K-5

Program Guide

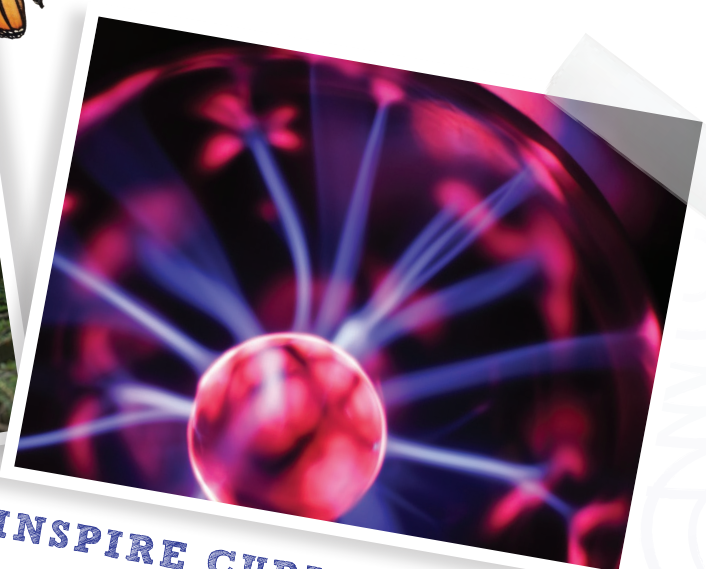
Program Design
Module and Lesson Structure
Digital Experience

Inspire Science

Start your journey on the path to NGSS success by using this guide.

INSPIRE INNOVATION

INSPIRE INVESTIGATION



INSPIRE CURIOSITY

GET INSPIRED!

See page 1 for the list of the inspiring features you won't want to miss!

Mc Graw Hill

Inspire Science

Explore Our Phenomenal World

Use this Program Guide to learn about the the overall program design, the module and lesson structure, and the digital experience that align *Inspire Science* 100% to Next Generation Science Standards (NGSS) and the Science Framework.

Program Design **4**

Learn about the pedagogical philosophies and instructional design strategies that serve as the foundation for *Inspire Science*.

- Key Shifts for NGSS Success
- Scope and Sequence
- Module Experience At-A-Glance
- Resources At-A-Glance
- Phenomena-Driven Learning
- Inquiry-Based Learning
- Hands-On Learning
- Inspire All Students
- Cross-Curricular Connections
- STEM Connections
- Next Generation Assessment Strategies
- Professional Learning
- Authors and Partners

Module and Lesson Walk-Through **32**

Tour a sample module and 5E lesson to begin experiencing the *Inspire Science* classroom.

- Formative Assessment Science Probes
- Engaging Phenomena to Explore
- STEM Module Projects

Digital Experience **57**

Learn more about the engaging interactive resources in the *Inspire Science* digital experience.

- Course Dashboard
- Module and Lesson Landing Pages
- Digital Resource Types and Learning Impact

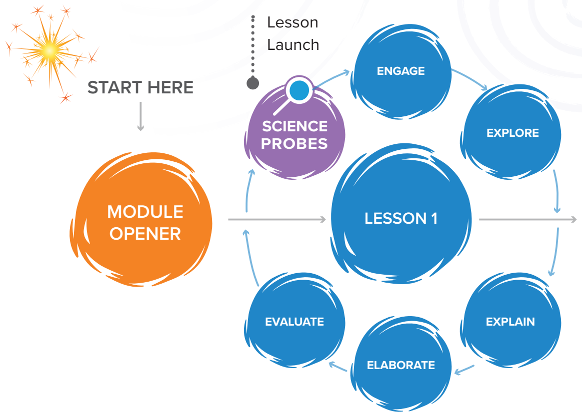
Get Inspired!

CHECK IT OFF

Make sure to see these inspiring features as you review this program guide!

A Next Generation Instructional Model

Take a close look at the Module and Lesson Design on **pages 10–11** to see how *Inspire Science* is designed for three-dimensional learning.



Rethinking Opportunities

With *Inspire Science*, your students will think, investigate, and rethink in every lesson—just like real-world scientists and engineers do. Look for these examples of these circling back opportunities on these pages:

- Collect Evidence Prompts and the CER Framework, **pages 47** and **50**
- Revisit the Science Probe, **page 43**
- Explain the Phenomenon, **page 52**

Chris Keeley Photography

PAGE KEELEY SCIENCE PROBES

Each *Inspire Science* lesson begins with a Formative Assessment Science Probe.

Phenomena-Driven Learning

See how phenomena drive the *Inspire Science* learning experience on **page 14.**

ENCOUNTER THE PHENOMENON

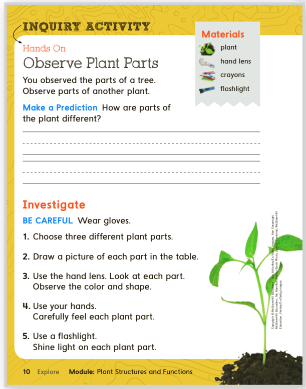
How do the goats climb the tree?

Research-Driven Inquiry Approach

Take a look at **page 16** to learn about the advanced and research-based approach to inquiry-based learning that's at the center of the student-led learning experience in *Inspire Science*.

INQUIRY ACTIVITIES

Hands On



INQUIRY ACTIVITY

Hands On

Observe Plant Parts

You observed the parts of a tree. Observe parts of another plant.

Make a Prediction How are parts of the plant different?

Materials
- plant
- hand lens
- crayons
- flashlight

Investigate

BE CAREFUL Wear gloves.

1. Choose three different plant parts.
2. Draw a picture of each part in the table.
3. Use the hand lens. Look at each part. Observe the color and shape.
4. Use your hands. Carefully feel each plant part.
5. Use a flashlight. Shine light on each plant part.

10 Explore **Module:** Plant Structures and Functions

Next Generation Assessments

As you'll see on **page 26**, with *Inspire Science* you can be confident that you have a program that guides students down a path to success with the Performance Expectations.

AdvancED measured progress

Measured Progress is the leading provider of assessments designed specifically for NGSS. These test items are in every *Inspire Science* module.

my.mheducation.com

Send all inquiries to:
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STEM

Our mission is to provide educational resources that enable students to become the problem solvers of the 21st century and inspire them to explore careers within Science, Technology, Engineering, and Mathematics (STEM) related fields.

Inspire Science

Explore Our Phenomenal World

Curiosity drives learning. *Inspire Science* provides an in-depth, collaborative, and project-based learning experience designed to help you spark students' interest and empower them to ask more questions and think more critically. Through inquiry-based, hands-on investigations of phenomena, your students will answer more rigorous science questions with evidence and generate innovative solutions to real-world problems.

Are you ready to inspire the next generation of innovators?

Inspire Curiosity
Spark critical thinking.

Inspire Investigation
Spark inquiry-driven, hands-on exploration.

Inspire Innovation
Spark creative solutions to real-world challenges.

100%
Built for the Next Generation Science Standards (NGSS)

Need login credentials?

Go to my.mheducation.com and select "Create Teacher Account."

Key Shifts for NGSS Success

Next Generation Science Standards are designed to help 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 *Inspire Science* supports you through each one.

Look for this symbol throughout this guide to learn more about these *Key Shifts for NGSS Success:*

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

Three-Dimensional Learning

The three-dimensional learning framework of *Inspire Science* delivers on the application-oriented approach needed to prepare your students for any challenge.

SEP Science and Engineering Practices

SKILLS
(for example, "Developing and Using Models")

DCI Disciplinary Core Ideas

CONTENT IN FOCUS
(for example, "The Universe and Its Stars")

CCC Crosscutting Concepts

COMMON THEMES
(for example, "Systems and System Models")

Performance Expectations

These statements describe what students must actually do in order to demonstrate mastery of a subject area's core content.

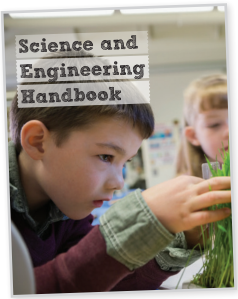
Students achieve proficiency with the Performance Expectations by working with the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts in tandem to make sense of phenomena and design solutions to real-world problems.

(for example, "Use observations of the Sun, Moon, and stars to describe patterns that can be predicted.")

CROSS-CURRICULAR Connections

The *Inspire Science* lessons include cross-curricular connections with quick and easy references to the specific literacy and math skills being reinforced through the science investigations.

Science and Engineering Handbook



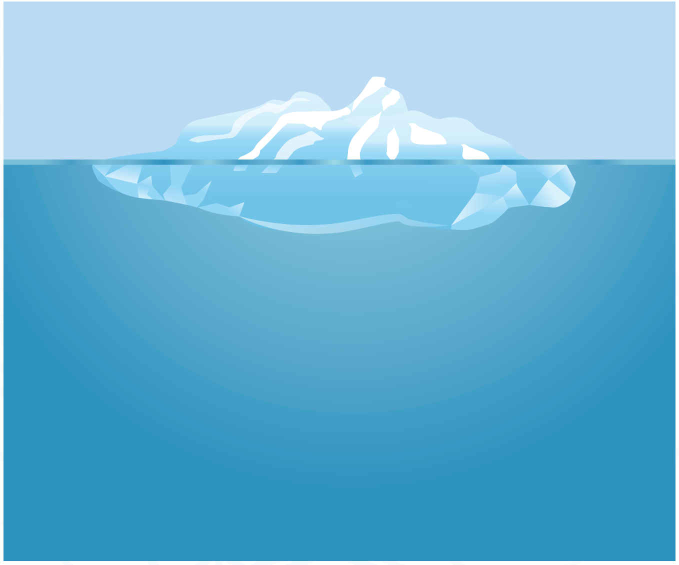
Go Online Use the digital Science and Engineering Handbook to learn more about each of the eight science and engineering practices and crosscutting concepts, as well as helpful science and engineering background information.

Key Shifts for NGSS Success

Depth Over Breadth

Inspire Science students will shift from a wide range of topics with shallow exploration to a more narrow range of topics with in-depth exploration to advance conceptual understanding.

TRADITIONAL APPROACH
Wide Range of Topics, Shallow Exploration



THE NGSS APPROACH
More Narrow Range of Topics, In-Depth Exploration

Phenomena-Driven, Inquiry-Based, Hands-On Learning

Students build long-lasting knowledge and skills by experiencing science and engineering in a more meaningful, real-world, application-oriented way. *Inspire Science* delivers on this approach through:

- Phenomena-Driven Learning
- Inquiry-Based Learning
- Hands-On Learning
- Project-Based Learning

Daleen Loest/Shutterstock

DISCOVER
THE PHENOMENON

What happens when you blow on a dandelion?

Evaluating Performance Over Testing Knowledge

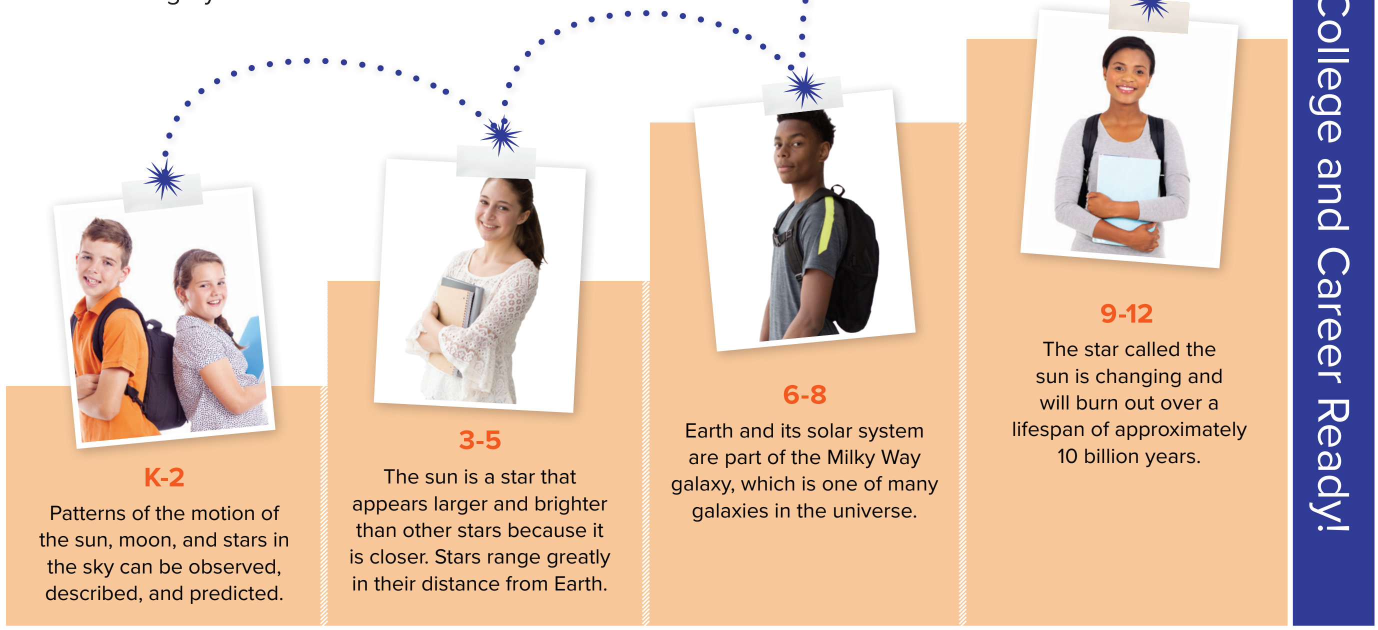
The formative and summative assessments in *Inspire Science* focus on helping students achieve a deep level of conceptual understanding performance-based evaluations and rubrics.

Integrated Engineering

One of the key shifts in the NGSS is the addition of the engineering design strand. Engineering activities and content (and teacher support) are seamlessly integrated throughout *Inspire Science*.

Progressive Learning

The NGSS progressions build on concepts year after year to deepen conceptual understanding over time. These progressions serve as a key building block for *Inspire Science*, allowing students to learn more about a given topic each year for an in-depth understanding by the end of Grade 12.



Disciplinary Core Idea Progression: The Universe and Its Stars

Scope and Sequence, K-5 Integrated

Grade K

UNIT 1	**LIVING THINGS**
MODULE	**Plants and Animals**
LESSON 1	Living and Nonliving
LESSON 2	Plant and Animal Survival
LESSON 3	Places Plants Live
LESSON 4	Places Animals Live
UNIT 2	**OUR CHANGING WORLD**
MODULE	**Changes to the Environment**
LESSON 1	Plants Change Their Environment
LESSON 2	Animals Change Their Environment
LESSON 3	People Change Their Environment
MODULE	**Protect Earth**
LESSON 1	Natural Resources
LESSON 2	Reduce, Reuse, Recycle
UNIT 3	**WEATHER AND THE SUN**
MODULE	**Weather**
LESSON 1	Describe Weather
LESSON 2	Weather Patterns
LESSON 3	Forecast Weather
LESSON 4	Severe Weather
MODULE	**The Sun and Earth's Surface**
LESSON 1	Sunlight on Earth's Surface
LESSON 2	Protection from the Sun
UNIT 4	**MAKE THINGS MOVE**
MODULE	**Forces and Motion**
LESSON 1	Pushes and Pulls
LESSON 2	Direction and Speed
LESSON 3	When Objects Collide

Grade 1

UNIT 1	**ALL ABOUT PLANTS**
MODULE	**Plant Structures and Functions**
LESSON 1	Plant Parts
LESSON 2	Functions of Plant Parts
MODULE	**Plant Parents and Their Offspring**
LESSON 1	Plants and Their Parents
LESSON 2	Plant Survival
UNIT 2	**ANIMALS AND HOW THEY COMMUNICATE**
MODULE	**Animals Parents and Their Offspring**
LESSON 1	Animal Structures
LESSON 2	Functions of Animal Structures
LESSON 3	Animals and Their Parents
LESSON 4	Animal Behaviors
MODULE	**Communication**
LESSON 1	Animal Communication
LESSON 2	Sound
UNIT 3	**LIGHT AND SHADOWS**
MODULE	**See Objects**
LESSON 1	Light
LESSON 2	Light and Materials
LESSON 3	Light Uses
UNIT 4	**SKY PATTERNS**
MODULE	**Observe the Sky**
LESSON 1	Objects in the Sky
LESSON 2	Day and Night Patterns
LESSON 3	Patterns During the Year

Grade 2

UNIT 1	**LAND AND WATER**
MODULE	**Earth's Landscape**
LESSON 1	Local Landscapes
LESSON 2	Land and Earth
LESSON 3	Water on Earth
UNIT 2	**PROPERTIES OF MATERIALS**
MODULE	**Describe Materials**
LESSON 1	Investigate Materials
LESSON 2	Test and Analyze Materials
MODULE	**Changes to Materials**
LESSON 1	Build with Materials
LESSON 2	Materials Can Change
UNIT 3	**EARTH'S CHANGING LANDSCAPE**
MODULE	**Landscape Changes**
LESSON 1	Slow Changes to Earth's Landscape
LESSON 2	Quick Changes to Earth's Landscape
LESSON 3	Design Solutions to Slow Landscape Changes
UNIT 4	**LIVING THINGS AND HABITATS**
MODULE	**Plants in Landscapes**
LESSON 1	What Plants Need
LESSON 2	Plants Depend on Animals
MODULE	**Living Things in Habitats**
LESSON 1	Local Habitats
LESSON 2	Land Habitats
LESSON 3	Water Habitats

K-5 Learning Progression within Each Grade

Inspire Science modules are bundled in a sequence designed to support learning progression toward the grade-level Performance Expectations in alignment with the NGSS. The progressions within each grade establish a strong base of knowledge for the Performance Expectations the following years.

Grade 3

UNIT 1	**FORCES AROUND US**
MODULE	**Forces and Motion**
LESSON 1	Motion
LESSON 2	Forces Can Change Motion
MODULE	**Electricity and Magnetism**
LESSON 1	Electricity and Designing Solutions
LESSON 2	Magnetism and Designing Solutions
UNIT 2	**LIFE CYCLES AND TRAITS**
MODULE	**Plants**
LESSON 1	Plant Life Cycles
LESSON 2	Plant Traits
MODULE	**Animals**
LESSON 1	Animal Life Cycles
LESSON 2	Animal Traits
LESSON 3	Animal Group Survival
UNIT 3	**DIFFERENT ENVIRONMENTS**
MODULE	**Survive the Environment**
LESSON 1	Survival of Organisms
LESSON 2	Adaptations and Variations
MODULE	**Change the Environment**
LESSON 1	Fossils
LESSON 2	Changes Affect Organisms
UNIT 4	**OBSERVING WEATHER**
MODULE	**Weather Impacts**
LESSON 1	Weather Patterns
LESSON 2	Weather and Seasons
LESSON 3	Natural Hazards and the Environment
LESSON 4	Prepare for Natural Hazards

Grade 4

UNIT 1	**FORCES AND ENERGY**
MODULE	**Energy and Motion**
LESSON 1	Forces and Motion
LESSON 2	Speed and Energy
LESSON 3	Energy Transfer in Collisions
UNIT 2	**USING ENERGY**
MODULE	**Energy Transfer**
LESSON 1	Types of Energy
LESSON 2	Sound and Light
LESSON 3	Electricity
LESSON 4	Heat
MODULE	**Natural Resources in the Environment**
LESSON 1	Energy from Nonrenewable Resources
LESSON 2	Energy from Renewable Resources
LESSON 3	Impact of Energy Use
LESSON 4	Design Energy Solutions
UNIT 3	**OUR DYNAMIC EARTH**
MODULE	**Earth and Its Changing Features**
LESSON 1	Map Earth's Features
LESSON 2	Evidence from Rocks and Fossils
LESSON 3	Changes in Landscapes Over Time
MODULE	**Earthquakes**
LESSON 1	Map Earthquakes
LESSON 2	Model Earthquake Movement
LESSON 3	Reduce Earthquake Damage
UNIT 4	**INFORMATION PROCESSING AND LIVING THINGS**
MODULE	**Structures and Functions of Living Things**
LESSON 1	Structures and Functions of Plants
LESSON 2	Structures and Functions of Animals
MODULE	**Information Processing and Transfer**
LESSON 1	Information Processing in Animals
LESSON 2	Role of Animals' Eyes
LESSON 3	Information Transfer

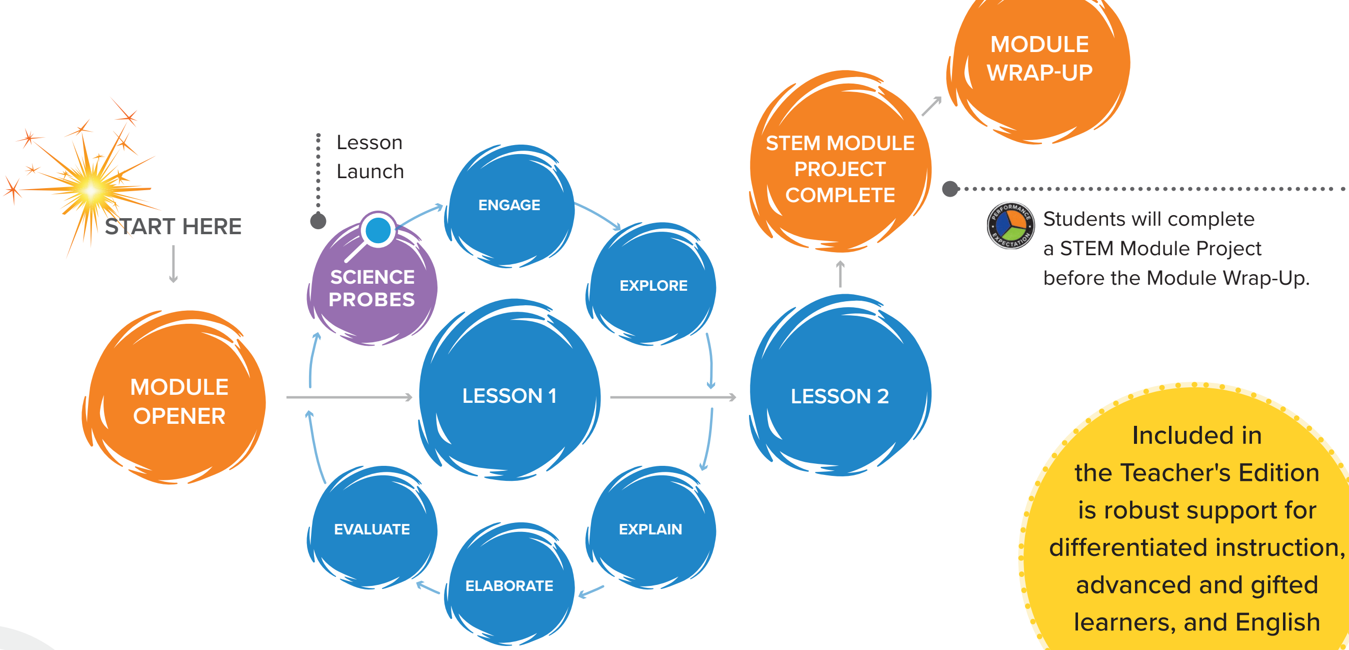
Grade 5

UNIT 1	**INVESTIGATE MATTER**
MODULE	**Matter**
LESSON 1	Identify Properties of Materials
LESSON 2	Mixtures and Solutions
LESSON 3	Physical and Chemical Changes
LESSON 4	Solids, Liquids, and Gases
UNIT 2	**ECOSYSTEMS**
MODULE	**Matter in Ecosystems**
LESSON 1	Plant Survival
LESSON 2	Interactions of Living Things
LESSON 3	Role of Decomposers
MODULE	**Energy in Ecosystems**
LESSON 1	Earth's Major Systems
LESSON 2	Cycles of Matter in Ecosystems
LESSON 3	Energy Transfer in Ecosystems
UNIT 3	**EARTH'S INTERACTIVE SYSTEMS**
MODULE	**Earth's Water System**
LESSON 1	Water Distribution on Earth
LESSON 2	Human Impact on Water Resources
LESSON 3	Effects of the Hydrosphere
MODULE	**Earth's Other Systems**
LESSON 1	Effects of the Geosphere
LESSON 2	Effects of the Atmosphere
LESSON 3	Effects of the Biosphere
UNIT 4	**EARTH AND SPACE PATTERNS**
MODULE	**Earth's Patterns and Movement**
LESSON 1	The Role of Gravity
LESSON 2	Earth's Motion
MODULE	**Earth and Space**
LESSON 1	Earth's Place in Space
LESSON 2	Stars and Their Patterns

Module Experience At A Glance

Inspire Science's phenomena-driven 5E lessons are designed to provoke critical thinking and spark creative problem solving.

