Looking to spark conversation? Getting students talking about science is fun and easy with Joyce Tugel's productive discussion strategies. While a strategy is recommended for each science probe, over 20 strategy videos are included with the **Inspire Science** High School series. Visit the Professional Learning located under Course Materials tab to watch these videos.

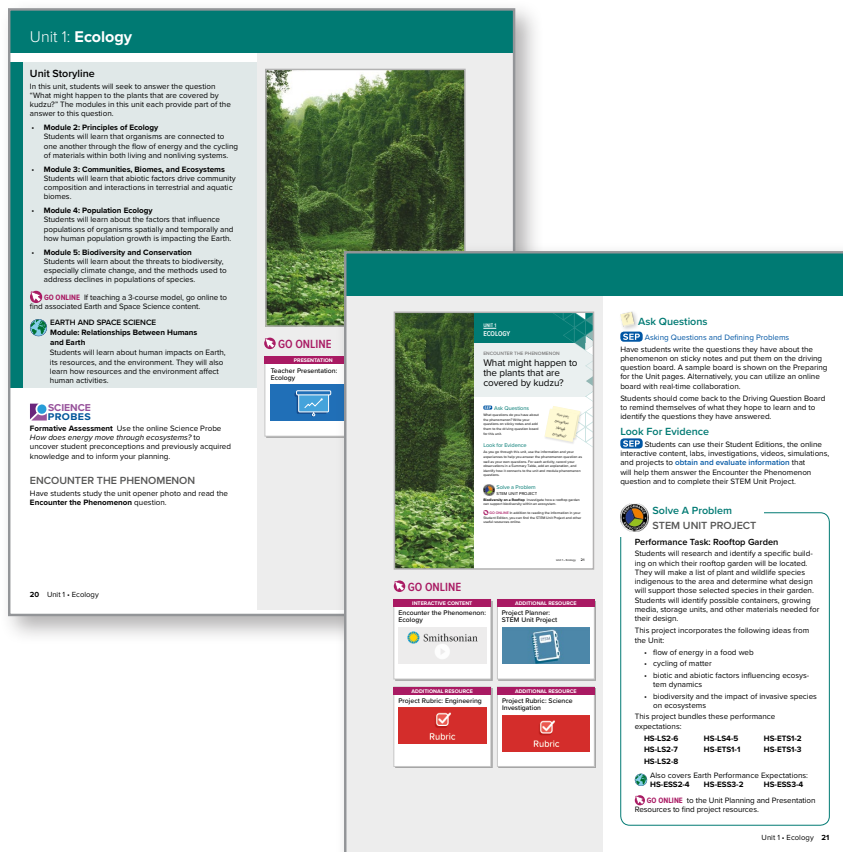
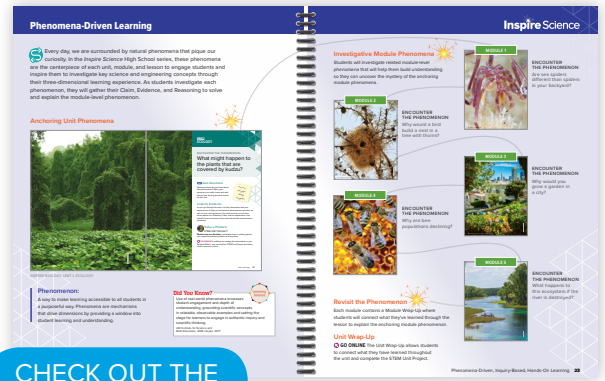
INSPIRE ALL STUDENTS:

The complex language of science can get in the way of your English Language learners accessing the content. At the module and lesson level of your Teacher's Edition, the **Inspire Science** High School series offers scaffolded activities that give specific language support to Emerging, Expanding, and Bridging English Language learners.

Phenomena-Driven Learning

Every day, we are surrounded by natural phenomena that pique our curiosity. In *Inspire Science* High School series, these phenomena are the centerpiece of each unit and module to engage students and inspire them to investigate key science and engineering concepts through their three-dimensional learning experience. As students investigate each phenomenon, they will gather their Claim, Evidence, and Reasoning to solve and explain the anchoring module-level phenomenon.

Check out the Pilot Landing Page for more information on Phenomena - Driven Learning.