Grades K–1 Module and Lesson Design



Included in the Teacher's Edition is robust support for differentiated instruction, advanced and gifted learners, and English language learners.

Pacing Options to Fit Your Schedule

FullTrack
45 min/day (5 days a week)

FlexTrack A
30 min/day (5 days a week)

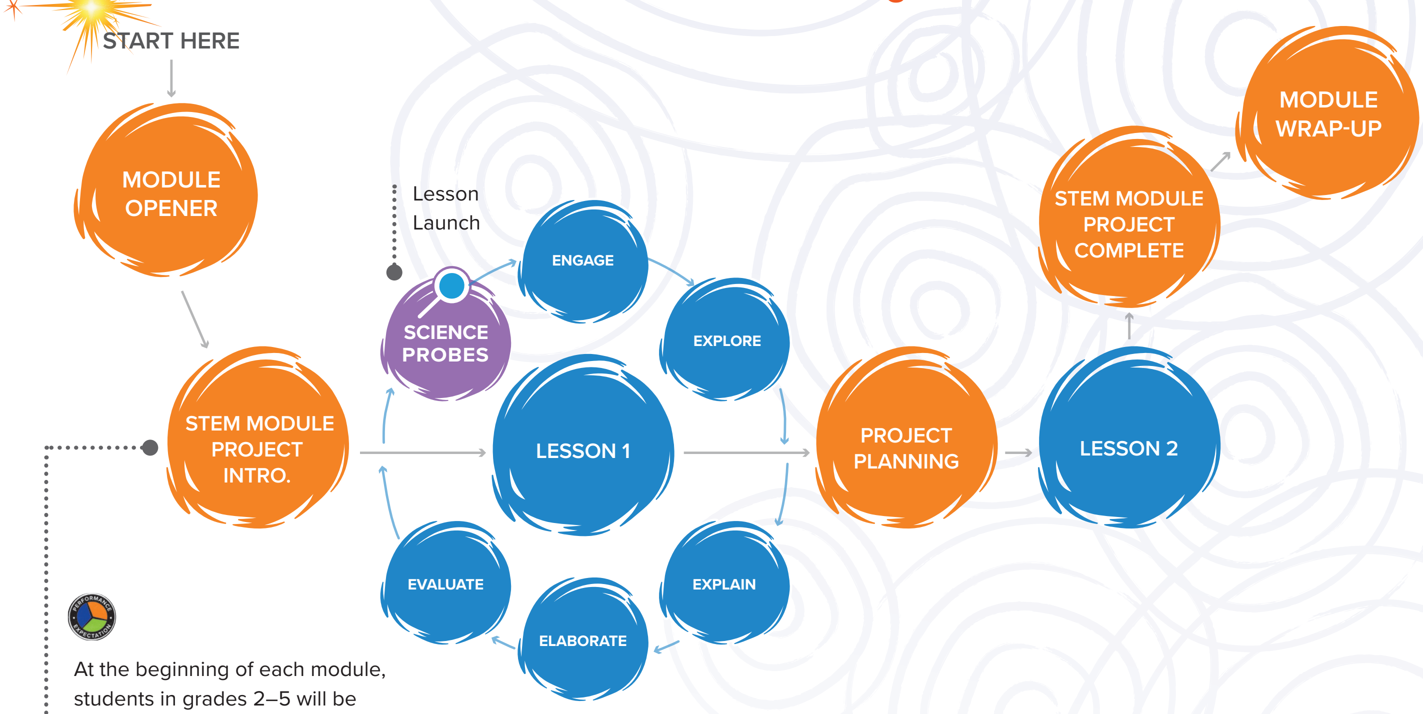
FlexTrack B
30 min/day (3 days a week)

Key Student Activities

STEM Module Project Launch (Grades 2–5)

MODULE OPENER	ASSESS PRIOR KNOWLEDGE	ENGAGE	EXPLORE
Discover / Encounter the Phenomenon STEM Connection Talk About It Word Wall (Grades K–1) Module Pretests (G2–5)	Science Probe Formative Assessment	Discover / Encounter the Phenomenon Talk About It	Explore the Phenomenon (Inquiry Activity) Claim, Evidence, Reasoning (CER) (Grades 2–5) Cross-Curricular Connections

Grades 2–5 Module and Lesson Design



At the beginning of each module, students in grades 2–5 will be introduced to a STEM Module Project that they will complete at the end of the module. Touch points at the end of each lesson provide for project planning.

STEM Module Project Planning (after each lesson in Grades 2–5) and Completion (end of the module in Grades K–5)

EXPLAIN

- Vocabulary
- Inquiry Activities
- Close Reading
- Talk About It
- Revisit the Science Probe
- Three-Dimensional Thinking
- Claim, Evidence, Reasoning (CER) (Grade 1)
- Cross-Curricular Connections
- Quick Check

ELABORATE

- Inquiry Activities
- STEM Connection
- Environmental Connections
- Close Reading
- Three-Dimensional Questions

EVALUATE

- Lesson Review
- Explain the Phenomenon
- Revisit the Science Probes
- Three-Dimensional Assessment

MODULE WRAP-UP

- Rediscover / Revisit the Module Phenomenon
- Three-Dimensional Assessment

Print Resources

Each interactive Student Edition unit encourages hands-on learning through the NGSS and Framework. Each Teacher Edition unit provides in-depth teacher strategies to make sure your classroom succeeds.

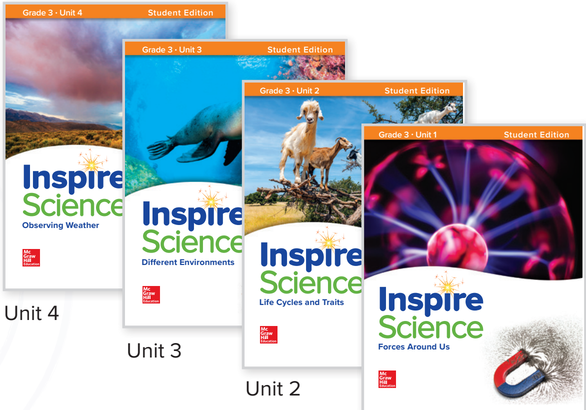
TEACHER'S EDITION

Available in Spanish (Grades K–5, Four Units Per Grade)

Unit 4 Unit 3 Unit 2 Unit 1

STUDENT EDITION

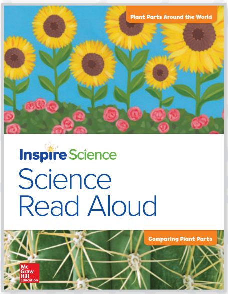
Available in Spanish (Grades K–5, Four Units Per Grade)



Unit 4 Unit 3 Unit 2 Unit 1

SCIENCE READ ALOUDS

Available in Spanish (Grades K–1)



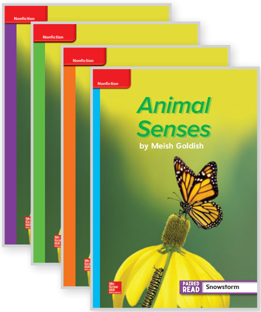
INVESTIGATOR ARTICLES

Available in Spanish (Grades 2–5)

- Approaching Level (online, printable)
- On Level

LEVELED READERS

Available in Spanish (Grades K–5)



- Approaching Level
- On Level
- Beyond Level
- ELL

Collaboration Kits

(for small group Hands-On Inquiry Activities)

Inspire Science Collaboration Kits make planning for hands-on time easier so you can focus on the activities. Each Collaboration Kit contains the materials needed for the hands-on inquiry activities, organized by unit and module.

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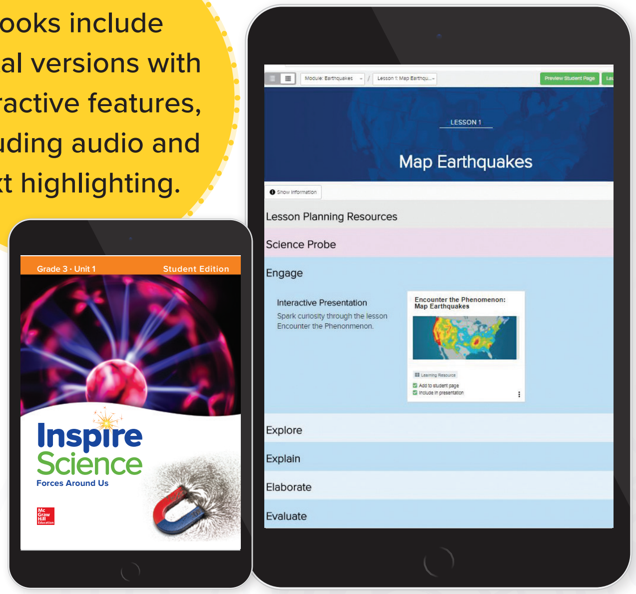
Student Digital Resources

Why Go Online?

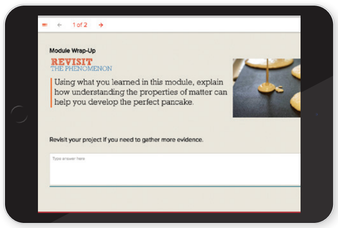
- Engaging Interactive Content
- Video Demos of Hands-On Activities
- Science Content Videos
- Text Read Aloud and Highlighting Features
- Dynamic Search Tools
- Impact News

Print books include digital versions with interactive features, including audio and text highlighting.

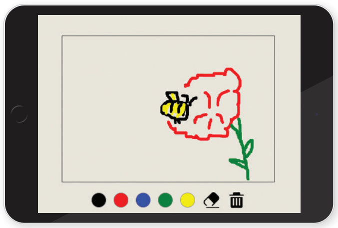


Spanish Digital Center Also Avaible

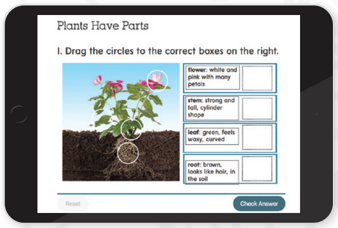
Type Entry



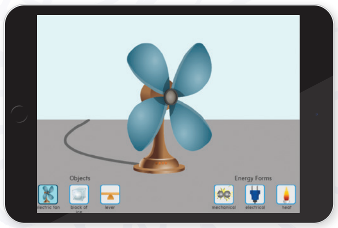
Drawing Tool



Drag and Drop



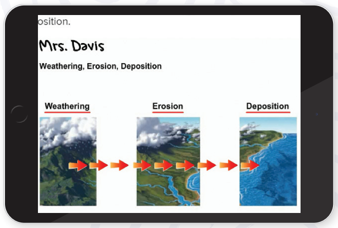
Simulations



Phenomena Videos

Science Content Videos

Personal Tutors (4-5)



Impact News

Beyond the Classroom (2–5)

See the Digital Experience section of this guide to learn more about these engaging interactives.

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Phenomena-Driven Learning

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

Anchoring Module Phenomena

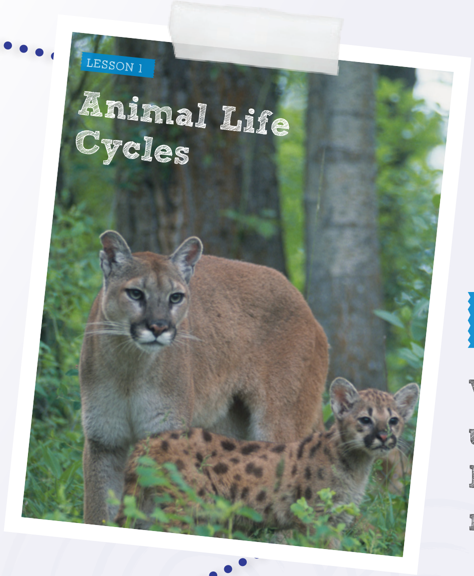
ENCOUNTER
THE PHENOMENON

How do the goats climb the tree?

Pavliha/iStock/Getty Images

Investigative Lesson Phenomena

Students will investigate related lesson-level phenomena that will help them build understanding so they can uncover the question of the anchoring module phenomena.

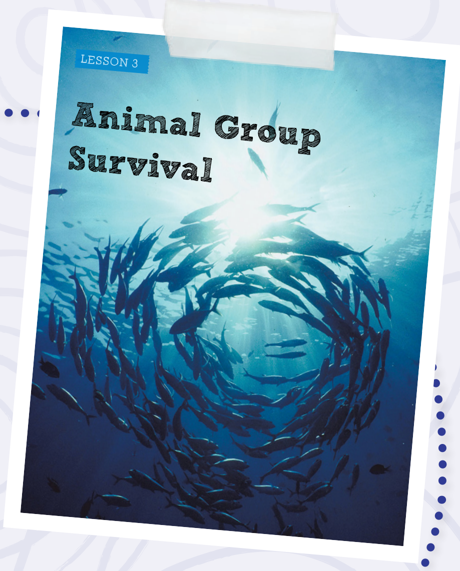


LESSON 1

Will the cub grow up to look more like the adult mountain lion?

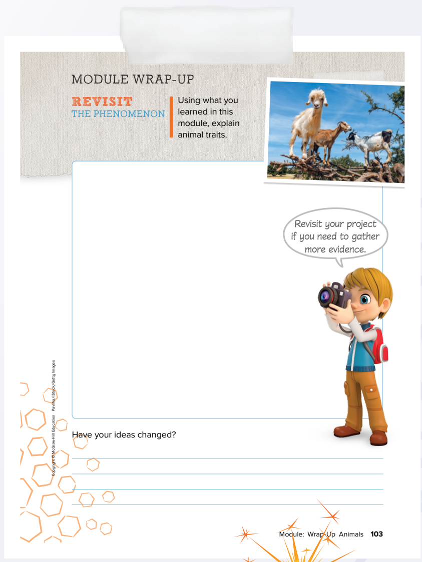
LESSON 2

Why do the kittens look different from the mom and each other?



LESSON 3

Why are the fish swimming in a circle?



Revisit the Phenomenon

In the Module Wrap-Up, students will connect what they've learned through the investigative lesson phenomena to explain the anchoring module phenomenon.

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Inquiry-Based Learning

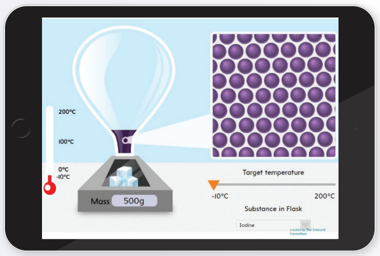
An inquiry-based approach to science and engineering education helps spark student curiosity and empower them to ask more questions, think more critically, answer deeper questions, and design solutions to the problems in their world. Today's students will need to know how to investigate questions and solve problems from a variety of angles. Inquiry-driven instruction gives students the practice they need to succeed in developing solutions to whatever challenges they may encounter.

In *Inspire Science*, students will conduct two to three inquiry activities per lesson, typically in the Explore, Explain, and Elaborate phases of the 5E model. Students will use their results and findings from each lesson to communicate their understanding through the STEM Module Project at the end of each module. These activities help students achieve proficiency with the science and engineering practices disciplinary core ideas, and crosscutting concepts.

Types of Inquiry Activities in *Inspire Science*

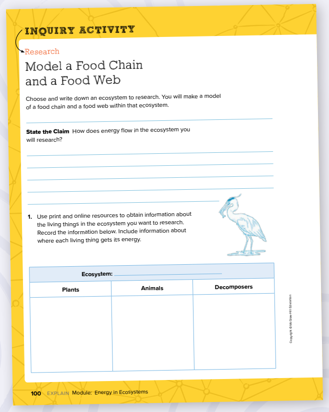
Inquiry is more than hands-on activities. With *Inspire Science*, students will investigate phenomena using the same techniques and practices that scientists and engineers use.

Simulations



INQUIRY ACTIVITIES

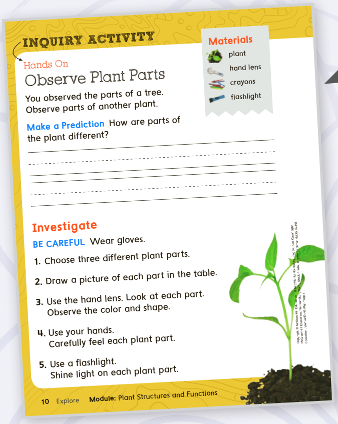
Research


INQUIRY ACTIVITY
Research
Model a Food Chain and a Food Web
Choose and write down an ecosystem to research. You will make a model of a food chain and a food web within that ecosystem.
State the Claim How does energy flow in the ecosystem you will research?
1. Use print and online resources to obtain information about the living things in the ecosystem you want to research. Record the information below. Include information about where each living thing gets its energy.

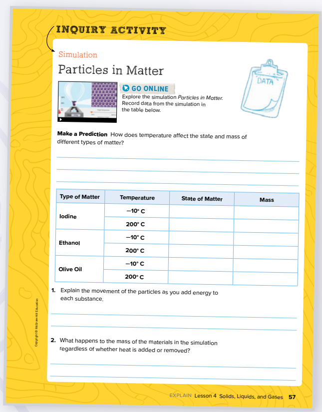
Ecosystem:		
Plants	Animals	Decomposers

100 EXPLAIN Module: Energy in Ecosystems

Hands On


INQUIRY ACTIVITY
Hands On
Observe Plant Parts
You observed the parts of a tree. Observe parts of another plant.
Materials
plant
hand lens
crayons
flashlight
Make a Prediction How are parts of the plant different?
Investigate
BE CAREFUL Wear gloves.
1. Choose three different plant parts.
2. Draw a picture of each part in the table.
3. Use the hand lens. Look at each part. Observe the color and shape.
4. Use your hands. Carefully feel each plant part.
5. Use a flashlight. Shine light on each plant part.
10 Explore Module: Plant Structures and Functions

Data Analysis


INQUIRY ACTIVITY
Simulation
Particles in Matter
GO ONLINE Explore the simulation Particles in Matter. Record data from the simulation in the table below.
Make a Prediction How does temperature affect the state and mass of different types of matter?

Type of Matter	Temperature	State of Matter	Mass
Iodine	−10° C		
	200° C		
Ethanol	−10° C		
	200° C		
Olive Oil	−10° C		
	200° C		

1. Explain the movement of the particles as you add energy to each substance.
2. What happens to the mass of the materials in the simulation regardless of whether heat is added or removed?
EXPLAIN Lesson 4 Solids, Liquids, and Gases 57

Engineering

Stocktrek Images, Inc./Alamy

ENCOUNTER
THE PHENOMENON

Why don't mastodons exist anymore?

The *Inspire Science* Inquiry Spectrum

Not all inquiry activities are the same. Depending upon the available time and student readiness, structured inquiry might be perfect or your class may be ready for open inquiry. The *Inspire Science* **Inquiry Spectrum** provides flexible options to adjust the inquiry level to align with the learning needs of each student.

Each lesson offers inquiry activities that have been developed with a recommended inquiry spectrum level, giving you the flexibility to modify the level of instruction based on your students' needs. The Inquiry Spectrums are provided in the Teacher's Edition and online at point of use in the teacher support for the lesson.

Inquiry Spectrum

Structured Inquiry
This activity it **Structured Inquiry.**

Guided Inquiry
Provide students with the explorable question and the prediction. Have students write their own procedure.

Open Inquiry
Remind students of the phenomenon, and allow time for students to continue their research on ramps. Bookmark appropriate websites and provide quality texts for students to continue their investigations.

Hands-On Learning

Inspire Science uses hands-on inquiry activities designed to engage students, inspire investigation, and motivate deeper thinking about core science concepts—without creating a logistical burden for you. To make hands-on time a little easier, *Inspire Science* includes:

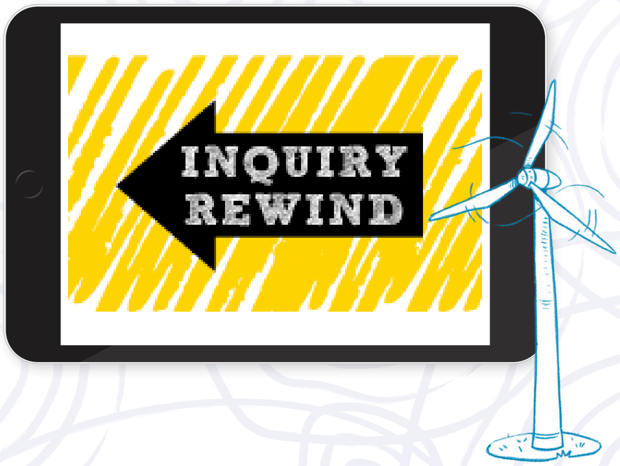
- Neatly organized **Collaboration Kits** with hands-on materials
- Inquiry Activity Support Videos
- **Module Inquiry Activity Planners** in the Teacher's Edition

Collaboration Kits with Customer Support

Inspire Science Collaboration Kits make planning for hands-on time easier so you can focus on the activities. Each Collaboration Kit contains most of the materials needed for the hands-on inquiry activities, organized by unit and module. Materials are clearly labeled and correlated with each lesson.

Inquiry Activity Support Videos

Every EXPLORE Inquiry Activity is paired with an Inquiry Rewind video to encourage student engagement. In these videos, students are provided guidance through every step of every activity. These videos are perfect for students who might have missed the in-class activity or who might be struggling to achieve the expected outcomes.

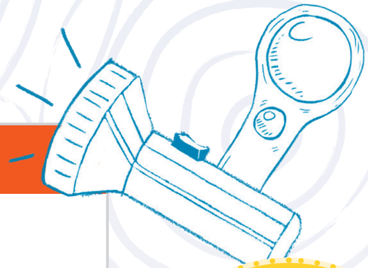


Every Inquiry Rewind video:

- Shows the activity materials and the step-by-step procedure
- Demonstrates the expected observations for each step of the activity
- Provides opportunities for students to pause the video and utilize their Claim, Evidence, and Reasoning skills they have learned through *Inspire Science.*

Inquiry Activity Planners

Planning and preparing for inquiry activities is made easier with the *Inspire Science* Inquiry Activity Planners. The planners clearly identify all the hands-on materials needed throughout the module and which materials are found in your *Inspire Science* Collaboration Kits.



Inquiry Activity Support

GO ONLINE Guide Inquiry Activities with confidence by watching the Inquiry Activity Teacher Preview video as you plan. After students complete the activity, the Inqu missed class, a

ADDITIONAL RESO

Inquiry Activity Teacher Preview

INQUIR TEACHE PREVIE

Teacher N

Blue materials are included in the Collaboration Kits.

Module: **Information Processing and Transfer**

Inquiry Activity Planner

In this module, students will investigate information processing and transfer and design and build a device that uses light and/or sound to communicate a message.

Lesson	Inquiry Activity		Materials: Consumable	Materials: Non-Consumable
	★ GO ONLINE for teacher support videos on selected activities. Materials included in the Collaboration Kit are listed in blue.			
Lesson 1	**Hands On** Sense of Touch **Purpose:** To explore how their sense of touch works when their sense of sight is impaired.	30 min small groups	material for blindfold	3 sandpaper samples of different grades, hand lens
	Hands On Pill Bugs **Purpose:** To investigate how pill bugs use their senses to help them survive.	30 min small groups	15 pill bugs, potting soil, leaves, paper towels, water, fish food	hand lens, plastic habitat
Lesson 2	**Hands On** How Light Travels **Purpose:** To investigate how light travels and what types of objects reflect light.	30 min small groups	white paper, batteries, clear cup, cup, water, index card	mirror, flashlight, protractor, sand, hand lens
	Hands On It's Time to Focus **Purpose:** To make a model to show how an animal eye works to refract light, and investigate what happens when the distance between the lens and retina is changed in a model eye.	30 min pairs	sheet of white paper	hand lens, desk lamp (teacher use only), various desk items: stapler, mug, tape dispenser (teacher use only)
Lesson 3	**Hands On** Secret Message **Purpose:** To investigate how patterns are used to transfer information.	30 min small groups	batteries	flashlight
	Hands On Morse Code Message **Purpose:** To use Morse code to send a message.	30 min pairs	batteries	flashlight, classroom objects
	Research What's That Say? **Purpose:** To research and decode a binary code message.	30 min pairs		
STEM Module Project	**Engineering Challenge** Pixel Message **Purpose:** To design and build a device that uses light and/or sound to send a message across a room.	30 min pairs	batteries	stopwatch, flashlight, bell, whistle, drum, translucent colored sheets, 2 colors

McGraw-Hill is your partner for hands-on materials. To order new Collaboration Kits or refill specific items, contact the McGraw-Hill Education customer support line at (800) 336-3987.

52G Module: **Information Processing and Transfer**

Differentiation and ELD Support

Inspire Science 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. Here's how!

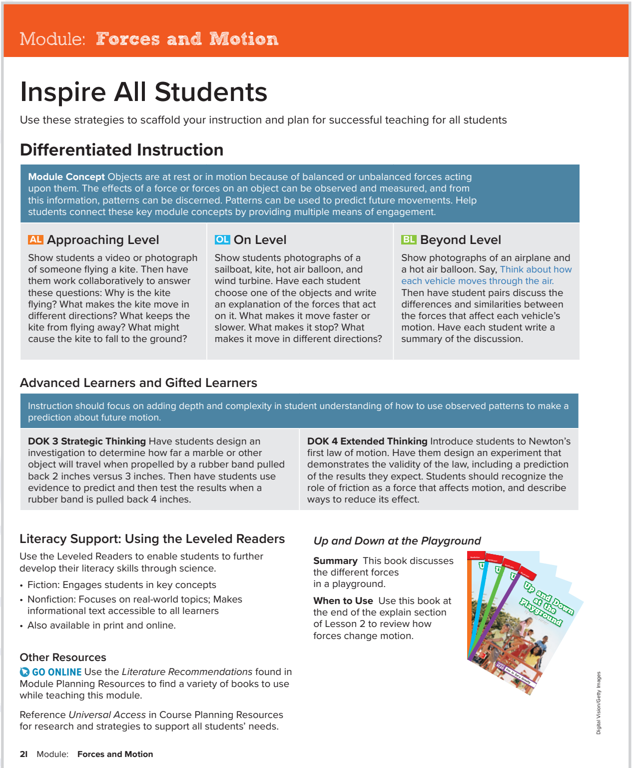
Uniting Phenomena

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 toward achieving their learning goals.

Differentiated Instruction

Inspire Science incorporates the research-based Universal Design Learning Principles to provide educational practices that support multiple means of engagement, representation, action, and expression to ensure that all students have access to rigorous curriculum.

Robust differentiation support is found within the Teacher's Edition, as well as through leveled informational text resources, such as the Leveled Readers and Investigator articles. Support with practical strategies is found at the module and lesson level at multiple points. Leveled text aligns with the lexile ranges of the CCSS.



Module: **Forces and Motion**

Inspire All Students

Use these strategies to scaffold your instruction and plan for successful teaching for all students

Differentiated Instruction

Module Concept Objects are at rest or in motion because of balanced or unbalanced forces acting upon them. The effects of a force or forces on an object can be observed and measured, and from this information, patterns can be discerned. Patterns can be used to predict future movements. Help students connect these key module concepts by providing multiple means of engagement.

AL Approaching Level	OL On Level	BL Beyond Level
Show students a video or photograph of someone flying a kite. Then have them work collaboratively to answer these questions: Why is the kite flying? What makes the kite move in different directions? What keeps the kite from flying away? What might cause the kite to fall to the ground?	Show students photographs of a sailboat, kite, hot air balloon, and wind turbine. Have each student choose one of the objects and write an explanation of the forces that act on it. What makes it move faster or slower. What makes it stop? What makes it move in different directions?	Show photographs of an airplane and a hot air balloon. Say, Think about how each vehicle moves through the air. Then have student pairs discuss the differences and similarities between the forces that affect each vehicle's motion. Have each student write a summary of the discussion.

Advanced Learners and Gifted Learners

Instruction should focus on adding depth and complexity in student understanding of how to use observed patterns to make a prediction about future motion.

DOK 3 Strategic Thinking Have students design an investigation to determine how far a marble or other object will travel when propelled by a rubber band pulled back 2 inches versus 3 inches. Then have students use evidence to predict and then test the results when a rubber band is pulled back 4 inches.	**DOK 4 Extended Thinking** Introduce students to Newton's first law of motion. Have them design an experiment that demonstrates the validity of the law, including a prediction of the results they expect. Students should recognize the role of friction as a force that affects motion, and describe ways to reduce its effect.

Literacy Support: Using the Leveled Readers

Use the Leveled Readers to enable students to further develop their literacy skills through science.

- Fiction: Engages students in key concepts
- Nonfiction: Focuses on real-world topics; Makes informational text accessible to all learners
- Also available in print and online.

Up and Down at the Playground

Summary This book discusses the different forces in a playground.

When to Use Use this book at the end of the explain section of Lesson 2 to review how forces change motion.

Digital Vision/Getty Images

Other Resources

GO ONLINE Use the *Literature Recommendations* found in Module Planning Resources to find a variety of books to use while teaching this module.

Reference *Universal Access* in Course Planning Resources for research and strategies to support all students' needs.

21 Module: **Forces and Motion**

mikroman6/Moment/Getty Images

English Language Support

Home Language Support Build on and make use of students' home language to support their science learning in English. Teach students how to identify and use cognates to create linguistic bridges between school science and home to capitalize on emerging bilingualism.

EMERGING	EXPANDING	BRIDGING
Cognate Strategies Demonstrate the meaning of cognates by writing the word animal on the board. Ask students to tell you what the word means using words, phrases or gestures. Say and point to the word animal and have students repeat. Then have students say the word in their home language. Guide students to notice that the pronunciation is a little different but the spelling is not different. Write animals and animales on the board. Guide students to notice the differences in spelling and pronunciation in the plural form. There are many cognates in this module. Ask students to keep a list of the words they see that are similar in their home language.	**Cognate Strategies** Explain the meaning of cognates by writing the words animals and animales on the board. Ask students to tell you the meaning of the words. Then support students in finding the differences and similarities in sounds and letters. For example, both words have the same spelling except that one ends in s and the other in es. Say the word animals and have students say animales. Note that there is not a lot of difference in spelling or pronunciation. There are many cognates in this module. Encourage students to list the cognates, noting the differences in spelling and pronunciation as you work through the module.	**Cognate Strategies** Ask students to tell you if they know what a cognate is, i.e. a word that looks similar, sounds similar, and shares a meaning across some languages. Have students read the title of the module to find the cognate, animal. Have them tell you the word in their home language (animal) and give you a definition of the word in English. Point out that the plural animals/animales have different spellings. Throughout the module, students will find many cognates. When beginning a new page, ask students to scan the page for cognates and add them to a list along with their definitions in English.

Strategies and activities allow for EL instruction specific to each of your students.

English Language Support

Inspire Science applies the best instructional practices for teaching EL students. Each module and lesson has scaffolded activities that offer students of any level of English language proficiency the opportunity to engage in academically challenging science and engineering content while supporting language acquisition.

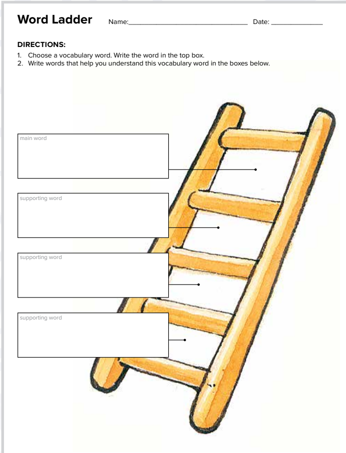
Language Building Resources

Inspire Science lessons carefully integrate reading, writing, speaking, listening, and collaborating into each lesson. This structure provides EL students purposeful language usage and resource access to convey their understanding in a meaningful way.

Cognates

Cognates are words in two different languages that share a similar meaning, spelling, and pronunciation. Review differences in spelling and pronunciation of these terms with your Spanish-speaking English Learners.

mammal mamífero	**insect** insecto	**reptile** reptil
amphibian anfibio	**protection** protección	**signal** señal
armadillo armadillo	**zebra** cebra	**lion** león



Thomas Barwick/Digital Vision/Getty Images

Advanced Learners and Gifted Learners

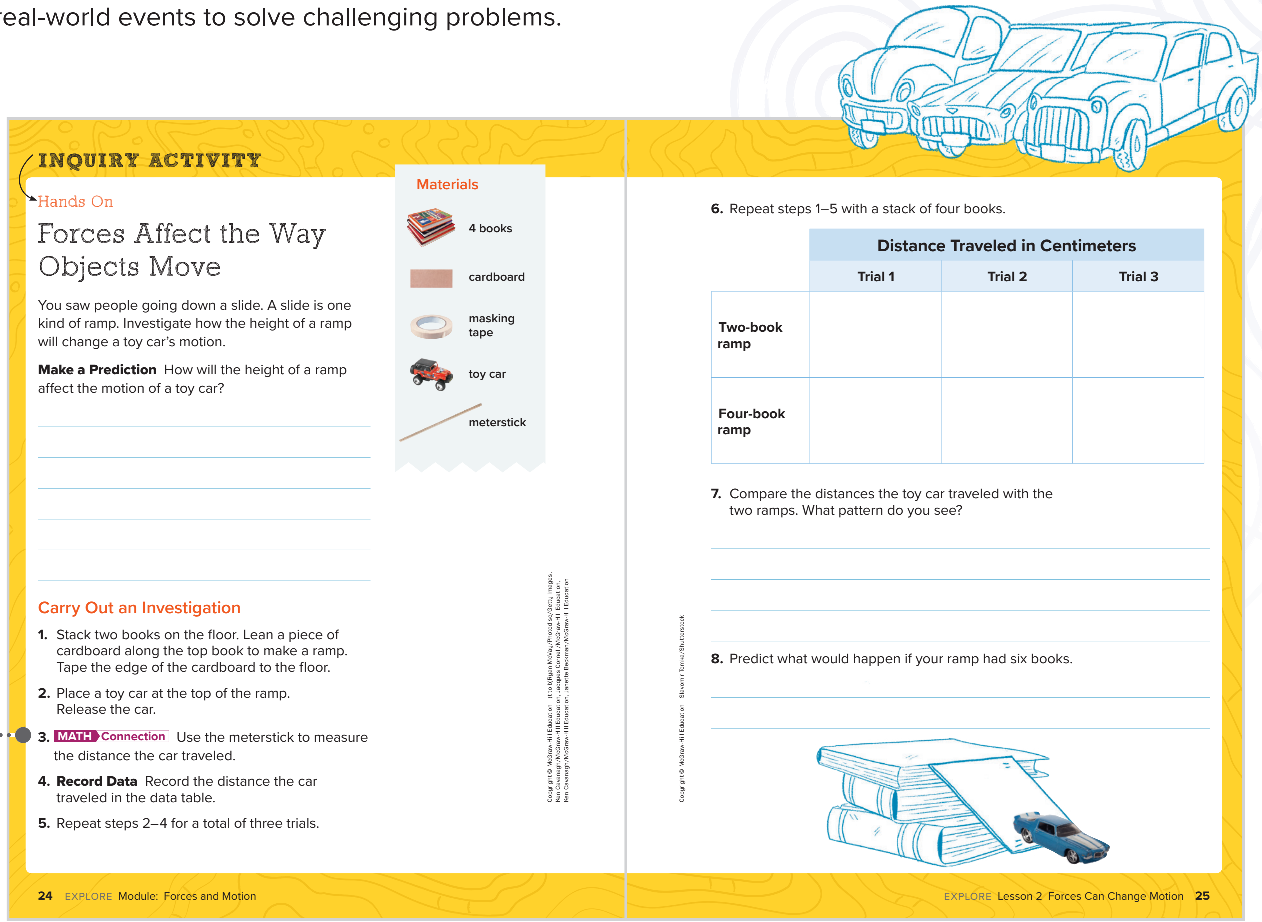
Provide your advanced and gifted learners with challenging activities that identify the Depth of Knowledge (DOK) to provide enrichment opportunities for demonstrating advanced performance in science and engineering. This is in addition to the Approaching Level, On Level, and Beyond Level support included in the differentiated instruction strategies for each module and lesson.

Inspire Science was built to help students develop language and mathematics skills in ways that support learning science and engineering while also supporting ELA and math goals. Every lesson integrates cross-curricular connections to the Common Core State Standards for ELA/Literacy and Common Core State Standards for Mathematics in alignment with the NGSS.

CROSS-CURRICULAR Connections

Math Integration

Science and math are closely related in the real world—a key reason for the Science and Engineering Practice of Using Mathematical and Computational Thinking, as well as Analyzing and Interpreting Data. In *Inspire Science*, students will engage with math the same way that real scientists and engineers do. They will collect and analyze data, create graphs, and make connections between mathematics and real-world events to solve challenging problems.



INQUIRY ACTIVITY

Hands On

Forces Affect the Way Objects Move

You saw people going down a slide. A slide is one kind of ramp. Investigate how the height of a ramp will change a toy car's motion.

Make a Prediction How will the height of a ramp affect the motion of a toy car?

Materials
- 4 books
- cardboard
- masking tape
- toy car
- meterstick

Carry Out an Investigation

1. Stack two books on the floor. Lean a piece of cardboard along the top book to make a ramp. Tape the edge of the cardboard to the floor.
2. Place a toy car at the top of the ramp. Release the car.
3. MATH Connection Use the meterstick to measure the distance the car traveled.
4. **Record Data** Record the distance the car traveled in the data table.
5. Repeat steps 2–4 for a total of three trials.

24 EXPLORE Module: Forces and Motion

6. Repeat steps 1–5 with a stack of four books.

	Distance Traveled in Centimeters		
	Trial 1	Trial 2	Trial 3
Two-book ramp			
Four-book ramp			

7. Compare the distances the toy car traveled with the two ramps. What pattern do you see?

8. Predict what would happen if your ramp had six books.

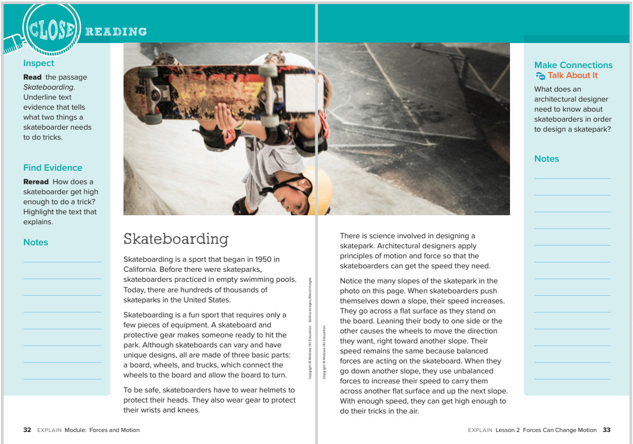
EXPLORE Lesson 2 Forces Can Change Motion 25

MATH Connection

Math connections are found in relevant places within the modules, including the inclusion of practical math skills within the inquiry activities.

Literacy Integration

Integrating literacy with your science instruction will help your students build literacy skills while learning science. By incorporating our leveled, nonfiction reading content, you will see your students' close reading and communication skills improve with text-dependent questions, paired readings, arguments, narratives, and collaborative conversations practiced in the context of science that's fun!



CLOSE READING

Inspect

Read the passage *Skateboarding*. Underline text evidence that tells what two things a skateboarder needs to do tricks.

Find Evidence

Reread How does a skateboarder get high enough to do a trick? Highlight the text that explains.

Notes

Skateboarding

Skateboarding is a sport that began in 1950 in California. Before there were skateparks, skateboarders practiced in empty swimming pools. Today, there are hundreds of thousands of skateparks in the United States.

Skateboarding is a fun sport that requires only a few pieces of equipment. A skateboard and protective gear makes someone ready to hit the park. Although skateboards can vary and have unique designs, all are made of three basic parts: a board, wheels, and trucks, which connect the wheels to the board and allow the board to turn.

To be safe, skateboarders have to wear helmets to protect their heads. They also wear gear to protect their wrists and knees.

There is science involved in designing a skatepark. Architectural designers apply principles of motion and force so that the skateboarders can get the speed they need.

Notice the many slopes of the skatepark in the photo on this page. When skateboarders push themselves down a slope, their speed increases. They go across a flat surface as they stand on the board. Leaning their body to one side or the other causes the wheels to move the direction they want, right toward another slope. Their speed remains the same because balanced forces are acting on the skateboard. When they go down another slope, they use unbalanced forces to increase their speed to carry them across another flat surface and up the next slope. With enough speed, they can get high enough to do their tricks in the air.

Make Connections

Talk About It

What does an architectural designer need to know about skateboarders in order to design a skatepark?

Notes

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32 EXPLAIN Module: Forces and Motion

EXPLAIN Lesson 2 Forces Can Change Motion 33

Science Literacy Framework

The CER Framework helps students construct explanations for science phenomenon using evidence they have gathered throughout the module.

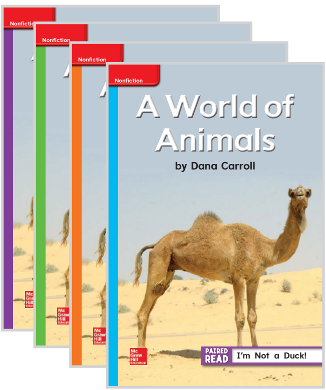
CLAIM

EVIDENCE

REASONING

Close Reading Framework

The Close Reading activities in Explain guide students to search for answers to text-dependent questions within informational text passages.



Leveled Readers

Every module includes a leveled reader title that is available in four levels.

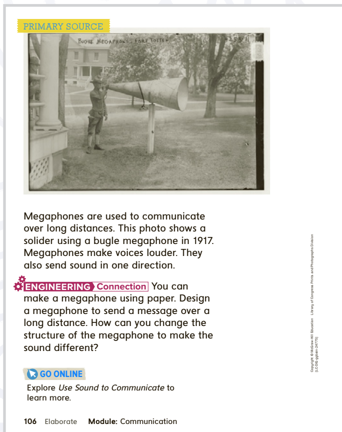
- Approaching Level
- On Level Available in Spanish
- Beyond Level
- EL

Investigator

These books provide a collection of engaging articles about real-world science and engineering stories, available in two levels.

Available in Spanish

- Approaching Level (online, printable)
- On Level



PRIMARY SOURCE

Megaphones are used to communicate over long distances. This photo shows a solider using a bugle megaphone in 1917. Megaphones make voices louder. They also send sound in one direction.

ENGINEERING Connection You can make a megaphone using paper. Design a megaphone to send a message over a long distance. How can you change the structure of the megaphone to make the sound different?

GO ONLINE

Explore *Use Sound to Communicate* to learn more.

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106 Elaborate Module: Communication

Primary Sources

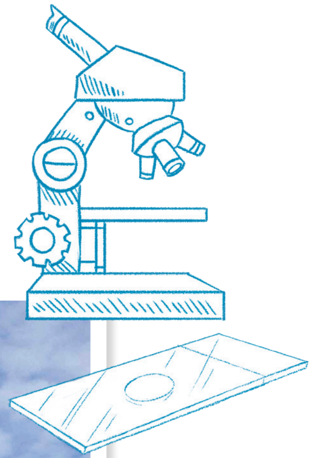
Use primary sources to learn about scientists and engineers and their fascinating discoveries.

STEM Connections

While career opportunities in Science, Technology, Engineering, and Math (STEM) increase each year, qualified candidates for these careers continue to fall short. This is known as the *STEM Gap.* This gap represents a great opportunity for the students in your classroom today. The real-world STEM Connections and the avatar-based STEM Career Kids in *Inspire Science* will help your students imagine a career they might like to pursue some day—a key factor of student engagement. The wide variety of connections, whether real-world or avatar-based, represents a broad range of STEM careers, from jobs that require a high-school education to those that require a PhD.

Real-World STEM Connections

Inspire Science integrates real-world STEM Connections into each module and lesson with real-world scientists and engineers.



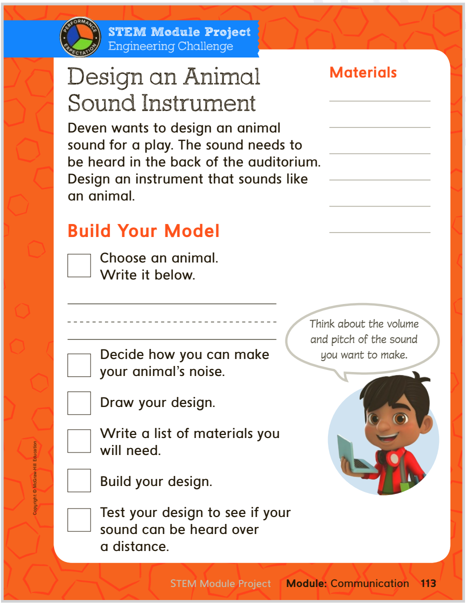
Microbial Ecologist

Dr. Shana K. Goffredi

STEM Career Kids

In Grades K–4, the STEM Career Kid avatars provide an approachable and engaging introduction to STEM Careers for young learners.

STEM Module Project



STEM Module Project
Engineering Challenge

Design an Animal Sound Instrument

Deven wants to design an animal sound for a play. The sound needs to be heard in the back of the auditorium. Design an instrument that sounds like an animal.

Materials

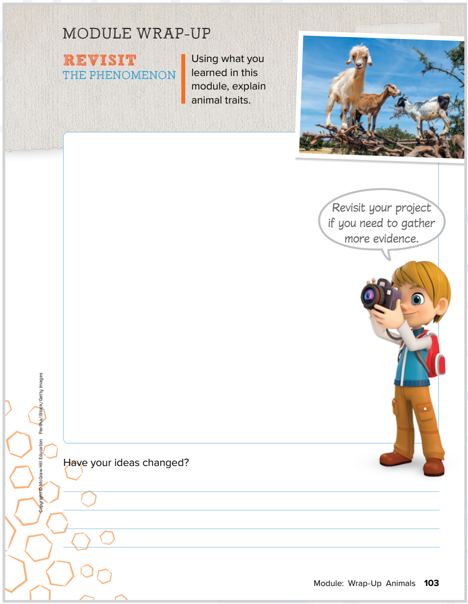
Build Your Model

- [ ] Choose an animal. Write it below.
- [ ] Decide how you can make your animal's noise.
- [ ] Draw your design.
- [ ] Write a list of materials you will need.
- [ ] Build your design.
- [ ] Test your design to see if your sound can be heard over a distance.