INSPIRE TIP:
Look for the “Encounter the Phenomenon” labeling found at the beginning of each unit and module. Throughout the unit students will be directed to revisit their earlier understandings to see how their thinking has changed and uncover the mystery of the anchoring module phenomena.

GO ONLINE
Use the *Encounter the Phenomenon* Interactive Content to encourage your students to experience the phenomenon up close. This content is found online in the Unit Opener tab.

INSPIRE ALL STUDENTS:
Phenomenon-Driven instruction levels the playing field for learners by allowing them to access the core science content through a shared experience observing a highly relevant real-world phenomenon. When students feel a personal connection to the phenomenon they are more invested in aggregating the knowledge needed to explain the event. It is through these shared occurrences and supported instruction that learning is truly accessible to **ALL** students as they work towards achieving their learning goals.

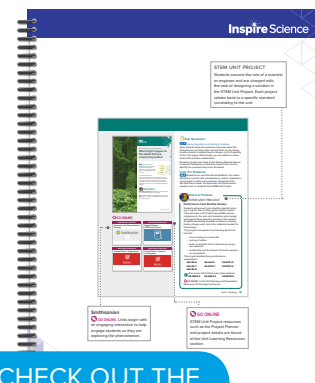
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STEM Unit Project

Each Unit of the *Inspire Science* High School series begins with the STEM Unit Project. Your students will assume the role of a scientist or an engineer and are charged with the task of designing a solution to the related Science or Engineering challenge. After each unit, they will reflect on that they have learned and how that can be applied to their project.

Build excitement and get students curious about what they will be learning with STEM Unit Project that introduces the Science or Engineering Challenge then challenges students the task of designing a solution.

Check out the Pilot Landing Page for more information on STEM Module Projects.



INSPIRE TIPS:

The *Inspire Science* High School Series was built with Crosscutting Concepts (CCC) seamlessly embedded into the program. Look for the call-outs throughout the program.

GO ONLINE

Go Online to find the Math and Literacy Handbook. Each of these handbooks provides background information, student support, and examples that get students ready to make the connections.

INSPIRE ALL STUDENTS:

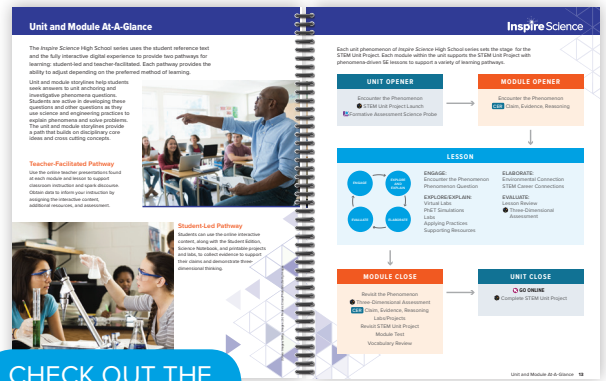
The *Inspire Science* High School series uses the student reference text and the fully interactive digital experience to provide two pathways for learning: student-led and teacher-facilitated. Each pathway provides the ability to adjust depending on the preferred method of learning.

5E Instructional Support

The 5E Instructional Model provides a proven, research driven lesson flow with the flexibility to adjust as needed for your classroom needs.

The **Inspire Science** High School series includes a variety of assessment options to support teachers with differentiation strategies and support students on their journey to mastery of the Performance Expectations.

Check out the Pilot Landing Page for more information on the Inspire Science 5E Instructional Model.



CHECK OUT THE PROGRAM GUIDE

Lesson 1: Organisms and Their Relationships

DCI Organization for Matter and Energy Flow in Organisms
LS1C As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products.
***bold font** indicates the part of the DCI covered in this lesson.

Engage
 Launch the Lesson Interactive Content can be assigned the night before class as a lesson preview, during class to spark discussion, as a resource during inquiry, or as homework.

Driving Question Board
 Have students revisit the DQB to remind themselves of the Unit and Module questions. Have them identify the sticky note questions they think will be answered in this lesson. Then, have students read the **Focus Question** and add to the DQB. Students will revisit the **Focus Question** at the end of the lesson.

Explore and Explain
Science Journal Remind students to keep records of their investigations in their Science Journals. Additionally, be sure that each reading or activity is added to the class Summary table.
Three-Dimensional Thinking The activities called out in the Student Edition will allow students to practice three-dimensional thinking. Worksheets for these activities can be found online.

Reading Strategy
Self-Monitor Comprehension Have students ask themselves questions as they read. If they finish a paragraph and have a question that has not been answered, they should reread the text where the question may be answered. If they still cannot answer it, they should write down the question and ask the teacher or another student to help to answer it. This will help students understand the concepts. It may be useful to walk through the room and prompt students with questions while they read.

Get It?
 Answers will vary, but should include reasonable and specific examples of biotic and abiotic factors and how they interact.

24 Module 2 • Principles of Ecology

Lesson 1: Organisms and Their Relationships

Elaborate
 Return to the DQB and have students determine what questions they can answer. At this point, they should be able to answer the **Focus Question**.

Evaluate
Formative Assessment Check
 Have students differentiate between the three categories of symbiosis and give an example of each. The three categories are **mutualism, commensalism, and parasitism**. Examples will vary.
Remediation Give each student three index cards. Have them write the types of symbiosis explained in this lesson on one side and make a visual cue on the other side. One helpful way for students to visualize is to use plus and minus signs. For example, with mutualism, both organisms benefit, so it can be represented with +/+; Parasitism: +/–, and commensalism: +/0 (0 can represent no effect). Then allow students to trade cards with the code side up and identify the type of symbiosis. Have students use the cards to quiz each other on these relationships.

Check Your Progress
 1. Unfavorable factors might restrict the population numbers and ability to reproduce. Some factors that are unfavorable to one species might be favorable to another.
 2. Temperature defines a polar bear's community and ecosystem. The bear's food sources and its physiology are adapted to the cold temperatures.
 3. Fever organisms will be found in their zone of physiological intolerance than in their tolerance zone.
 4. Answers will vary depending on student choices. All answers should clearly distinguish between a habitat (which is an area) and a niche (which is a role).
 5. The steelhead trout will grow more slowly in their zone of physiological stress.
 6. Catfish can tolerate a temperature from 10°C to 25°C.

Formative Assessment: Lesson Check
GO ONLINE You might want to assign from the Additional Resources the pre-made Lesson Check based on key concepts and disciplinary core ideas, or you can customize your own using the customization tool.

34 Module 2 • Principles of Ecology

INSPIRE TIPS:
 The **Inspire Science's** High School series phenomena-driven 5E lessons are designed to provoke critical thinking and spark creative problem-solving. Use the 5E lessons in **Inspire Science** High School series to encourage deeper thinking in each and every student.

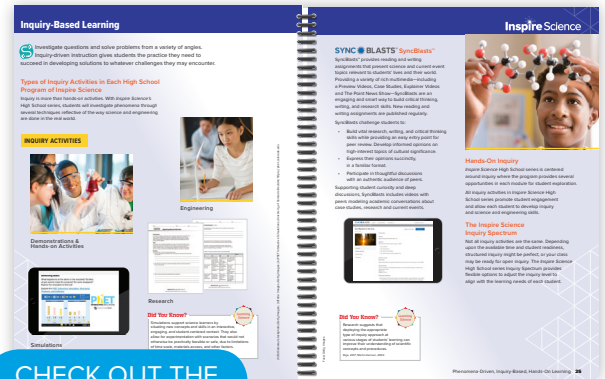
GO ONLINE
 Go Online to find support at every step of each 5E lesson in **Inspire Science** High School series. Each unit includes online LAB support to interactive content to encourage students to drive their own learning.

INSPIRE ALL STUDENTS:
 Challenge your students to push themselves to be the best and do the best they can. All students learn differently and **Inspire Science** High School series provides opportunities for all learners to be successful.

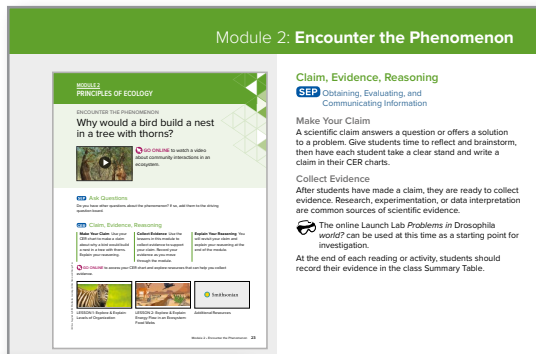
Inquiry-Based Learning

Every unit in the **Inspire Science** High School series offers multiple inquiry-based activities. Inquiry-driven instruction gives your students the practice they need to succeed in developing solutions to whatever challenges they encounter. Your students will use their findings from these activities to communicate their understanding through the STEM Unit Project.