Think about the volume and pitch of the sound you want to make.

STEM Module Project Module: Communication 113

Module Wrap-Up



MODULE WRAP-UP

REVISIT THE PHENOMENON

Using what you learned in this module, explain animal traits.

Revisit your project if you need to gather more evidence.

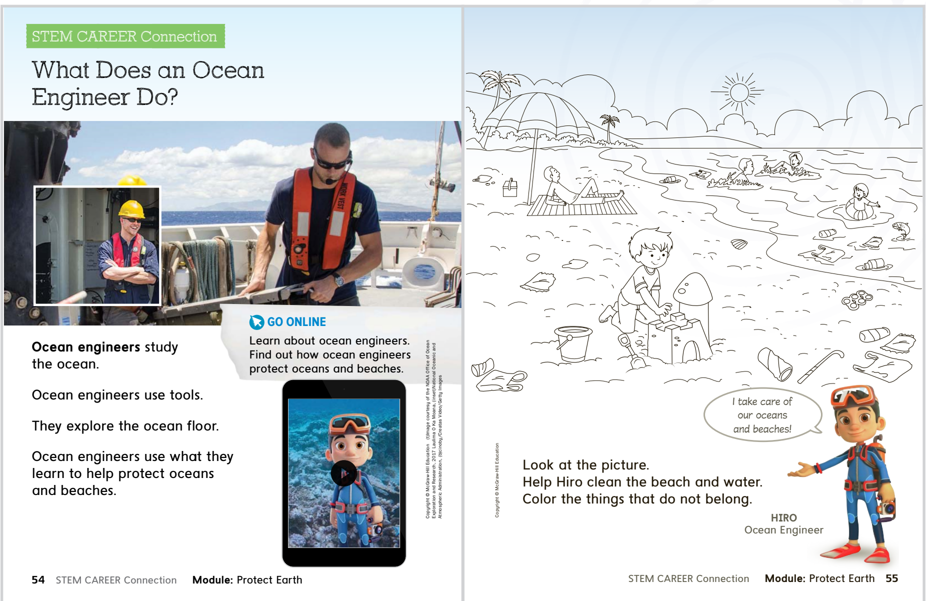
Have your ideas changed?

Module: Wrap-Up Animals 103

The STEM Career Kids capture the imaginations of young learners.

MAYA
Geologist

STEM Connection



STEM CAREER Connection

What Does an Ocean Engineer Do?

GO ONLINE
Learn about ocean engineers. Find out how ocean engineers protect oceans and beaches.

Ocean engineers study the ocean.

Ocean engineers use tools.

They explore the ocean floor.

Ocean engineers use what they learn to help protect oceans and beaches.

54 STEM CAREER Connection Module: Protect Earth

I take care of our oceans and beaches!

Look at the picture.
Help Hiro clean the beach and water.
Color the things that do not belong.

HIRO
Ocean Engineer

STEM CAREER Connection Module: Protect Earth 55

Three-Dimensional Learning Requires Three-Dimensional Assessments!

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

Each *Inspire Science* lesson begins with a Formative Assessment Science Probe.

PAGE KEELEY, M.Ed.

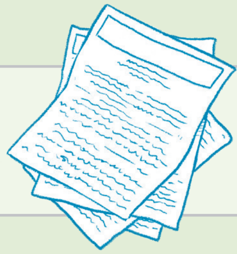
Page Keeley's Science Probes present the lesson phenomenon in an engaging way, promoting student thinking and discussion and revealing commonly-held preconceptions students bring to their learning to guide differentiated instruction strategies.

Chris Keeley Photography

Formative Assessment

Formative assessment, embedded at many points throughout each module and lesson, facilitates student reflection on their thinking (metacognition) and allows teachers to dynamically differentiate instruction. Following are the types of formative assessment resources in *Inspire Science*, which you'll find online and in the print Student Editions.

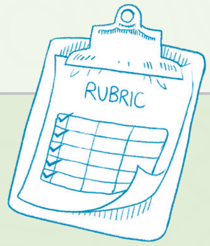
FEATURE	INSTRUCTIONAL PURPOSE
Science Probes	Found at the beginning of each lesson, **Science Probes** reveal student preconceptions to guide instruction.
Claim-Evidence-Reasoning	With the **CER Framework** (Claim, Evidence, Reasoning), found in certain lessons, students will make claims and document their reasoning during Explore and add evidence and revise their claims as needed later in the lesson.
Three-Dimensional Thinking Questions	Throughout each lesson, students will encounter questions that address at least two of the three dimensions of the NGSS to check progress with the SEPs, DCIs, CCCs, and Performance Expectations.
Talk About It	Throughout each lesson, student-initiated or teacher-led **Talk About It** prompts encourage discussion, allowing students to demonstrate their understanding of the phenomena, DCIs, or CCCs.
Inquiry Activities	In each inquiry activity (2–3 per lesson), students will encounter formative assessment questions that help bolster three-dimensional thinking.
Module Pretest	The **Module Pretests**, found at the beginning of each module in Grades 2–5, assess prerequisite knowledge of Disciplinary Core Ideas from prior grades to evaluate student readiness for the module.



Summative Assessment

Summative assessment tools at the module and lesson level help ensure lasting learning and alignment of student skills to the Performance Expectations. Following are the summative assessment tools found in *Inspire Science*, both online and in the print Student Editions.

FEATURE	INSTRUCTIONAL PURPOSE
Three-Dimensional Thinking Questions	At the end of the lessons, students will demonstrate their understanding of at least two of the three dimensions of NGSS to develop three-dimensional thinking skills.
Lesson Check	Found in every lesson online, **Lesson Checks** determine how students are building a progression of learning toward the Performance Expectations.
Module Test	Found at the end of each module online, **Module Tests** evaluate student proficiency against the Performance Expectations with multiple choice, extended response, constructed response, and performance-task items.
STEM Module Project Performance-Based Rubrics	With each STEM Module Project, found at the end of each module, students will complete **Performance-Based Rubrics** and answer summative questions to demonstrate how they've applied their knowledge and understanding of the Performance Expectations to their project.
Vocabulary Check	Through online interactives, students practice and check their understanding of science language. Immediate feedback from the system is provided.
Three-Dimensional Assessment Guide	Through completing the *Inspire Science* units and practicing with the discrete items and performance tasks your students will have a feeling of confidence going into the year-end assessment. The *Inspire Science* Three-Dimensional Assessment guide, available in print and digital formats, provides Guided Practice and Practice items that will prepare students for success.



AdvancED® measured progress.

The NGSS call for higher rigor, a greater demand for evidence of student learning, and the integration of the three dimensions (Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts). Integrated throughout the *Inspire Science* assessments are AdvancED/Measured Progress® assessment items that provide students with opportunities to demonstrate an understanding of the three dimensions of the Performance Expectations as instruction occurs.

Professional Learning

We know it can be a challenge to implement a new science program with new standards. That's why *Inspire Science* comes with a library of relevant, self-paced, professional learning videos and modules to support you from implementation through instructional progression and mastery, all available 24/7, at your fingertips.

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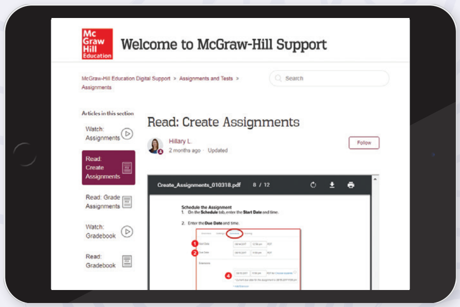
Program Implementation Support

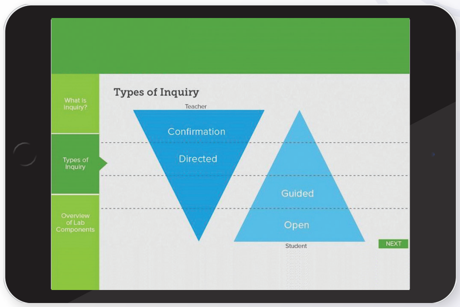
Implementation support provides everything you need to know to get up to speed on the first day of school.

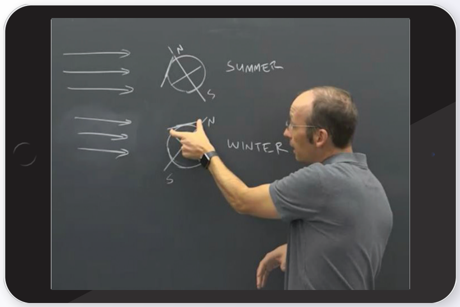
- **Quick Start eLearning Modules** explain program basics to help get you started.
- **Plan, Teach, and Assess eLearning Modules** provide deep-dives of the program's instructional model and resources.



Digital Platform Support

In the Technical Support Resource Library, you will find step-by-step instructions for each of your digital tools to help you feel confident planning, teaching, and assessing in the digital experience.





Ongoing Pedagogy Support

With *Inspire Science*, you will find a wide range of resources on key instructional and pedagogical topics, including videos from our program authors and consultants.

- **STEM Classroom Videos** model lessons from real classrooms
- **Science Preconceptions Videos** review common preconceptions and strategies to overcome them
- **Instructional Coaching Videos** discuss best practice strategies and the "Why" behind the success
- **Teacher Activity Videos** show planning tips and expected results to help with hands-on activity time
- **Science Pedagogy Micro-Courses** provide facilitation guides for both self-guided or small-group courses

Finding Your Professional Learning Resources

All professional learning resources are easily identifiable in your digital experience. Just look for the apple icon in your course, module, or lesson pages.

Program Authors

Dr. Doug Fisher

Dr. Douglas Fisher is Professor of Educational Leadership at San Diego State University and a teacher leader at Health Sciences High & Middle College. He is a member of the California Reading Hall of Fame and recipient of many awards for excellence in education. He has published numerous books and articles and is the co-author of *Visible Learning for Science, Grades K-12 and Reading and Writing in Science: Tools to Develop Disciplinary Literacy*. He is also an ASCD author, keynote presenter, and President of the International Reading Association.

Dr. Jay Hackett

Dr. Jay Hackett is an emeritus professor of Earth Sciences and past recipient of the William R. Ross Science Award as an Honored Alumnus at the University of Northern Colorado. Dr. Hackett is co-author of *Teaching Science as Investigations* and made contributions to the development of *Inquiry and the National Science Education Standards: A Guide for Teaching and Learning*. Dr. Hackett is an admired science educator and McGraw-Hill Education science author.

Page Keeley, M.Ed.

Page Keeley, M.Ed., is a nationally-renowned expert on science formative assessment and teaching for conceptual change. She is the author of several award-winning books and journal articles on uncovering student thinking using formative assessment probes and techniques. She was the Science Program Director at the Maine Mathematics and Science Alliance for 16 years and a past President of the National Science Teachers Association. Currently she is an independent consultant providing professional development to school districts and science education organizations and a frequent invited speaker at national conferences.

Dr. Jo Anne Vasquez

Dr. Jo Anne Vasquez, a past President of the National Science Teachers Association and the National Science Education Leadership Association, was the first elementary educator to become a Presidential Appointee to the National Science Board, the governing board of the National Science Foundation. Her distinguished service and extraordinary contributions to the advancement of science and STEM education at the local, state, and national levels has won her numerous awards: 2014 National Science Education Leadership Award for Outstanding Leadership in Science Education, 2013 National Science Board Public Service Award, and “Robert H. Carlton Award” for Leadership in Science Education.

Dr. Richard Moyer

Dr. Richard Moyer is an emeritus professor of Science Education and Natural Sciences at the University of Michigan-Dearborn. He is an award-winning educator, author, and co-author of *Everyday Engineering: Putting the E in STEM Teaching and Learning, Teaching Science as Investigations,* and *More Everyday Engineering*. Dr. Moyer has served for more than 33 years as a McGraw-Hill Education science author.

In Memoriam Dr. Dorothy J.T. Terman

Dr. Dorothy J.T. Terman served for 21 years as Science Coordinator for California’s Irvine Unified School District, where she was responsible for science curriculum development, program implementation, and assessment. She held a B.S. in Science Education from Cornell University, an M.A. in Cell Biology from Columbia University, and a Ph.D. in Curriculum from the University of Iowa. She received many awards, including the Ohaus Award from the National Science Teachers Association for Innovation in Elementary Science Education. She was a consultant for inquiry-based science curriculum implementation and a veteran McGraw-Hill Education science author. We will miss her inspiration and passion for science education

Dinah Zike, M.Ed.

Dinah Zike, M.Ed. is an award-winning author, educator, and inventor known for designing three-dimensional hands-on manipulatives and graphic organizers known as Foldables® and VKVs® (Visual Kinesthetic Vocabulary®). Ms. Zike is the founder and President of Dinah-Might Adventures, LP and Dinah Zike Academy. She is also the recipient of the Teachers’ Choice Award For the Classroom and Teachers’ Choice Award For Professional Development.

Key Partners

The Concord Consortium is a nonprofit educational research and digital learning organization focused on delivering the promise of technology for education in science, math, and engineering. The *Inspire Science* simulations, created in partnership with The Concord Consortium, enable students to model concepts otherwise not possible to explore in the classroom.

Filament Games creates digital learning games and interactives designed to foster 21st-century skills through experiential learning. The immersive games included with *Inspire Science*, developed in partnership with Filament Games, enable students to "play" with the lesson concepts to deepen conceptual understanding.

Measured Progress, a not-for-profit organization, is a pioneer in authentic, standards-based assessments. Included with *Inspire Science* is **Measured Progress STEM Gauge®** assessment content, which enables teachers to monitor progress toward learning NGSS.

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Inspire Science

Module and Lesson Walk Through

This section will provide you with a step-by-step tour of a module. Become familiar with the print and digital activities and resources available in each module of *Inspire Science*. Here you will find examples of the following:

* Correlations for the NGSS Performance Expectations
* Module and Lesson Planning Resources
* Module Opener
* STEM Module Project Launch
* 5E Lesson
* STEM Module Project
* Module Wrap-Up

Need login credentials?

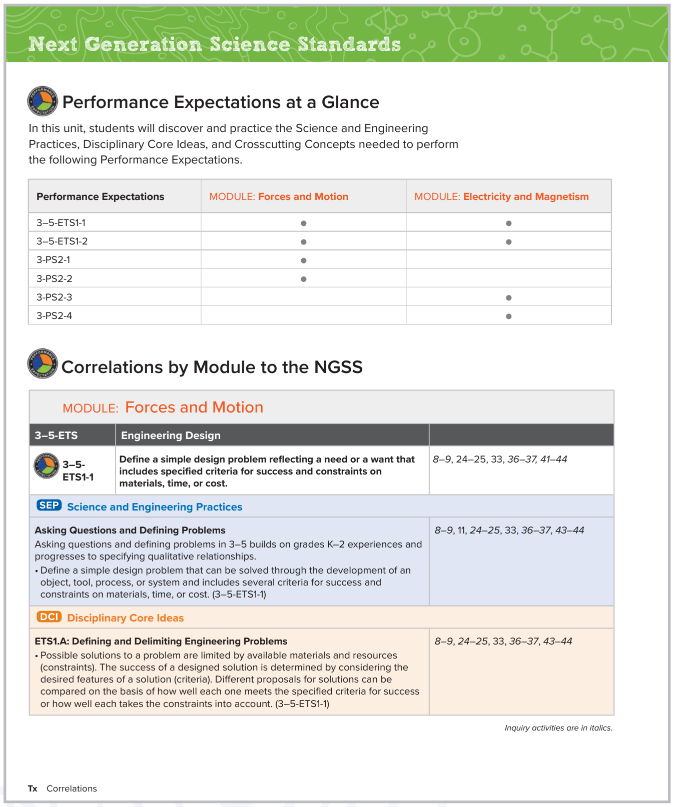
Go to my.mheducation.com and select "Create Teacher Account."

Module and Lesson Planning Resources

The *Inspire Science* Teacher's Edition provides easy-to-follow correlations to the Next Generation Science Standards, telling you which modules address which Performance Expectation.

Performance Expectations and NGSS Correlations

At the beginning of each unit, correlations show how the modules within the unit align to the NGSS in the **Performance Expectations at a Glance** feature. This table identifies where students will discover and practice the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts needed to succeed with each Performance Expectation. Every module clearly identifies by page number the *Inspire Science* resources that correlate to the Next Generation Science Standards.



Next Generation Science Standards

Performance Expectations at a Glance

In this unit, students will discover and practice the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts needed to perform the following Performance Expectations.

Performance Expectations	MODULE: Forces and Motion	MODULE: Electricity and Magnetism
3–5-ETS1-1	•	•
3–5-ETS1-2	•	•
3-PS2-1	•	
3-PS2-2	•	
3-PS2-3		•
3-PS2-4		•

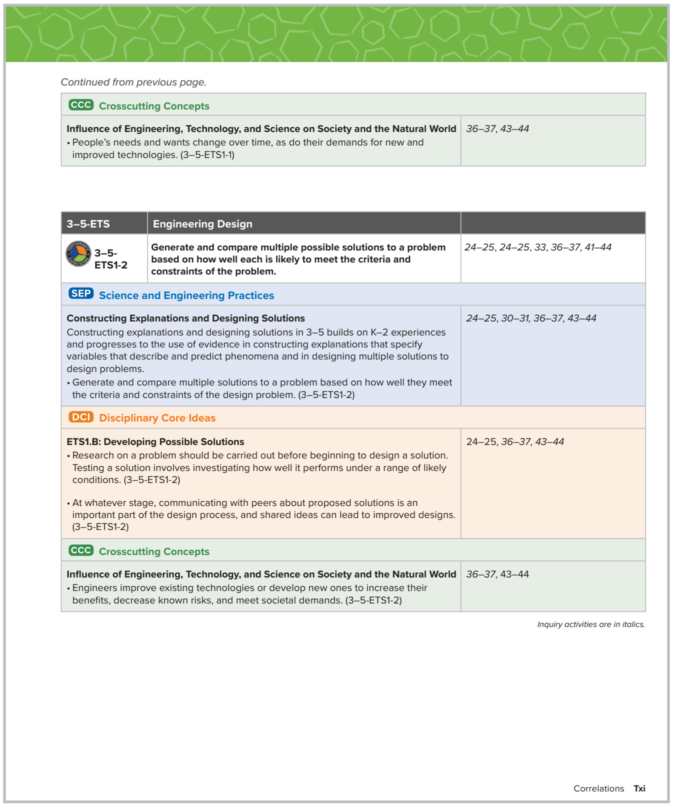
Correlations by Module to the NGSS

MODULE: Forces and Motion

3–5-ETS	Engineering Design	
3–5-ETS1-1	**Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.**	*8–9*, 24–25, 33, *36–37, 41–44*
SEP Science and Engineering Practices		
Asking Questions and Defining Problems Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. • Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3–5-ETS1-1)		*8–9*, 11, *24–25*, 33, *36–37*, *43–44*
DCI Disciplinary Core Ideas		
ETS1.A: Defining and Delimiting Engineering Problems • Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3–5-ETS1-1)		*8–9*, *24–25*, 33, *36–37*, *43–44*

Inquiry activities are in italics.

Tx Correlations



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CCC Crosscutting Concepts	
Influence of Engineering, Technology, and Science on Society and the Natural World • People's needs and wants change over time, as do their demands for new and improved technologies. (3–5-ETS1-1)	*36–37*, *43–44*

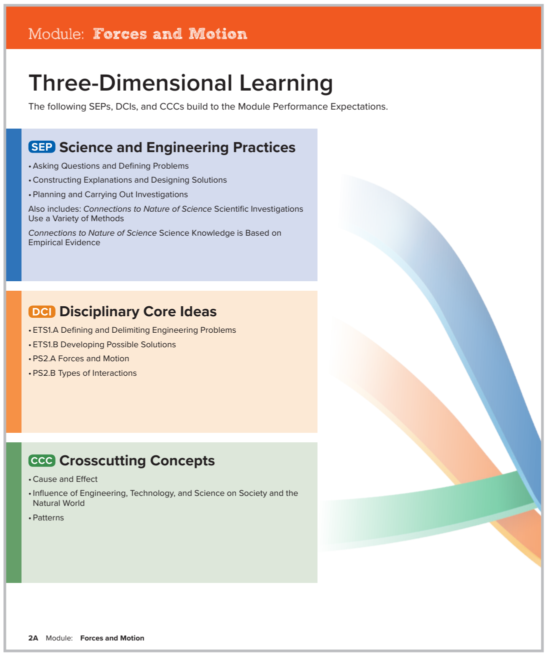
3–5-ETS	Engineering Design	
3–5-ETS1-2	**Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.**	*24–25*, *24–25*, *33*, *36–37*, *41–44*
SEP Science and Engineering Practices		
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3–5-ETS1-2)		*24–25*, *30–31*, *36–37*, *43–44*
DCI Disciplinary Core Ideas		
ETS1.B: Developing Possible Solutions • Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3–5-ETS1-2) • At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3–5-ETS1-2)		24–25, *36–37*, *43–44*
CCC Crosscutting Concepts		
Influence of Engineering, Technology, and Science on Society and the Natural World • Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3–5-ETS1-2)		*36–37*, 43–44

Inquiry activities are in italics.

Correlations Txi

Three-Dimensional Learning

Each module shows the three dimensions of learning that enable students to achieve proficiency with the Performance Expectations addressed in the module.



Module: **Forces and Motion**

Three-Dimensional Learning

The following SEPs, DCIs, and CCCs build to the Module Performance Expectations.

SEP Science and Engineering Practices

- Asking Questions and Defining Problems
- Constructing Explanations and Designing Solutions
- Planning and Carrying Out Investigations

Also includes: *Connections to Nature of Science* Scientific Investigations Use a Variety of Methods

Connections to Nature of Science Science Knowledge is Based on Empirical Evidence

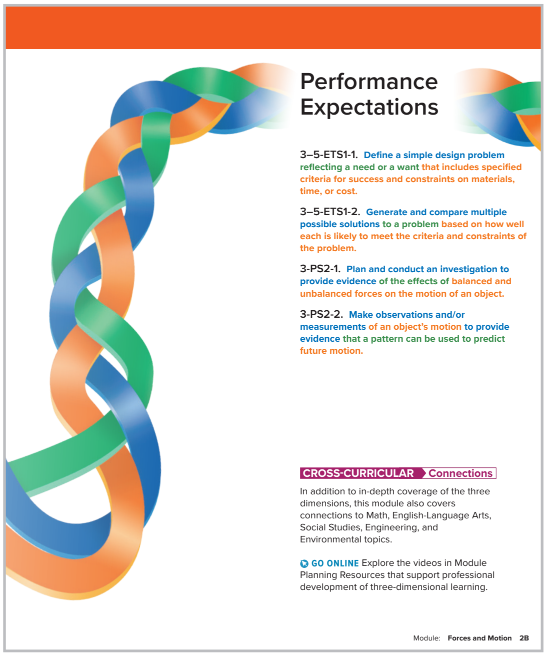
DCI Disciplinary Core Ideas

- ETS1.A Defining and Delimiting Engineering Problems
- ETS1.B Developing Possible Solutions
- PS2.A Forces and Motion
- PS2.B Types of Interactions

CCC Crosscutting Concepts

- Cause and Effect
- Influence of Engineering, Technology, and Science on Society and the Natural World
- Patterns

2A Module: **Forces and Motion**



Performance Expectations

3–5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3–5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

CROSS-CURRICULAR Connections

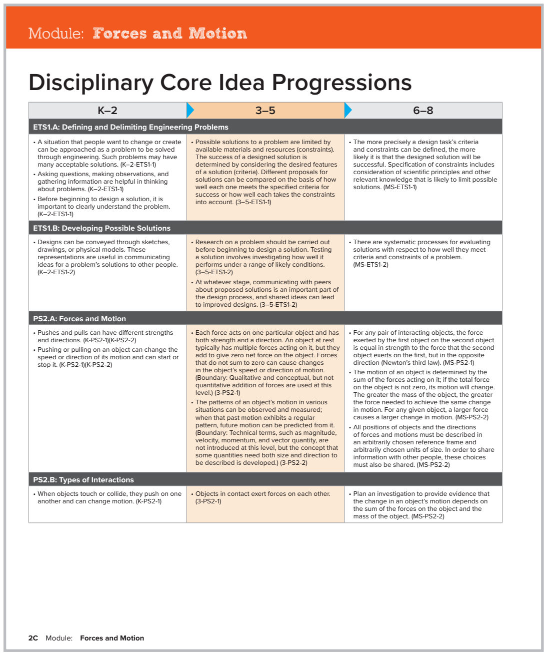
In addition to in-depth coverage of the three dimensions, this module also covers connections to Math, English-Language Arts, Social Studies, Engineering, and Environmental topics.

GO ONLINE Explore the videos in Module Planning Resources that support professional development of three-dimensional learning.

Module: **Forces and Motion** 2B

Disciplinary Core Idea Progression

This table illustrates in detail the Disciplinary Core Idea Progressions across grades K—8.



Module: **Forces and Motion**

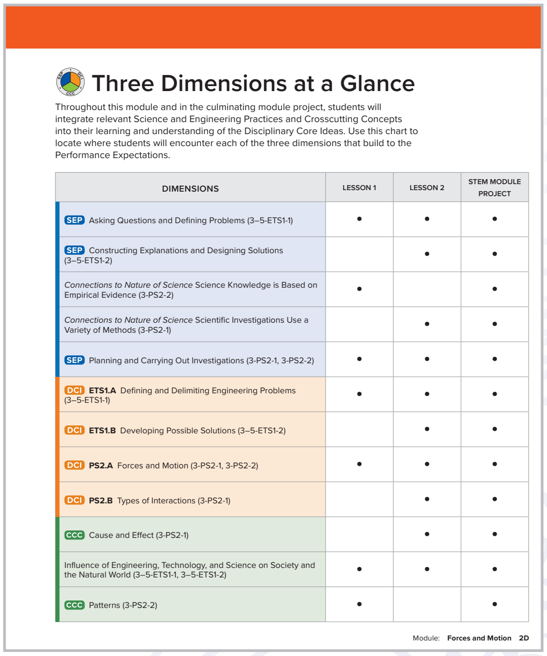
Disciplinary Core Idea Progressions

K–2	3–5	6–8
ETS1.A: Defining and Delimiting Engineering Problems		
• A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. (K–2-ETS1-1) • Asking questions, making observations, and gathering information are helpful in thinking about problems. (K–2-ETS1-1) • Before beginning to design a solution, it is important to clearly understand the problem. (K–2-ETS1-1)	• Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3–5-ETS1-1)	• The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions. (MS-ETS1-1)
ETS1.B: Developing Possible Solutions		
• Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K–2-ETS1-2)	• Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3–5-ETS1-2) • At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3–5-ETS1-2)	• There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem. (MS-ETS1-2)
PS2.A: Forces and Motion		
• Pushes and pulls can have different strengths and directions. (K-PS2-1)(K-PS2-2) • Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1)(K-PS2-2)	• Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) (3-PS2-1) • The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) (3-PS2-2)	• For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law). (MS-PS2-1) • The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion. (MS-PS2-2) • All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared. (MS-PS2-2)
PS2.B: Types of Interactions		
• When objects touch or collide, they push on one another and can change motion. (K-PS2-1)	• Objects in contact exert forces on each other. (3-PS2-1)	• Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. (MS-PS2-2)

2C Module: **Forces and Motion**

Three Dimensions at a Glance

Use this chart to locate where students will encounter each of the three dimensions that build to the Performance Expectations in the module.



Three Dimensions at a Glance

Throughout this module and in the culminating module project, students will integrate relevant Science and Engineering Practices and Crosscutting Concepts into their learning and understanding of the Disciplinary Core Ideas. Use this chart to locate where students will encounter each of the three dimensions that build to the Performance Expectations.

DIMENSIONS	LESSON 1	LESSON 2	STEM MODULE PROJECT
SEP Asking Questions and Defining Problems (3–5-ETS1-1)	•	•	•
SEP Constructing Explanations and Designing Solutions (3–5-ETS1-2)		•	•
Connections to Nature of Science Science Knowledge is Based on Empirical Evidence (3-PS2-2)	•		•
Connections to Nature of Science Scientific Investigations Use a Variety of Methods (3-PS2-1)		•	•
SEP Planning and Carrying Out Investigations (3-PS2-1, 3-PS2-2)	•	•	•
DCI **ETS1.A** Defining and Delimiting Engineering Problems (3–5-ETS1-1)	•	•	•
DCI **ETS1.B** Developing Possible Solutions (3–5-ETS1-2)		•	•
DCI **PS2.A** Forces and Motion (3-PS2-1, 3-PS2-2)	•	•	•
DCI **PS2.B** Types of Interactions (3-PS2-1)		•	•
CCC Cause and Effect (3-PS2-1)		•	•
Influence of Engineering, Technology, and Science on Society and the Natural World (3–5-ETS1-1, 3–5-ETS1-2)	•	•	•
CCC Patterns (3-PS2-2)	•		•

Module: **Forces and Motion** 2D

Module and Lesson Planning Resources

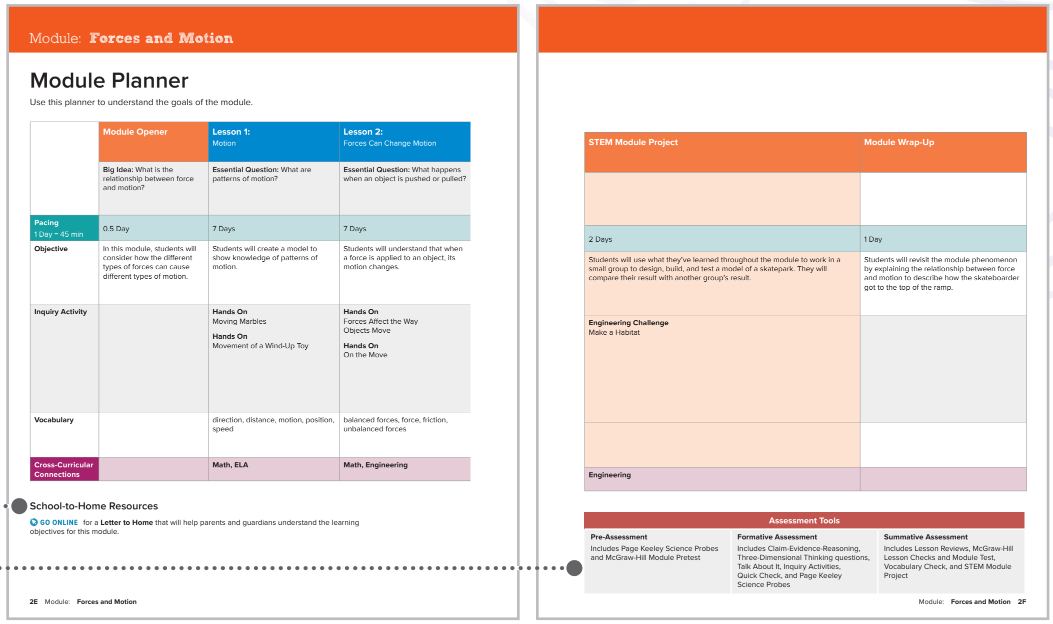
The Module and Lesson Planner pages provide a high-level look at what students will use to learn and master the Performance Expectations.

Module Planner

The **Module Planner** provides a summary of the key activities and resources in the module as well as pacing recommendations.

School-to-Home Resources provide letters to be sent home that explain the learning objectives that will be taught for each module.

Assessment Tools are available in every module.

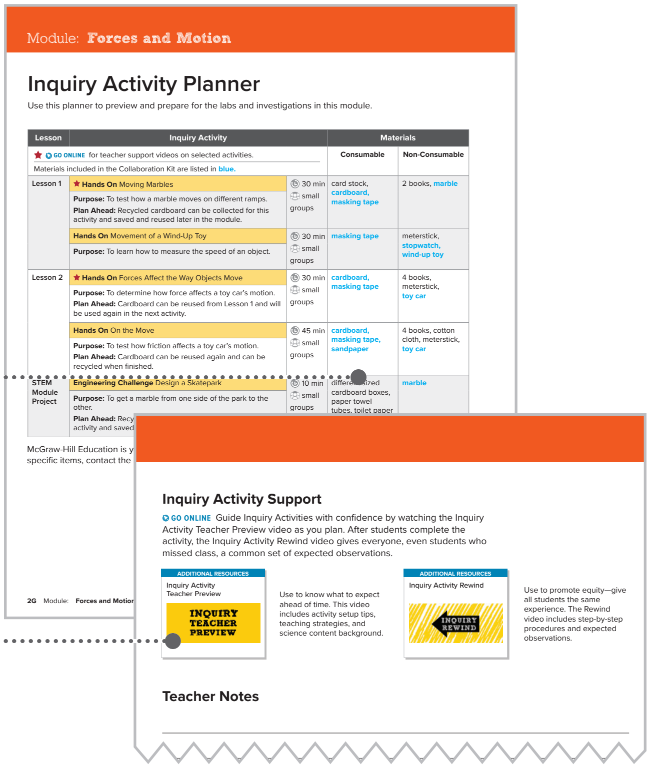


Inquiry Activity Planner

The **Inquiry Activity Planner** helps you get ready for all inquiry activities in the module, with a summary of the activity, the purpose, pacing and grouping strategies, and needed materials.

Materials in blue are included in the **Collaboration Kits**.

Each module includes **Inquiry Videos** that demonstrate the hands-on activities so you know what to expect.

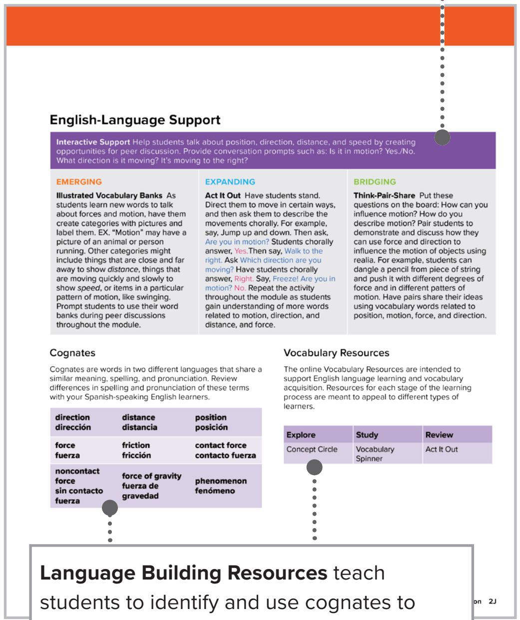


Inspire All Students

Each module includes strategies to scaffold instruction and plan for successful teaching for all students.

Differentiated Instruction strategies suggest leveled activities for Approaching Level, On Level, Beyond Level, and Advanced and Gifted Learners.

English-Language Support provides suggested strategies and activities for EL students in alignment with the EL Framework (Emerging, Expanding, Bridging).



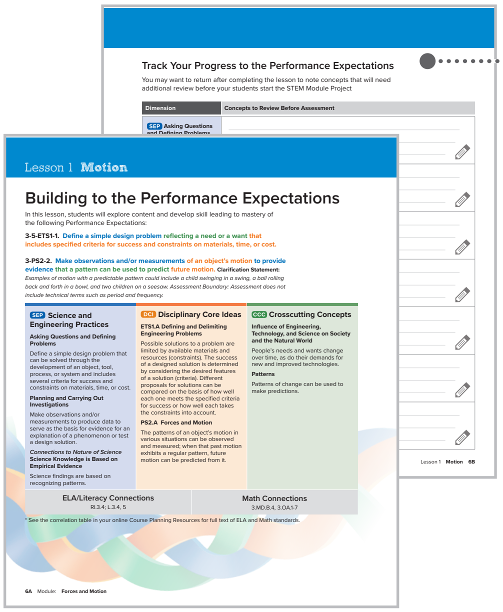
Add depth and complexity for your **Advanced and Gifted Learners.**

Literacy Support helps students to further develop close reading skills through science.

Language Building Resources teach students to identify and use cognates to create linguistic bridges between school and home to capitalize on emerging bilingualism.

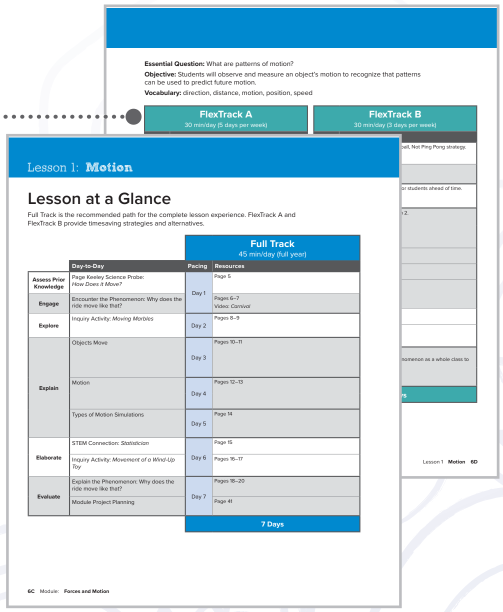
Lesson Planner

Building to the Performance Expectations details the three dimensions of learning that your students will explore to develop mastery of Performance Expectations.



The **Track Your Progress** table helps you monitor student progress toward mastery of the Performance Expectations.

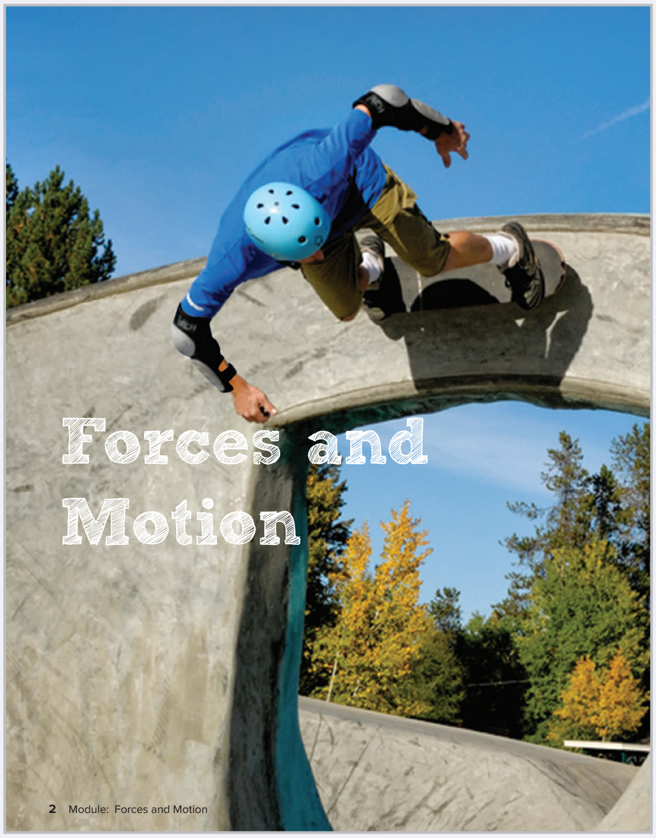
Every lesson offers three pacing options to best meet your schedule.



Module Opener

AT-A-GLANCE

Inspire your students' curiosity with a real-world phenomenon that inspires students to ask questions and investigate the world around them. The anchoring module phenomenon will uncover students' initial ideas, setting them up to see how their thinking evolves as they progress through the module.



Inspiring Teacher Support

Performance Expectations are identified to let you know what students will be learning throughout the module.

Differentiated Instruction suggestions help you provide instruction that is just right for students of all levels.

Word Walls are included for students in Grades K–1 to emphasize key foundational vocabulary.

STEM Connections

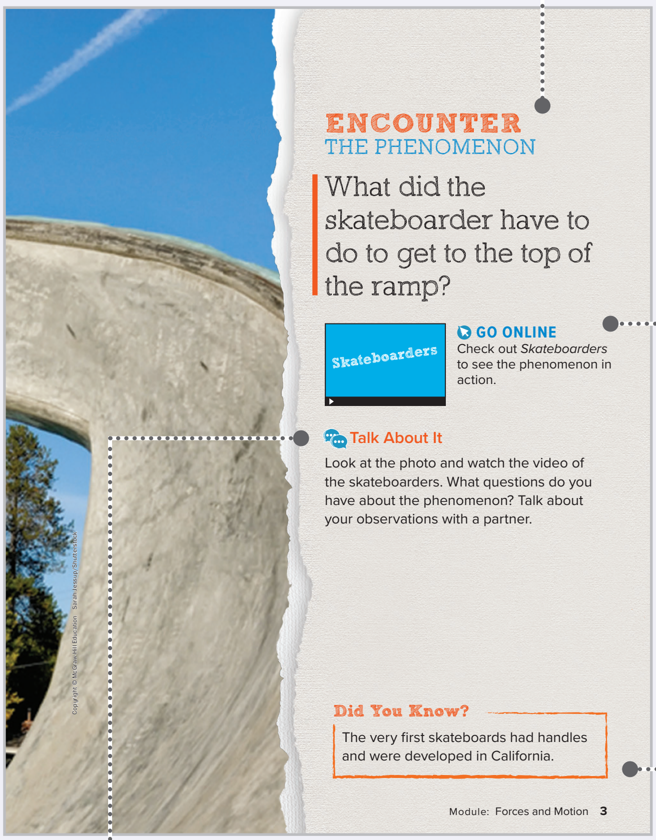
Real-world STEM Careers (with relatable STEM Career Kids in K–1) are introduced at the module level to help students see how the information from the module is applied in the real world.

Teacher Toolbox

Look for the Teacher Toolbox. It appears throughout each module and provides science background information or to or identifies common preconceptions related to the content at hand.

ENCOUNTER THE PHENOMENON

The **Module Opener** begins the inquiry process by presenting an anchoring phenomenon to explore throughout module. Lesson-level investigative phenomena and inquiry activities help students build understanding of the module phenomenon.



GO ONLINE

Go Online to Explore

Interactive digital content gets students thinking and talking about the module phenomenon.

Talk About It

In each **Module Opener**, students are prompted to discuss the module phenomenon after reviewing the **ENCOUNTER THE PHENOMENON** resource.

Did You Know?

Did You Know statements provide background information to promote conversation and help students turn their observations into questions they will answer later.

Skyward Kick Productions/Shutterstock

STEM Module Project Launch

AT-A-GLANCE

In grades 2 and up, build excitement and get your students curious about what they'll be learning in each lesson. This section tells students about the project they'll complete at the end of the module and how the lessons in the module will help them in their planning. Your students will start asking questions, setting goals, and preparing to experience the engineering design process like the professionals.

STEM Module Project Launch
Engineering Challenge

Lesson 1
Motion

Lesson 2
Forces Can Change Motion

Design a Skatepark

You have been hired as an architectural designer. At the end of this module, you will develop a design for a skatepark. Your goal will be to design, build, and test a model that is able to get a marble from one side of the park to the other.

Architectural designers apply their knowledge of motion, forces, and design to create playgrounds and skateparks.

What do you think you need to know before you can design a skatepark?

SAM
Architectural Drafter

STEM Module Project

Plan and Complete the Engineering Challenge Use what you learn throughout the module to complete the challenge.

4 STEM MODULE PROJECT Module: Forces and Motion

PHASE 1 (Grades 2-5)

STEM Module Project Launch
Engineering Challenge

Students assume the role of a scientist or engineer and are charged with the task of designing a solution to the related Science or Engineering Challenge at the end of the module.

As students progress through each lesson, they will generate questions and begin initial planning while learning about the related, real-world STEM Career.

(t)Cathy Yeulet/stockbroker/123RF, (b)Steve Debenport/E+/Getty Images

PHASE 2 (Grades 2–5)

STEM Module Project Planning

After each lesson, students have the opportunity to think about how what they've just learned can help them with their project at the end of the module.

KEEP PLANNING


STEM Module Project
Engineering Challenge

Design a Skatepark

You have been hired as an architectural designer. Using what you have learned throughout this module, you will design a skatepark. Your goal will be to design, build, and test a model that will successfully get a marble from one end of the park to the other using parameters set by your teacher.

Planning after Lesson 1

Apply what you have learned about motion to your project planning.

How does knowing about motion affect your project planning?

Record information to help you plan your model after each lesson.

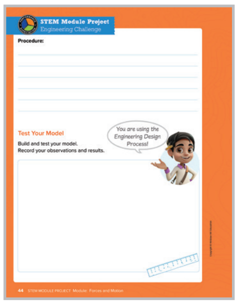
STEM MODULE PROJECT Module: Forces and Motion 41

What do you think you need to know before you can design a skatepark?

PHASE 3 (Grades K–5)

STEM Module Project

At the end of the module, students will complete the Science or Engineering Challenge.



ENGINEERING CHALLENGE
In this STEM module project, students will follow the **Engineering Design Process** to design, construct, and test a skatepark.

SAM
Architectural Drafter

Science Probe

AT-A-GLANCE

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

Science probes present a real-world phenomenon, or core concept, to promote student thinking and discussion, revealing commonly-held preconceptions and initial ideas students bring to their learning so you can best inform your instruction.

Inspiring Teacher Support

Detailed teacher support for every science probe:

- Research-based, common preconceptions associated with the content of the lesson
- Suggested Page Keeley discussion strategies and support videos
- Detailed account of the purpose and usefulness of each probe
- Clearly stated teaching and learning implications
- Scientific explanations to clarify the specific content at hand

Page Keeley **Productive Discussion Strategies** provide a variety of ways to get students talking and documenting their thinking. A strategy is recommended for each science probe including specific Page Keeley strategy videos.

PAGE KEELEY SCIENCE PROBES

PAGE KEELEY, M.Ed.
Author and Educator

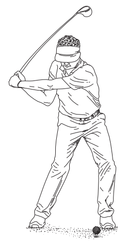
Uncover Student Preconceptions

Page Keeley, M.Ed. is a nationally-renowned expert on science formative assessment and teaching for conceptual change. She is the author of several award-winning books and journal articles on uncovering student thinking using formative assessment probes and techniques. She was the Science Program Director at the Maine Mathematics and Science Alliance for 16 years and a past President of the National Science Teachers Association.

Sticky Bar Graph Productive Discussion Strategy

Simple Illustration or Scenario

Science Probes present students with familiar real-world phenomenon or a core concept. These could be in the form of simple illustration or scenario.



PAGE KEELEY SCIENCE PROBES

LESSON 2 LAUNCH

Golf Ball

Three friends are playing golf. They each have different ideas about the forces that act on a golf ball. This is what they think:

Finn: *Forces act on the golf ball only when the golfer hits the ball.*

Pete: *Forces act on the golf ball only when the ball is on the tee.*

Tad: *Forces act on the golf ball when it is on the tee and when the golfer hits the ball.*

Who has the best idea about forces? ______

Explain why you think it is the best idea.