Check out the Pilot Landing Page for more information on Inquiry-Based Learning.

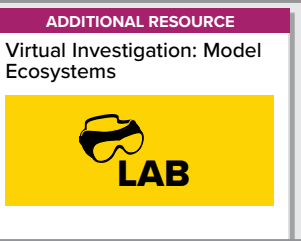
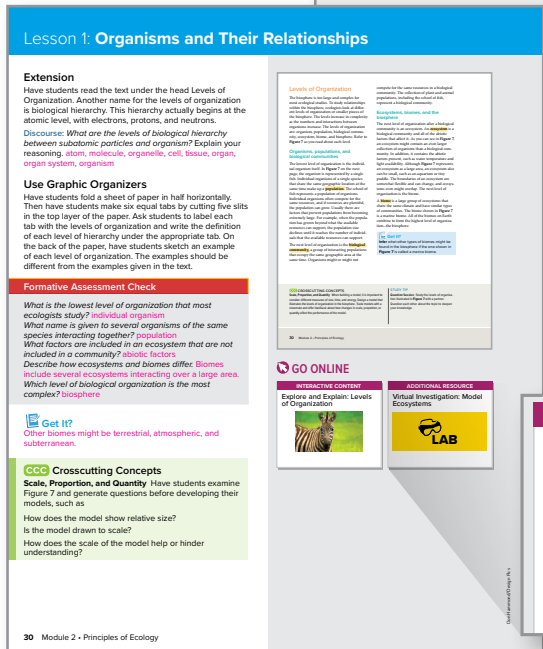


CHECK OUT THE PROGRAM GUIDE



INSPIRE TIPS: Inquiry is more than hands-on activities. With the **Inspire Science** High School series, students investigate phenomenon through several techniques, such as data analysis, engineering, hands-on, research, and simulations. Check out the Module Planner at the beginning of each module to see how, what, and where your students will be participating in inquiry activities.

GO ONLINE Interactive Content Videos demonstrate and provide direction and inspiration for all students. Find them online throughout each Unit and in the Professional Learning Library under course materials.



INSPIRE ALL STUDENTS: The level of support needed in your classroom for the Inquiry activities may be adjusted based on your students and the content. Use the Teacher-Facilitated Pathway or the Student-Led Pathway depending on the preferred method of learning.

Differentiation and EL

Rooted in learning sciences research, the **Inspire Science** High School series applies the best instructional practices for teaching EL students. Each module and lesson has scaffolded activities designed to meet the English Language Development Standards and offers students of any level of English language proficiency the opportunity to engage in academically challenging science and engineering content.

Check out the Pilot Landing Page for more information on Differentiation and EL.

The program guide features a 'LEARNSMART' section with 'Adult Learning' and 'Possible Implementation to Match Your Classroom Needs' (Model 1, Model 2, Model 3). It also includes 'Did You Know?' facts and 'Distinguishing Phenomena'.

This lesson page includes a 'SEP Quick Practice' on 'Engaging in Argument from Evidence', 'Writing Support' for 'Informal Writing', and 'EL Support' for 'ELD PI.9/10.3'. It features a 'Driving Question Board' and 'IMPLEMENTATION OPTIONS' for both 'Presentation: Teacher-Facilitated Pathway' and 'Interactive Content: Student-Led Pathway'. A 'DCI Organization for Matter and Energy Flow in Organisms' section is also present.

INSPIRE TIPS:
The **Inspire Science** High School series has been designed to ensure that **ALL** students have access to quality, intellectually-rich science and engineering curriculum that supports language development and provides engaging learning opportunities. Encourage **ALL** students to engage with the phenomena provided to depend thinking and understanding of the topic at hand.

GO ONLINE
Go Online to find additional scaffolded strategies for instruction including: Approaching Level and Beyond Level support.

INSPIRE ALL STUDENTS:
The **Inspire Science** High School series lessons carefully integrate reading, writing, speaking, listening, and collaboration into each lesson. By doing so EL students are given a purpose to use the language in a meaningful way and have access to resources so they can convey their understanding.

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Inspire Curiosity



Inspire Investigation



Inspire Innovation



Learn more at inspire-science.com

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