______

You will revisit the Page Keeley Science Probe later in the lesson.

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SCIENCE PROBE Lesson 2 Forces and Motion 21

Real-World Phenomena

Relevant phenomena have great explanatory power. The situations presented are designed to draw out deeper thinking and elicit more thoughtful responses from students.

Best Versus Right Answer

Students are more motivated to learn in a non-judgmental environment. By referencing the “best answer” to explain thinking, rather than the “right answer,” students feel safe in sharing their thinking.

Explanatory Answers Reveal Students’ Thoughts

Students are required to provide an explanation for their answers, which helps uncover preconceived notions that may be clouding students’ thought processes.

Revisit the Probe

REVISIT PAGE KEELEY SCIENCE PROBES

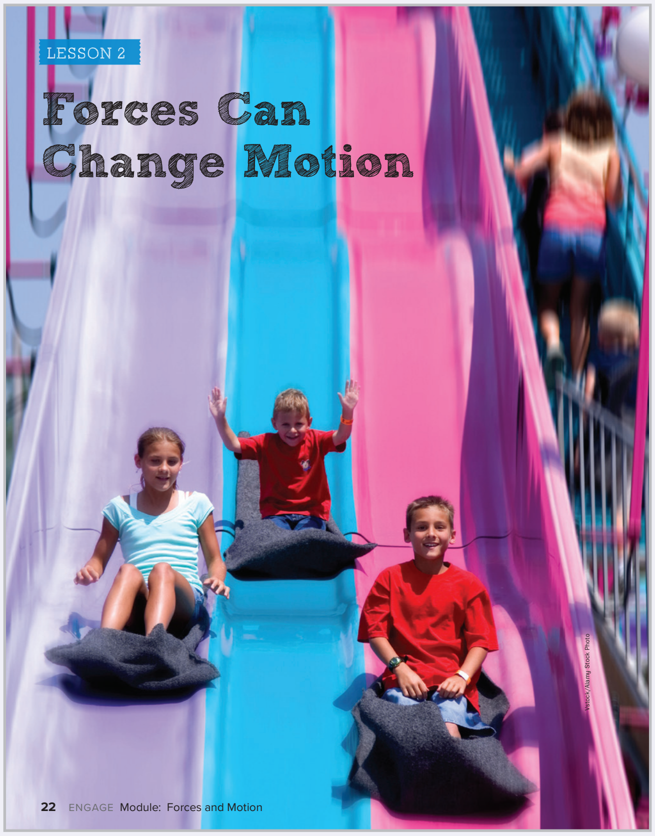
Students will revisit the science probe throughout the lesson. After engaging with a variety of learning opportunities, students will be able to adjust their thinking if needed based on the evidence they’ve gathered in the lesson.

Engage

AT-A-GLANCE

The Engage phase will inspire students' curiosity with a real-world phenomenon they will investigate throughout the lesson. These lesson phenomena help uncover student preconceptions and generate collaborative conversations that turn observations into questions to investigate.

As students progress through the lesson, they will begin to reveal answers to the questions they generated and will revisit their initial thinking to see how it changes as they learn new information.

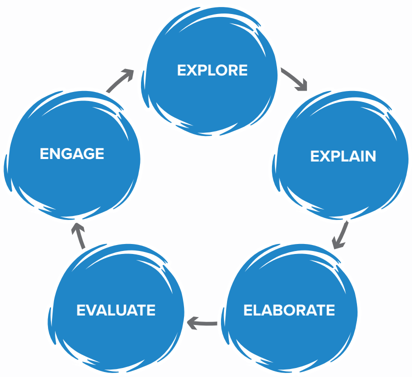


Inspiring Teacher Support

Disciplinary Core Ideas and **Lesson Objectives** are clearly stated.

The **Encounter/Discover the Phenomenon** question is connected to the **Essential Question** for the lesson.

Discussion prompts are provided to help you facilitate collaborative conversations.

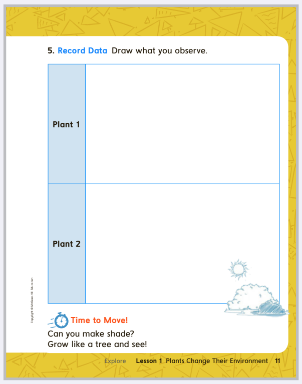


5E INSTRUCTIONAL MODEL

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

Time To Move (Grades K—1)

Engage younger students with suggested activities that get them up and moving.

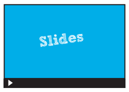


ENCOUNTER THE PHENOMENON

Students will engage with the lesson-level, investigative phenomena and collaborate to generate a list of questions.

ENCOUNTER
THE PHENOMENON

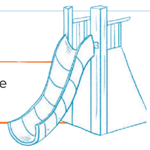
How are they going down the slide so fast?



GO ONLINE
Check out *Slides* to see the phenomenon in action.

Talk About It
Look at the photo and watch the video of the kids going down the slide. What questions do you have about the phenomenon? Talk about your questions and observations with a partner.

Did You Know?
London has the longest and tallest slide in the world. It takes about 40 seconds to go down!



GO ONLINE

Go Online to Explore

Check out the video *Slides* to see the phenomenon in action.

Talk About It

Keep the Conversation Going

Students will describe what they see and turn their observations into questions that they will revisit and try to answer as they progress through the lesson.

Hifi Films/Shutterstock

Explore

AT-A-GLANCE

The Explore phase lets your students get involved and investigate the phenomenon through a related, common experience. They will carry out an investigation, collect and interpret data, and begin to reveal answers to their questions and build understanding using different types of inquiry activities.

Inspiring Teacher Support

Inquiry activity support outlines the purpose, materials needed, and suggested strategies for facilitating the student work and discussions.

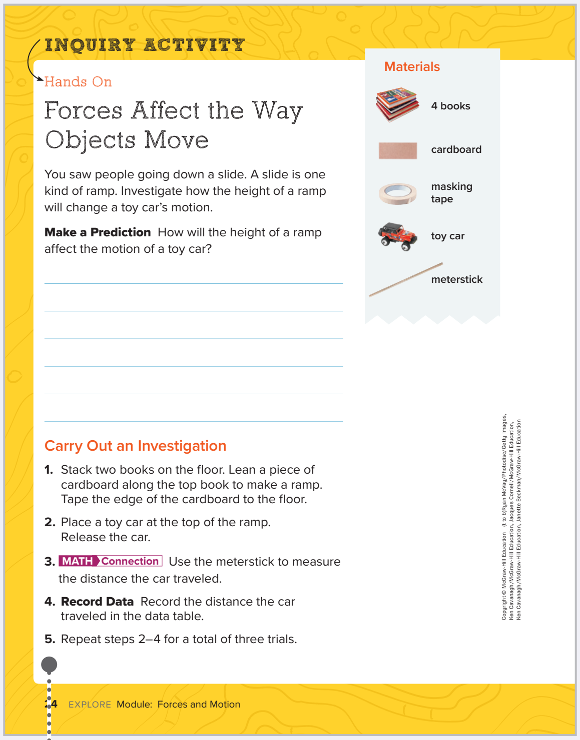
The **Science and Engineering Practices** are clearly highlighted, along with the **Crosscutting Concepts**, where relevant.

Differentiated Instruction tables provide activity customization suggestions to align with different levels of student skills.

Inquiry Spectrum provides flexible activity options to adjust the inquiry level to align with the learning needs of your students.

Engineering Connection activities are provided and include teacher support.

Collaboration Kits contain most of the materials needed for the hands-on inquiry activities. The materials are neatly organized and labeled to correlate with each unit and module, with enough materials for five groups of students.



INQUIRY ACTIVITY

Hands On

Forces Affect the Way Objects Move

You saw people going down a slide. A slide is one kind of ramp. Investigate how the height of a ramp will change a toy car's motion.

Make a Prediction How will the height of a ramp affect the motion of a toy car?

Materials
- 4 books
- cardboard
- masking tape
- toy car
- meterstick

Carry Out an Investigation

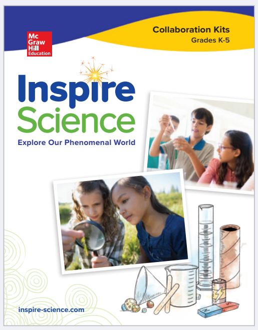
1. Stack two books on the floor. Lean a piece of cardboard along the top book to make a ramp. Tape the edge of the cardboard to the floor.
2. Place a toy car at the top of the ramp. Release the car.
3. MATH Connection Use the meterstick to measure the distance the car traveled.
4. **Record Data** Record the distance the car traveled in the data table.
5. Repeat steps 2–4 for a total of three trials.

24 EXPLORE Module: Forces and Motion

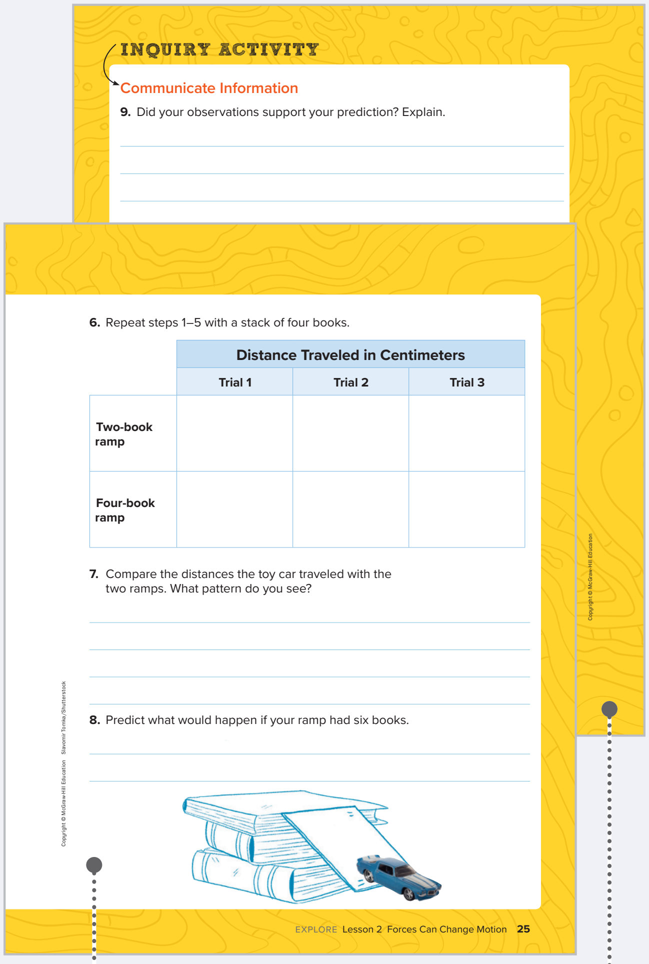
Inquiry activities guide students to think about the phenomenon, **make a prediction**, and **carry out an investigation** to test their predictions.

Inquiry Rewind

Inquiry activity videos provide a step-by-step look at the inquiry activity.



See the **Collaboration Kit Guide** for details regarding the materials that come in each kit.



INQUIRY ACTIVITY

Communicate Information

9. Did your observations support your prediction? Explain.

6. Repeat steps 1–5 with a stack of four books.

	Distance Traveled in Centimeters		
	Trial 1	Trial 2	Trial 3
Two-book ramp			
Four-book ramp			

7. Compare the distances the toy car traveled with the two ramps. What pattern do you see?

8. Predict what would happen if your ramp had six books.

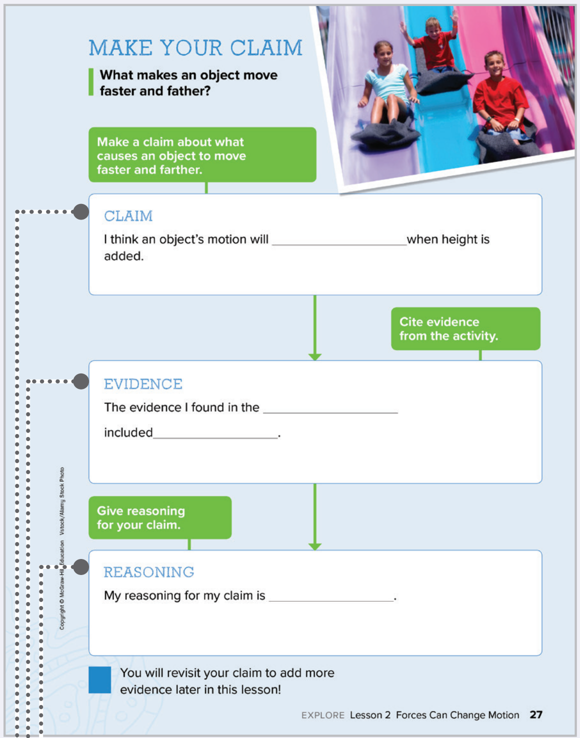
EXPLORE Lesson 2 Forces Can Change Motion 25

During their investigation, students will **record and analyze** their observations, think about changes to their prediction, and plan changes to their investigation.

At the end of the inquiry activities, students **communicate their findings** (with evidence) and **make connections to real-world examples**.

CLAIM EVIDENCE REASONING

Students will use the Claim, Evidence, Reasoning framework to help them as they explore and explain the phenomenon.



MAKE YOUR CLAIM

What makes an object move faster and father?

Make a claim about what causes an object to move faster and farther.

CLAIM

I think an object's motion will ________ when height is added.

Cite evidence from the activity.

EVIDENCE

The evidence I found in the ________

included________.

Give reasoning for your claim.

REASONING

My reasoning for my claim is ________.

You will revisit your claim to add more evidence later in this lesson!

EXPLORE Lesson 2 Forces Can Change Motion 27

CLAIM Students reflect and brainstorm possible answers and take a clear stance on how the object will move.

EVIDENCE Students provide their initial evidence from what they learned in the inquiry activity. They return to their claim to add more evidence as it is revealed throughout the lesson.

REASONING Students explain the scientific knowledge, principle, or theory they used to support their argument.

Explain

AT-A-GLANCE

This phase of the lesson model provides students with an array of informational text, supportive resources, and interactive activities so they can synthesize information and convey their understanding of the concepts.

Students will interact with the content and practice close-reading skills.

Inspiring Teacher Support

Inquiry activity support outlines the purpose, materials needed, and suggested strategies for facilitating the student work and discussions.

The **Science and Engineering Practices** are clearly highlighted, along with the **Crosscutting Concepts**, where relevant.

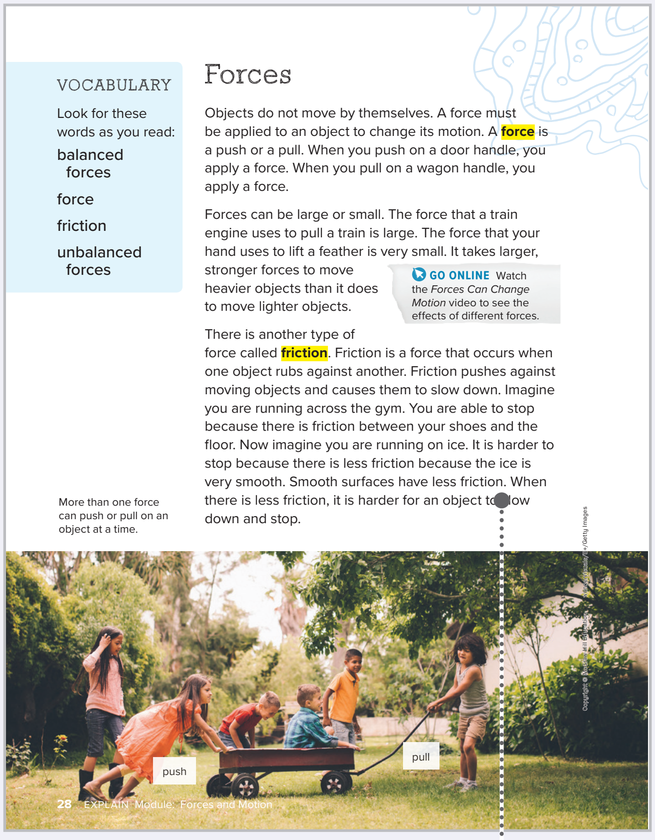
EL Support provides suggested activities for Emerging, Bridging, and Expanding student groups.

Differentiated Instruction tables provide activity customization suggestions to align with different levels of student skills.

Close Reading framework support to help you guide students through the Inspect, Find Evidence, and Make Connection steps.

Visual Literacy strategies and teacher support give students practice reading and understanding diagrams.

Vocabulary strategies encourage students to use context clues to derive the meaning of the vocabulary words.



VOCABULARY

Look for these words as you read:

balanced forces

force

friction

unbalanced forces

Forces

Objects do not move by themselves. A force must be applied to an object to change its motion. A **force** is a push or a pull. When you push on a door handle, you apply a force. When you pull on a wagon handle, you apply a force.

Forces can be large or small. The force that a train engine uses to pull a train is large. The force that your hand uses to lift a feather is very small. It takes larger, stronger forces to move heavier objects than it does to move lighter objects.

GO ONLINE Watch the *Forces Can Change Motion* video to see the effects of different forces.

There is another type of force called **friction**. Friction is a force that occurs when one object rubs against another. Friction pushes against moving objects and causes them to slow down. Imagine you are running across the gym. You are able to stop because there is friction between your shoes and the floor. Now imagine you are running on ice. It is harder to stop because there is less friction because the ice is very smooth. Smooth surfaces have less friction. When there is less friction, it is harder for an object to slow down and stop.

More than one force can push or pull on an object at a time.

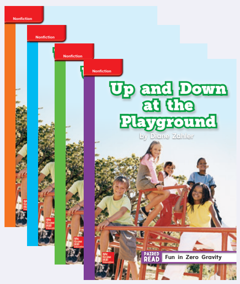
28 EXPLAIN Module: Forces and Motion

Interactive Text

Students interact directly with core content to strengthen literacy and writing skills.

Leveled Reader

Students can extend their learning with leveled informational text that includes a paired fiction reading, text-dependent questions, hands-on activities, and graphic organizers to help summarize the selection.



- Approaching
- On Level
- Beyond
- ELL

Digital Vision/Getty Images

CLOSE READING

Inspect

Read the passage *Skateboarding.* Underline text evidence that tells what two things a skateboarder needs to do tricks.

Find Evidence

Reread How does a skateboarder get high enough to do a trick? Highlight the text that explains.

Notes

Skateboarding

Skateboarding is a sport that began in 1950 in California. Before there were skateparks, skateboarders practiced in empty swimming pools. Today, there are hundreds of thousands of skateparks in the United States.

Skateboarding is a fun sport that requires only a few pieces of equipment. A skateboard and protective gear makes someone ready to hit the park. Although skateboards can vary and have unique designs, all are made of three basic parts: a board, wheels, and trucks, which connect the wheels to the board and allow the board to turn.

To be safe, skateboarders have to wear helmets to protect their heads. They also wear gear to protect their wrists and knees.

There is science involved in designing a skatepark. Architectural designers apply principles of motion and force so that the skateboarders can get the speed they need.

Notice the many slopes of the skatepark in the photo on this page. When skateboarders push themselves down a slope, their speed increases. They go across a flat surface as they stand on the board. Leaning their body to one side or the other causes the wheels to move the direction they want, right toward another slope. Their speed remains the same because balanced forces are acting on the skateboard. When they go down another slope, they use unbalanced forces to increase their speed to carry them across another flat surface and up the next slope. With enough speed, they can get high enough to do their tricks in the air.

Make Connections

Talk About It

What does an architectural designer need to know about skateboarders in order to design a skatepark?

Notes

32 EXPLAIN Module: Forces and Motion

EXPLAIN Lesson 2 Forces Can Change Motion 33

Close Reading

Integrating literacy with science content helps students make connections while building close-reading skills and strengthening writing skills.

ACT Access Complex Text

The ACT Framework (Access Complex Text) provides scaffolded practice for seven different complex text features.

Premade questions specific to the text help students understand complex text more clearly.

PRIMARY SOURCE

Students learn about scientists and engineers and their related discoveries through primary source features.

Changing Motion

GO ONLINE Explore the PhET simulation *Forces and Motion* to see the forces in tug of war.

Think back to your toy car. With a partner, brainstorm five ways you can make the object have motion. In the table, draw a picture using arrows to indicate the direction and label what force was applied and if the forces were balanced or unbalanced.

Motion	Forces Acting on Object	Balanced or Unbalanced
Make an object remain still		❑ Balanced ❑ Unbalanced
Make an object move forward		❑ Balanced ❑ Unbalanced
Make an object move faster, forward		❑ Balanced ❑ Unbalanced

30 EXPLAIN Module: Forces and Motion

Crosscutting Concept Graphic Organizers

Use Crosscutting Concept Graphic Organizers to apply the themes to the science concept at hand throughout the lesson.

Elaborate

AT-A-GLANCE

In Elaborate, students apply knowledge to new situations to develop a deeper understanding of the lesson concepts.

Inspiring Teacher Support

EL Support and suggested lesson alternatives are available throughout.

Question Prompts and Answers help support the conversation about STEM Connections.

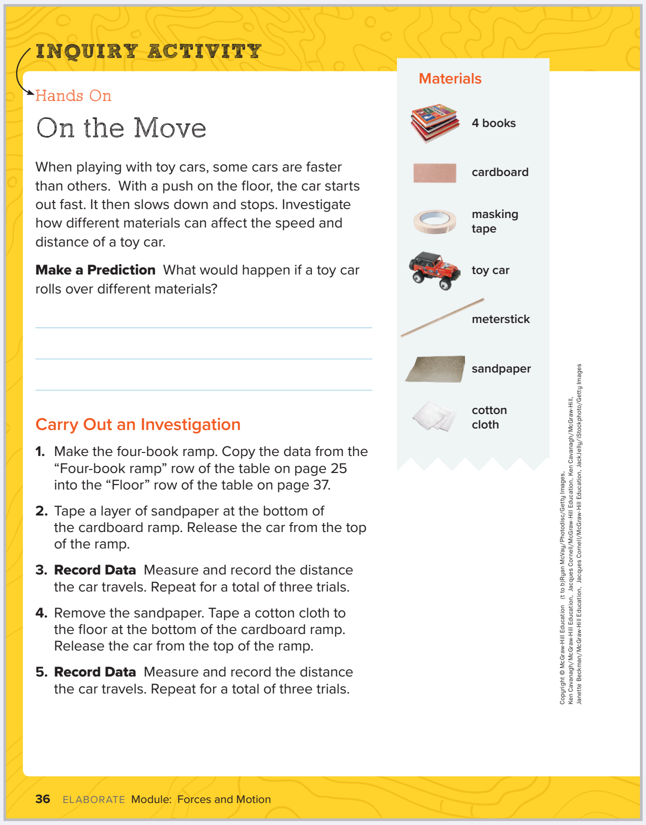
Crosscutting Concepts Science Songs are available for Grade K–2 students.

Teacher suggestions on how to save time are included throughout.

Word Origin Study guides students' research through the word origins of the lesson vocabulary to better understand that parts of the words can give clues about the whole meaning.

Literacy and Math Connections are embedded throughout every lesson.

EL Support provides suggested activities for Emerging, Bridging, and Expanding student groups.



INQUIRY ACTIVITY

Hands On

On the Move

When playing with toy cars, some cars are faster than others. With a push on the floor, the car starts out fast. It then slows down and stops. Investigate how different materials can affect the speed and distance of a toy car.

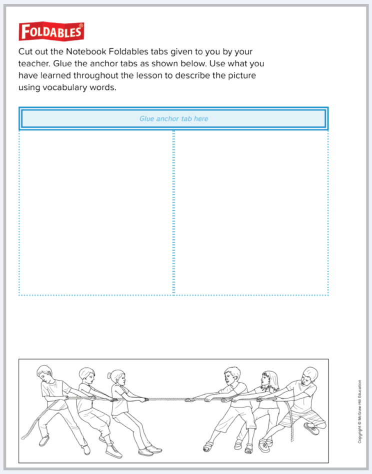
Make a Prediction What would happen if a toy car rolls over different materials?

Materials: 4 books, cardboard, masking tape, toy car, meterstick, sandpaper, cotton cloth

Carry Out an Investigation

1. Make the four-book ramp. Copy the data from the "Four-book ramp" row of the table on page 25 into the "Floor" row of the table on page 37.
2. Tape a layer of sandpaper at the bottom of the cardboard ramp. Release the car from the top of the ramp.
3. **Record Data** Measure and record the distance the car travels. Repeat for a total of three trials.
4. Remove the sandpaper. Tape a cotton cloth to the floor at the bottom of the cardboard ramp. Release the car from the top of the ramp.
5. **Record Data** Measure and record the distance the car travels. Repeat for a total of three trials.

36 ELABORATE Module: Forces and Motion



FOLDABLES®

Use **Dinah Zike's Study Guide and Notebook Foldables®** as a tool to organize important lesson information and **Visual Kinesthetic Vocabulary®** to construct meaning and master lesson vocabulary.

STEM Connection

What Does a Landscape Designer Do?

Landscape Designers plan and design public spaces, residential areas, and college campuses. They are creative people who like to work on big projects. You might think landscape designers work only with plants and lawns, but they also know a lot about paving, walls, fencing, wood, concrete, and metal. They know about irrigation and water management, too.

Landscape designers also think a lot about motion and force. When they design spaces where people will work or play, they consider what objects will move through the spaces and the forces that will affect the movement of the objects.

It's Your Turn

As a landscape designer, what information would you need to build a skatepark? How could you find out how skateboarders move in a park, and how would your findings influence your design?

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ELABORATE Lesson 2 Forces Can Change Motion 35

STEM Connections

Introduce students to real-world STEM professions that they may have one day. Students will learn about the career and then apply what they have learned to a related assignment.

INVESTIGATOR Articles

Students will engage with informational text and real-world science and engineering stories that are available in approaching level and on level.

Evaluate

AT-A-GLANCE

In the Evaluate phase of the instructional model, you are able to gauge student progress toward achieving lesson objectives. This is a time to assess students' new understanding and abilities.

Inspiring Teacher Support

The **Environmental Connections** are identified in the Teacher's Edition.

Suggested activities are included to meet **ELD Standards**.

Differentiated Instruction suggestions are provided to support all learners.

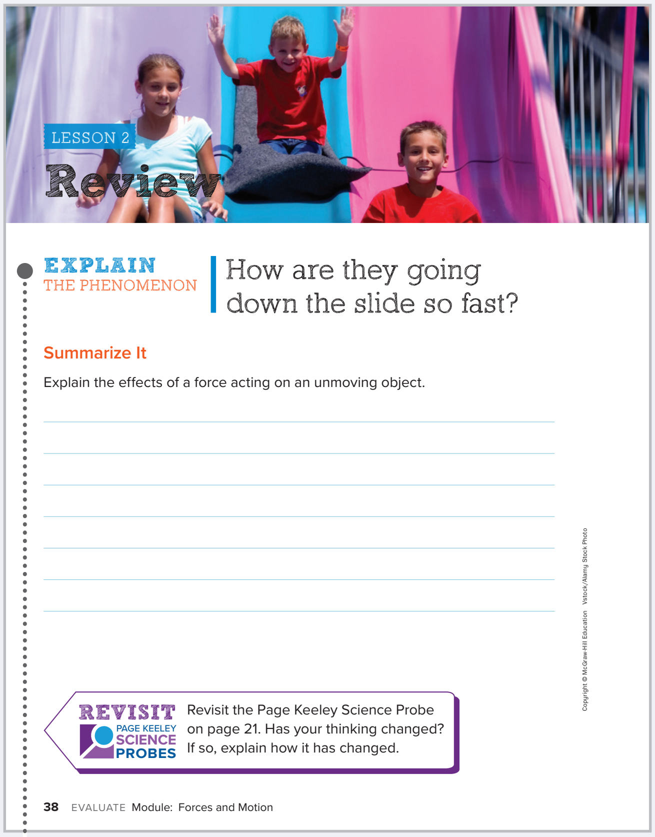
Professional Learning Videos support your needs from start to finish.

Go online for interactive **Lesson Review** tools and resources.

The Online Assessment Center lets you assign students a pre-made **Lesson Check** that is based on the Disciplinary Core Ideas or customize your own practice assignments and assessments.

Students can practice important **21st Century Skills** with **Open Inquiry** activities.

Scoring Rubrics provide guidelines for the **Extend It** open inquiry activity.


LESSON 2

Review

EXPLAIN THE PHENOMENON

How are they going down the slide so fast?

Summarize It

Explain the effects of a force acting on an unmoving object.

REVISIT PAGE KEELEY SCIENCE PROBES

Revisit the Page Keeley Science Probe on page 21. Has your thinking changed? If so, explain how it has changed.

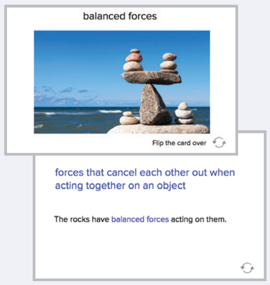
38 EVALUATE Module: Forces and Motion

EXPLAIN THE PHENOMENON

In the **Lesson Review**, students will demonstrate their learning by explaining the phenomenon, utilizing the SEPs and CCCs to showcase their Three-Dimensional Thinking skills, and extend their learning to real-world scenarios.

Lesson Checks and Interactive Practice

Assign students pre-made lesson checks and interactive practice tools that are purposefully designed to revisit the Disciplinary Core Ideas.



Aleksandr Simonov/Shutterstock

Three-Dimensional Thinking

1. How do forces change the motion of objects?
   A. Forces can change the speed or direction of an object's motion.
   B. The size of the force affects the speed of the object.
   C. The direction of the force affects the direction of the object's motion.
   D. All the above
   E. None of the above

2. An egg is about to roll off the counter. How can you get the egg to stop without picking it up?

3. Explain why the amount of friction would be different on an icy surface and a dry, concrete surface. How does the amount of friction affect the movement of an object across both surfaces?

Extend It

You are the mayor of San Francisco, California. The trolley cars are in need of repair. How might you communicate with your citizens about the importance of repairing the cable car brakes? Think about what you have learned in this module to help explain force and motion.

Write a speech, draw a poster, create a flyer, or use media.

KEEP PLANNING
STEM Module Project
Engineering Challenge

Now that you have learned how forces can affect motion, go to your Module Project to explain how the information will affect your plan for the skatepark.

Three-Dimensional Thinking

Students will apply their three-dimensional learning to show their understanding.

See the Teacher's Edition for more three-dimensional thinking support and DOK levels.

ENVIRONMENTAL Connection

Environmental Connections help students to understand environmental impacts.

Extend It with Open Inquiry

Students engage in an open inquiry activity that focuses on 21st Century Skills.

STEM Module Project Planning

At the end of each lesson, students return to the STEM Module Project planning pages to apply what they have learned throughout the lesson to the STEM Module Project they complete at the end of the module.

STEM Module Project Planning

STEM Module Project Planning

AT-A-GLANCE

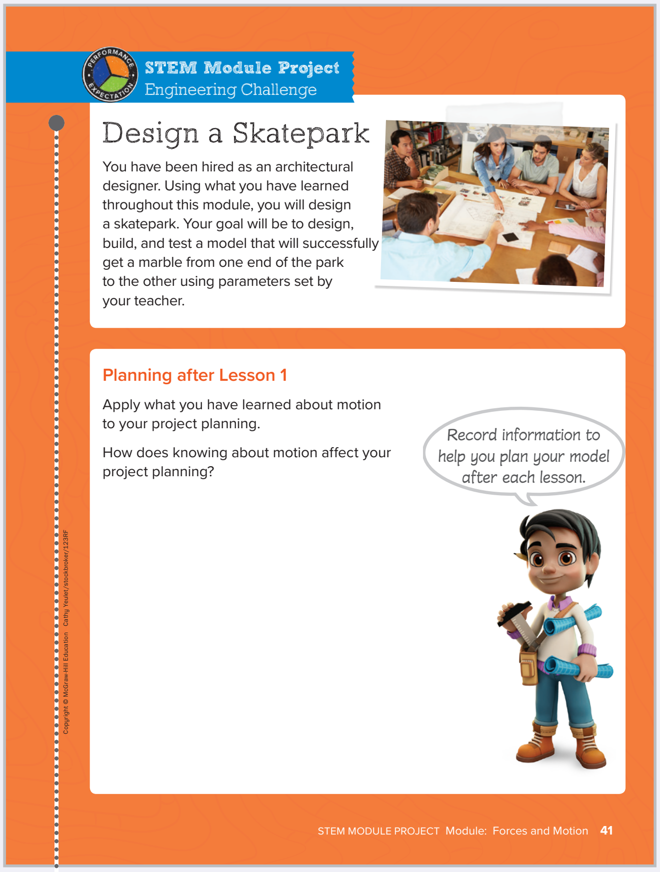
Students in Grades 2–5 will use the **Project Planning Pages** at the end of each lesson to see how their learning can be applied to the **STEM Module Project** they'll complete at the end of the module. Students will define the problem they're trying to solve and complete research to deepen their understanding. They will think about the related STEM career that was introduced and discuss what real scientists or engineers do to answer science questions and prepare to solve a problem. After collecting the necessary information, they will sketch models and select the best one to build.

Inspiring Teacher Support

Project Parameters are clearly outlined and include student pages that should be revisited to help students with project planning.

Scripted facilitation questions are provided to guide student planning discussions.

Online **STEM Module Project** Teacher support pages that provide constraints, drawings, and additional support to teachers.



STEM Module Project
Engineering Challenge

Design a Skatepark

You have been hired as an architectural designer. Using what you have learned throughout this module, you will design a skatepark. Your goal will be to design, build, and test a model that will successfully get a marble from one end of the park to the other using parameters set by your teacher.

Planning after Lesson 1

Apply what you have learned about motion to your project planning.

How does knowing about motion affect your project planning?

Record information to help you plan your model after each lesson.

STEM MODULE PROJECT Module: Forces and Motion 41

Review the STEM Module Project Parameters

After the first lesson in the module, students will revisit the purpose of the **STEM Module Project** and review how what they're learning will help with project planning.

For students in Grades K–1, detailed steps are provided to support their developmental needs.

STEM Module Project
Engineering Challenge

Planning after Lesson 2

Apply what you have learned about forces that can change motion.

What factors should be considered when building your model of a skatepark?

Research the Problem

Research building designs by reading the Investigator article *Play It Safe!* Go online to teacher-approved websites, or by finding books on designing skateparks at your local library.

Source	Information to Use in My Project

Sketch Your Model

Draw your ideas on a separate piece of paper. Select the best one to build and test.

Lesson Planning Review

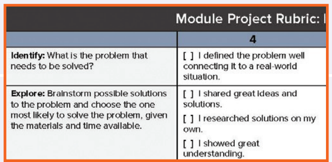
As they begin to complete their projects, students will revisit their planning notes from the close of each lesson.

Define the Problem and Complete Research

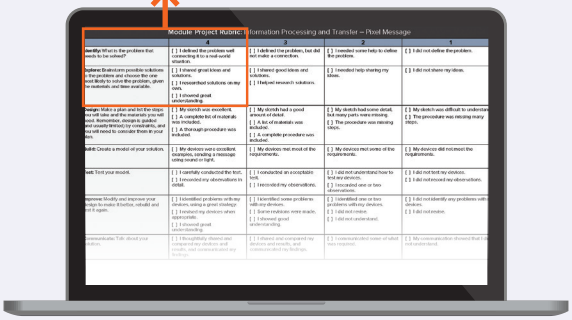
As part of the planning process, students will research possible materials they could use in their project.

Sketch Your Model

Before deciding on a final model to build, students are encouraged to sketch ideas on a separate piece of paper.



Module Project Rubric:	
	4
Identify: What is the problem that needs to be solved?	[ ] I defined the problem well connecting it to a real-world situation.
Explore: Brainstorm possible solutions to the problem and choose the one most likely to solve the problem, given the materials and time available.	[ ] I shared great ideas and solutions. [ ] I researched solutions on my own. [ ] I showed great understanding.



STEM Connection

During the project planning, students will review the related STEM career that was introduced at the beginning of the **STEM Module Project** and discuss what the professional's role would be at this point in the planning.

STEM Connection

Module Project Rubric

Teacher and student rubrics allow students to decide on the criteria and constraints to assess their **STEM Module Project**.

(l)Cathy Yeulet/stockbroker/123RF, (r)scottdunlap/iStockvectors/Getty Images

STEM Module Project Completion and Module Wrap-Up

AT-A-GLANCE

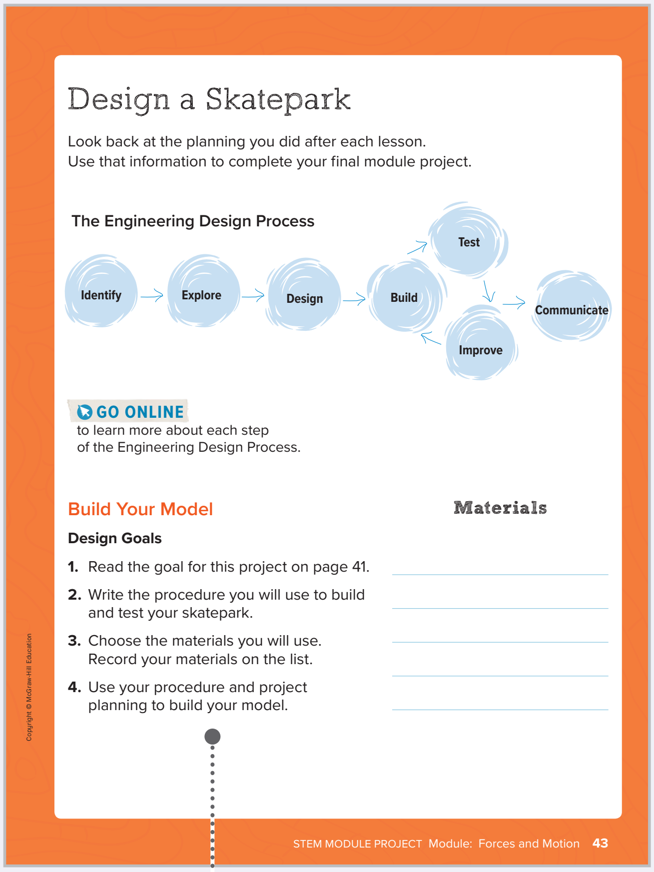
As the module comes to a close, students will complete a final culminating STEM Module Project to demonstrate their understanding of the Performance Expectations in the module. Through the completion of the project, students apply the three dimensions of learning to solve a problem related to the module phenomenon.

Inspiring Teacher Support

Background information and **STEM Connection** support is provided to connect the STEM Module Project to real-world STEM projects.

Scripted questions are provided to support group discussion facilitation.

Communicate Your Results support helps you guide students to the best way to communicate their project results.



Design a Skatepark

Look back at the planning you did after each lesson.
Use that information to complete your final module project.

The Engineering Design Process

GO ONLINE to learn more about each step of the Engineering Design Process.

Build Your Model

Design Goals

1. Read the goal for this project on page 41.
2. Write the procedure you will use to build and test your skatepark.
3. Choose the materials you will use. Record your materials on the list.
4. Use your procedure and project planning to build your model.

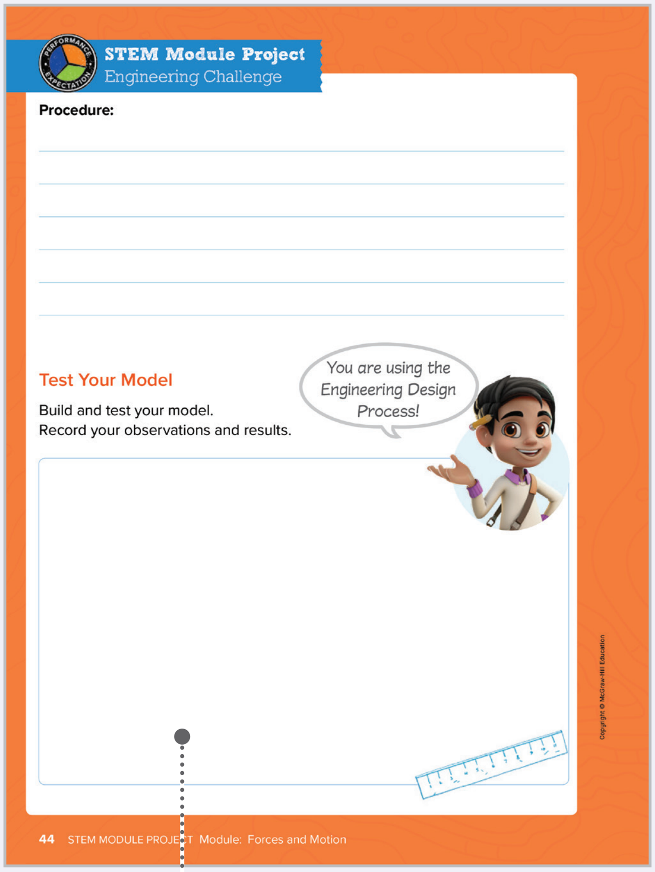
Materials

Copyright © McGraw-Hill Education

STEM MODULE PROJECT Module: Forces and Motion 43

1. Build Your Model

- Review the Design Goals.
- Prepare a list of materials needed to build the model.
- List the procedure used to design the model.
- Build the model they designed.
- Test, record observations, and make improvements.

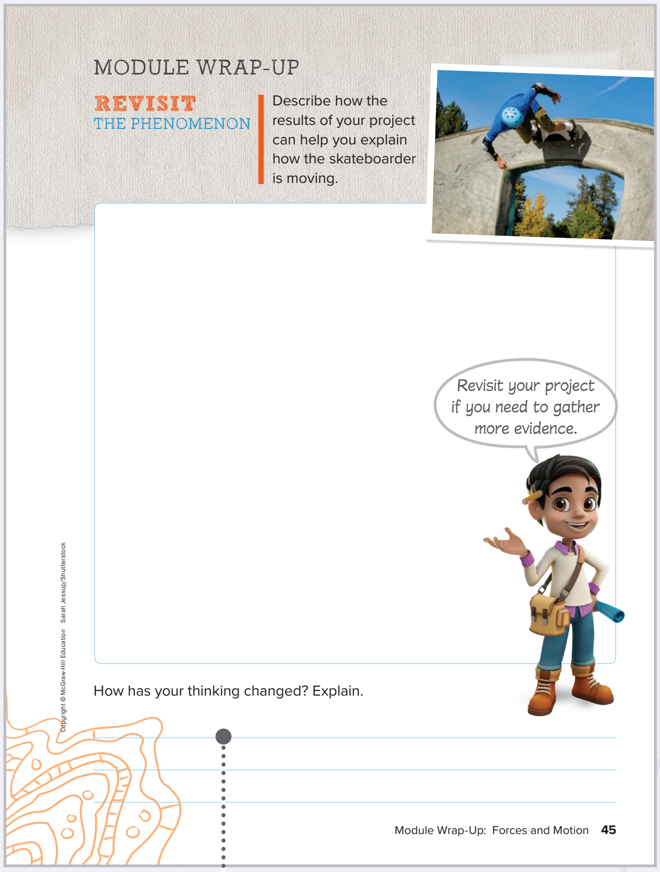

STEM Module Project
Engineering Challenge

Procedure:

Test Your Model

Build and test your model.
Record your observations and results.

44 STEM MODULE PROJECT Module: Forces and Motion


MODULE WRAP-UP

REVISIT THE PHENOMENON

Describe how the results of your project can help you explain how the skateboarder is moving.

How has your thinking changed? Explain.

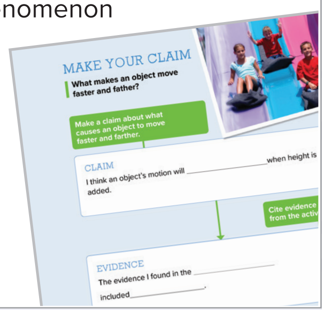
Module Wrap-Up: Forces and Motion 45

2. Test Your Model and Communicate Your Results

Students should refer to their rubric at the beginning of the project to make sure their model fits the criteria.

Module Wrap-Up

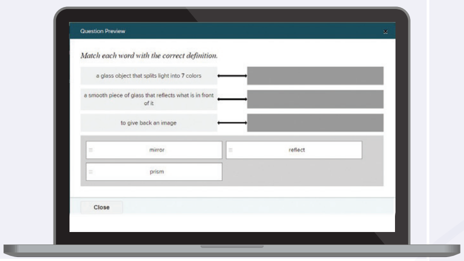
Students revisit the module phenomenon and try to answer the phenomenon question using evidence from what they have learned throughout the module and the STEM Module Project.



Online eAssessment Center

GO ONLINE

Assign a premade Module test based on the Disciplinary Core Ideas or customize your own test.

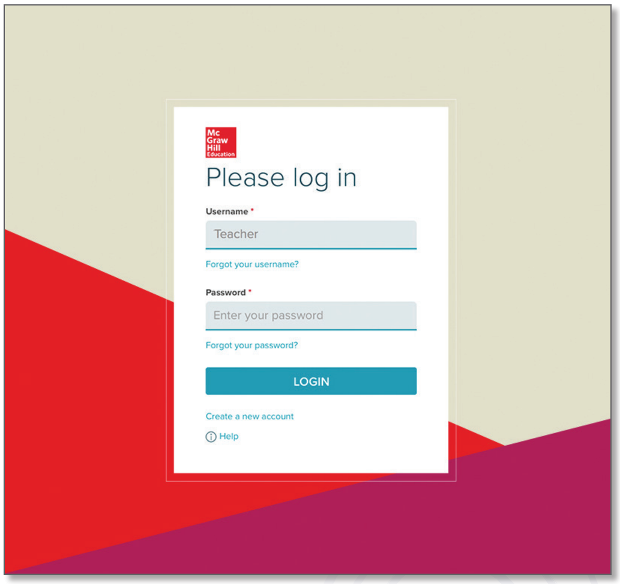


(l)scottdunlap/iStockvectors/Getty Images, (r)Vstock/Alamy Stock Photo

Inspire Science
Digital Experience

Immerse yourself in the *Inspire Science* digital experience. This section will provide an overview of the following:

* Course Dashboards
* Module and Lesson Landing Pages
* Digital Resource Types and Learning Impact



Get Started by Logging In:

1. Go to https://my.mheducation.com from an Internet browser.
2. Enter your username and password and click "Log In."

Upon login, you will find helpful videos to support your digital review.

Need login credentials?

Go to my.mheducation.com and select "Create Teacher Account."

The digital designs and navigation shown in this guide may vary as we continue to enhance the digital experience.

Welcome to the *Inspire Science* digital experience!

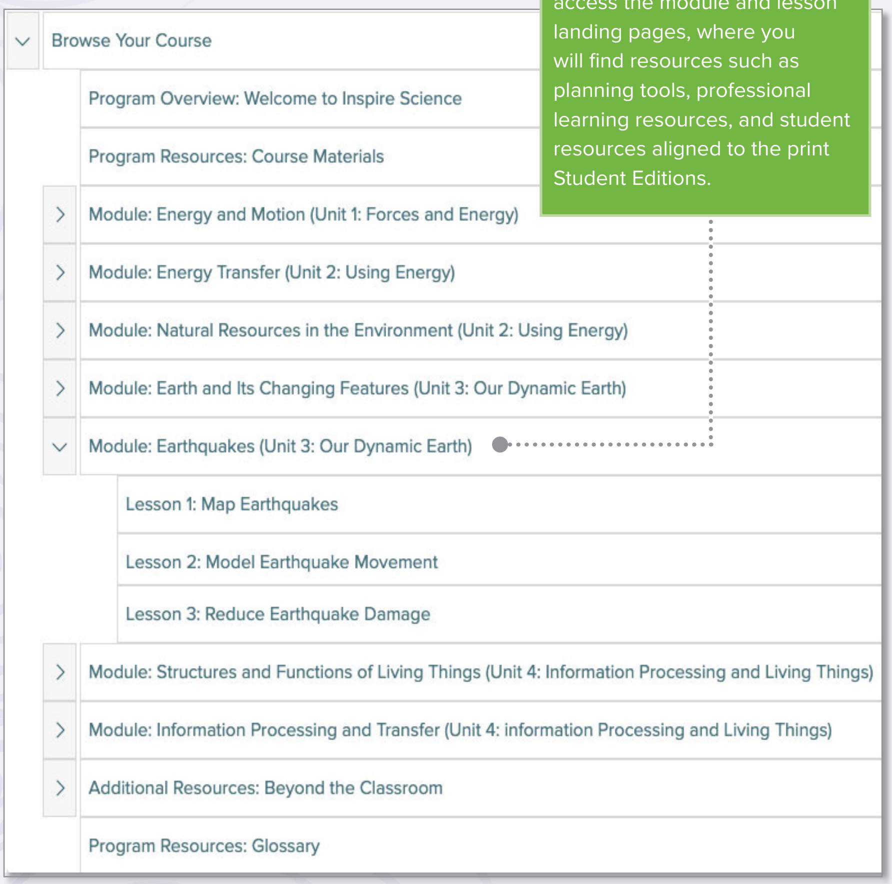
Use this section of your Program Guide to easily find the digital resources that make *Inspire Science* engaging and fun for students.

Browse Your Course

Upon login, you will see a colorful banner for your course showing the images from your book covers. Select “Browse Your Course” or click anywhere in this banner to begin accessing your course resources.

Choose a Module and Lesson

After launching your course, you will land on the table of contents page with expandable folders for all modules and lessons in the course, as well as folders with documents to support understanding of the entire program, such as this Program Guide. Select a module, or a lesson within a module, to access the module and lesson landing pages.

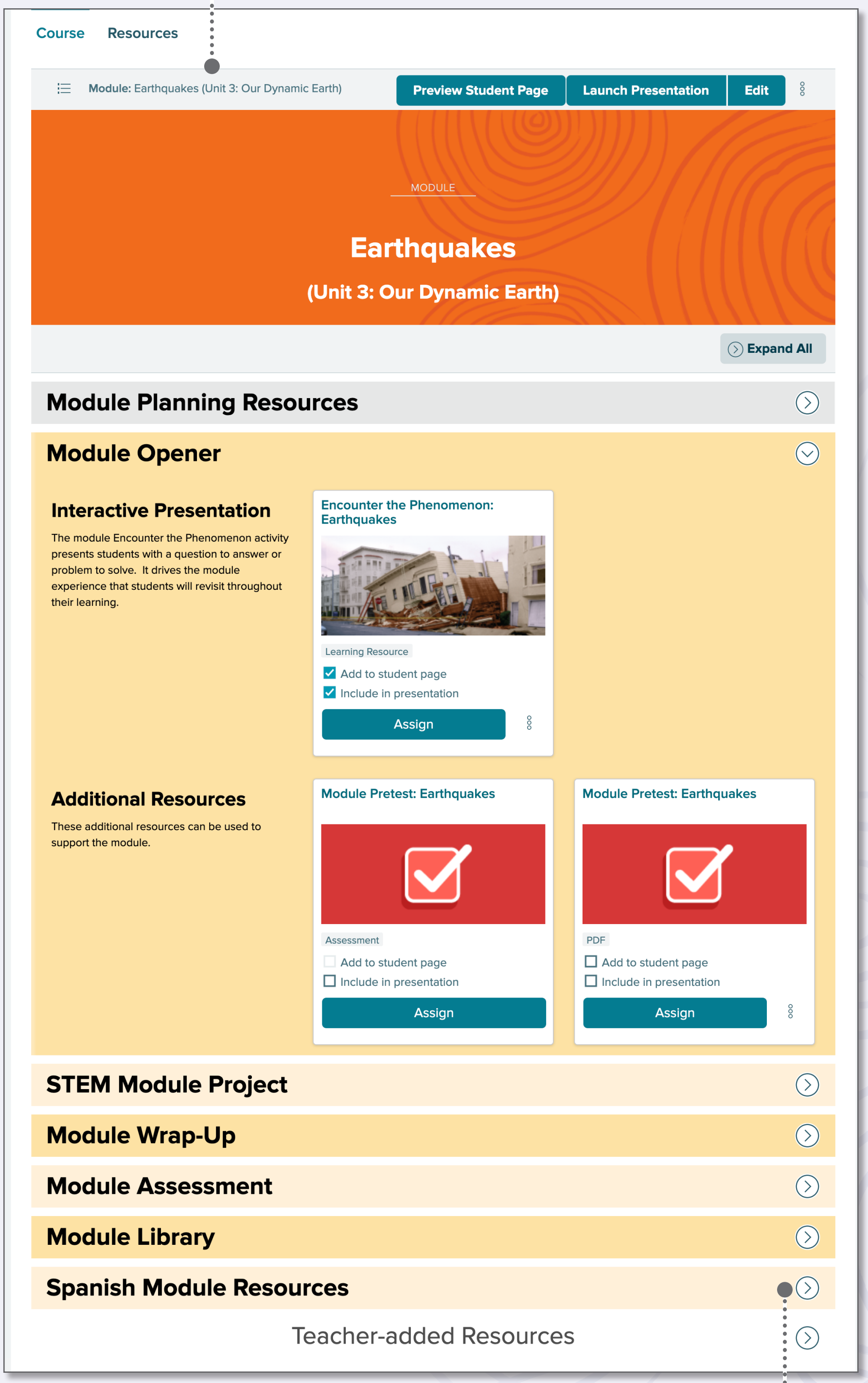


Select a module or lesson to access the module and lesson landing pages, where you will find resources such as planning tools, professional learning resources, and student resources aligned to the print Student Editions.

(l to r)Little_Desire/Shutterstock, DOE Photo, Photodigitaal.nl/Shutterstock, agustavop/iStock/Getty Images

Note: Digital design and navigation may vary.

Easily navigate to other module and lesson landing pages by using the module and lesson drop-down menus.



To collapse or open sections, click on

Note: Digital design and navigation may vary.

Access Module Interactive Resources

Module Landing Pages

From the module landing pages, you can access module resources for teachers and students, organized by key module-level activities. Module-level resource folders for each module include:

- Module Planning Resources (including Professional Learning Resources)
- Module Opener
- STEM Module Project
- Module Wrap-Up
- Module Assessment
- Module Library (including leveled readers and additional STEM career connections)

Access Your Resources

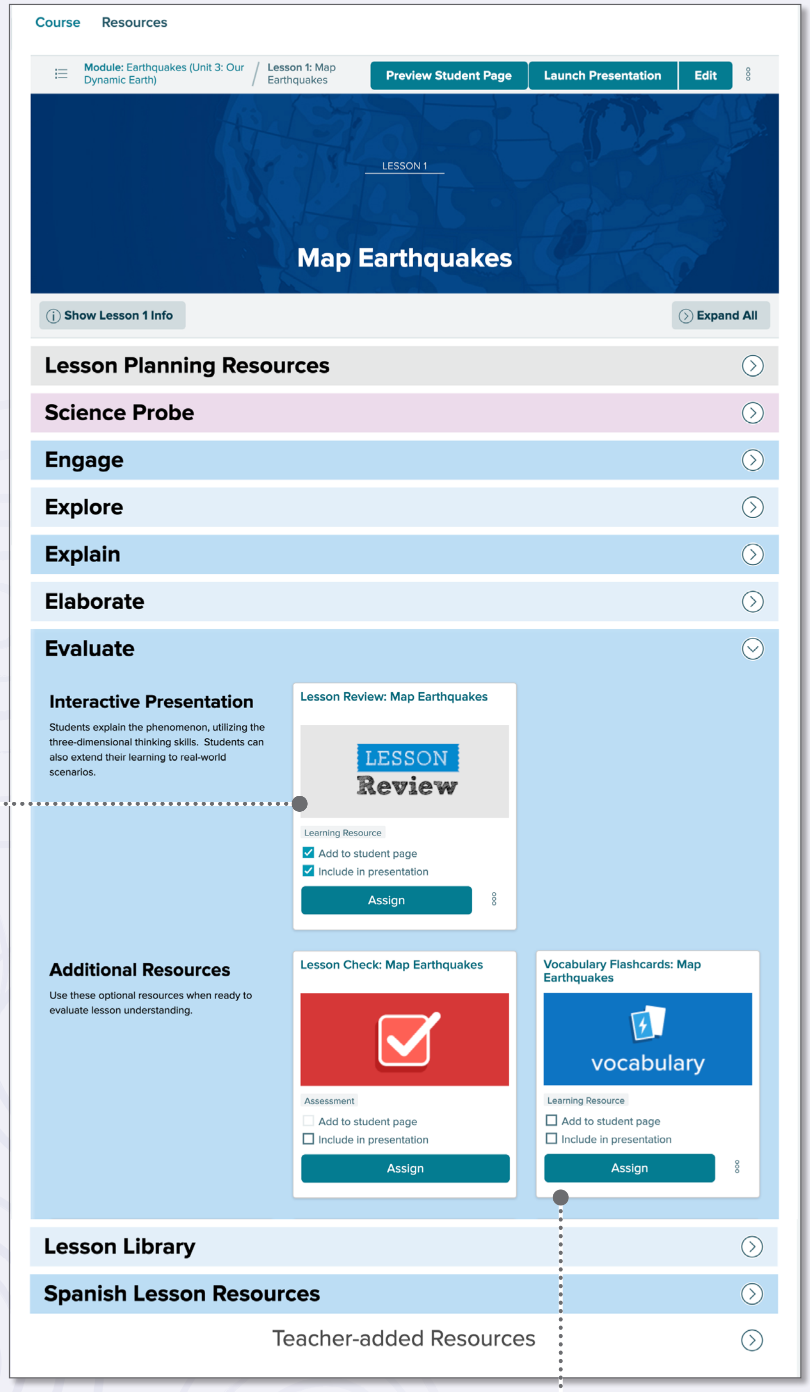
You will notice within the module and lesson landing page folders that many digital resources are further organized by two categories:

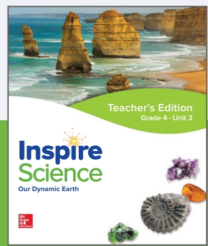
1 Interactive Presentation

These resources provide access to the digital content that aligns with the resources featured in the print Student Edition. By default, these resources will display on the student page and in the teacher presentation. Resources in the Interactive Presentation section of the module and lesson landing page is optimized for digital projection and student 1:1 device use.

2 Additional Resources

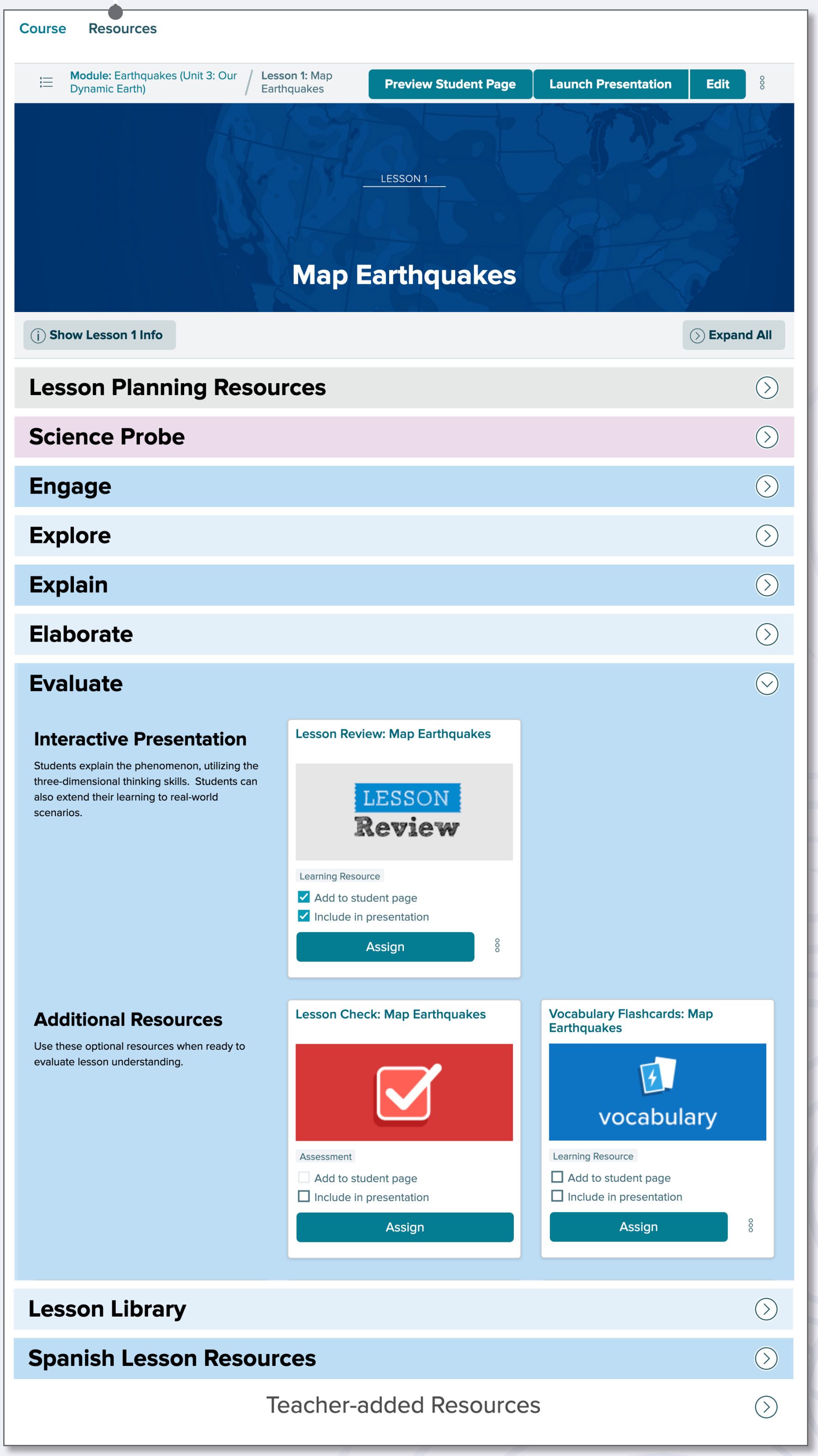
These resources provide access to supplemental content, optional content, and assessments. Resources in this section are typically hidden from students until teachers are ready to add them to student pages or assign them.





Your print Teacher's Edition will reference Interactive Presentation and Additional Resources, so you can easily see your print resources and the paired digital resources.

Select the Resources tab to search for resources by type, course, and standard.



Access Lesson Interactive Resources

Lesson Landing Pages

From the lesson landing pages, you can access lesson resources for teachers and students, which are organized by the 5E instructional model. Lesson resource folders for each lesson include:

- Lesson Planning Resources
- Science Probe (Formative Assessment)
- Engage
- Explore
- Explain
- Elaborate
- Evaluate
- Lesson Library

Viewing Digital Resources

Inspire Science offers a variety of rich media and interactive content with the flexibility to customize lessons to fit your needs.

Follow these tips for viewing resources:

1. Select

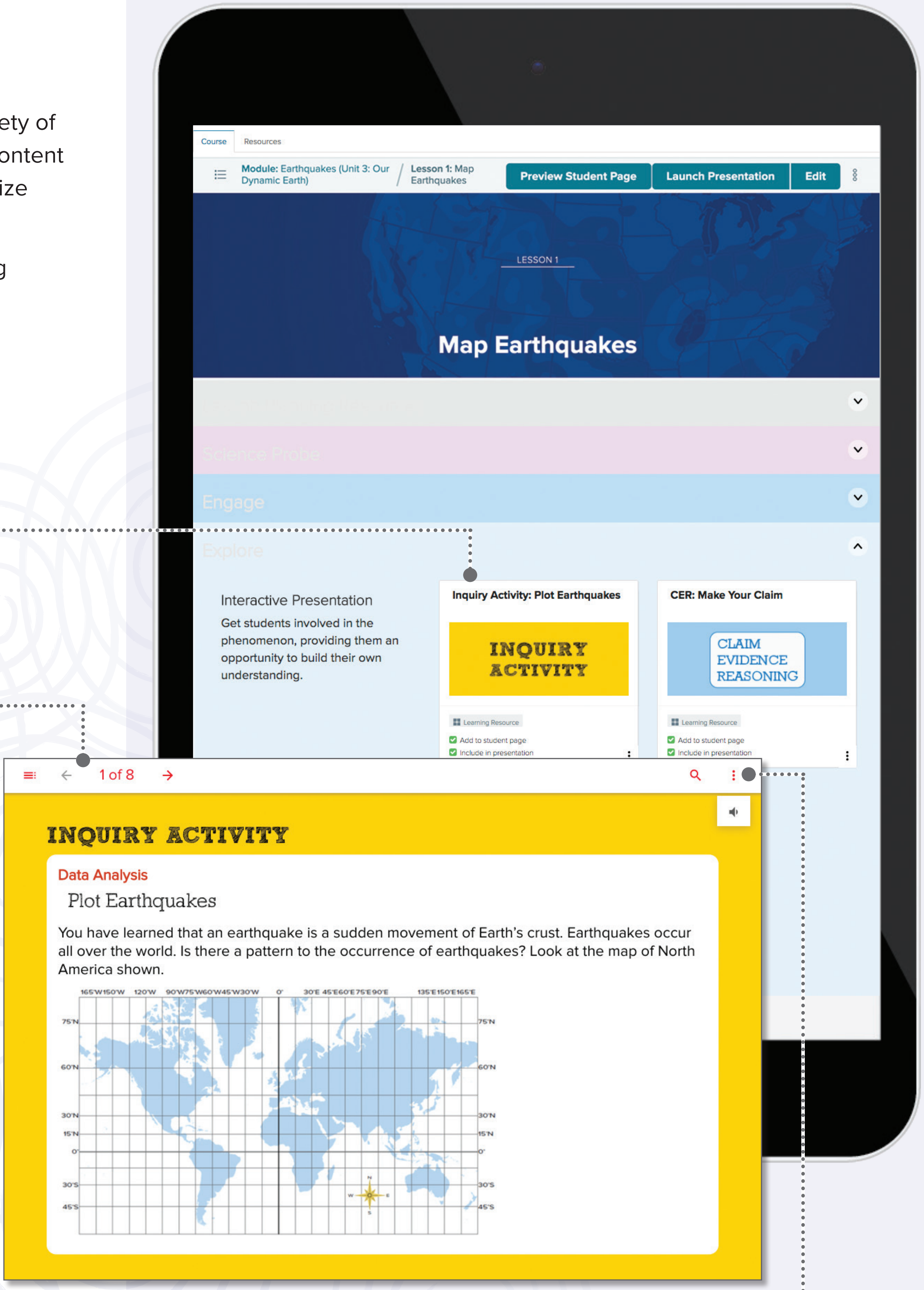
From a landing page, select any resource to launch and review it.

2. View

While reviewing a resource, use the red arrows to navigate through the screens of each resource.

3. Close

Once you are finished reviewing, close out by selecting "X" to get back to the landing page.



To reset an activity within a resource (clear any content entered), use the three vertical dots and select "Reset Activities."

Reset Activities

Note: Digital design and navigation may vary.

Carry Out an Investigation

MATH **Connection**

1. Use the table on the next page to plot the latitude and longitude of ten major earthquakes on the map. Be sure to label each point you plot with the corresponding letter.

— Teacher Note

Carry Out an Investigation

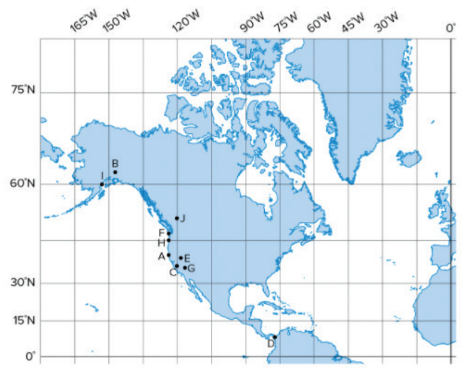
MATH **Connection**

Geometry 4.G.1

1. Students learned about latitude and longitude in the

Teacher Note
From the Online Teacher Center login, teacher support can be seen at point of use by expanding (select +) the Teacher Note section.

Identify



Earthquake Locations					
Earthquake	Latitude	Longitude	Earthquake	Latitude	Longitude
A			B		
C					

Table Entry
Students can enter data into tables at point of use for review.

Carry Out an Investigation

2. Describe any patterns you found in the locations of the earthquakes you plotted.

Type answer here

Done

— Answer

Sample answer: The data shows that most of these earthquakes occurred along the edge of the continent.

Audio Support
Select the speaker icon to hear the on-screen text read aloud.

Answers
From the Online Teacher Center login, answers can be seen at point of use by expanding (select +) the Answer section.

Types of Interactive Resources

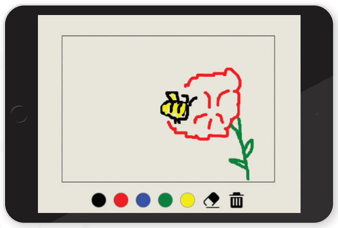
In the *Inspire Science* digital experience, students will interact with a wide variety of digital content types that will make learning science engaging and fun.

Engaging Online Resources

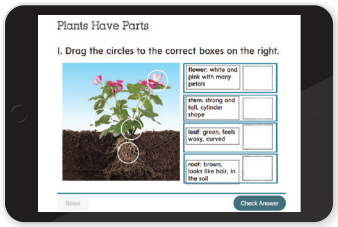
The following list is a few of many offerings for *Inspire Science*:

- Engaging interactive content
- Video demos of hands-on activities
- Science content videos
- Text read aloud and highlighting features
- Dynamic search tools
- Impact News

Drawing Tool



Drag and Drop



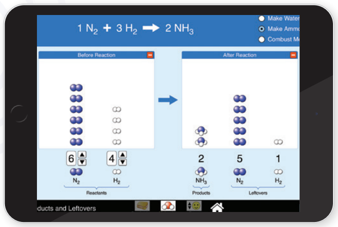
Phenomena Videos

Science Content Videos

Pop Tips

Layer Reveal

Simulations

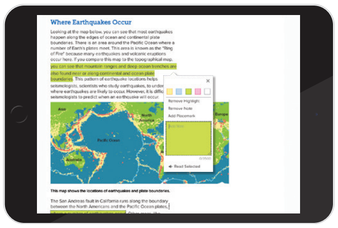


Games

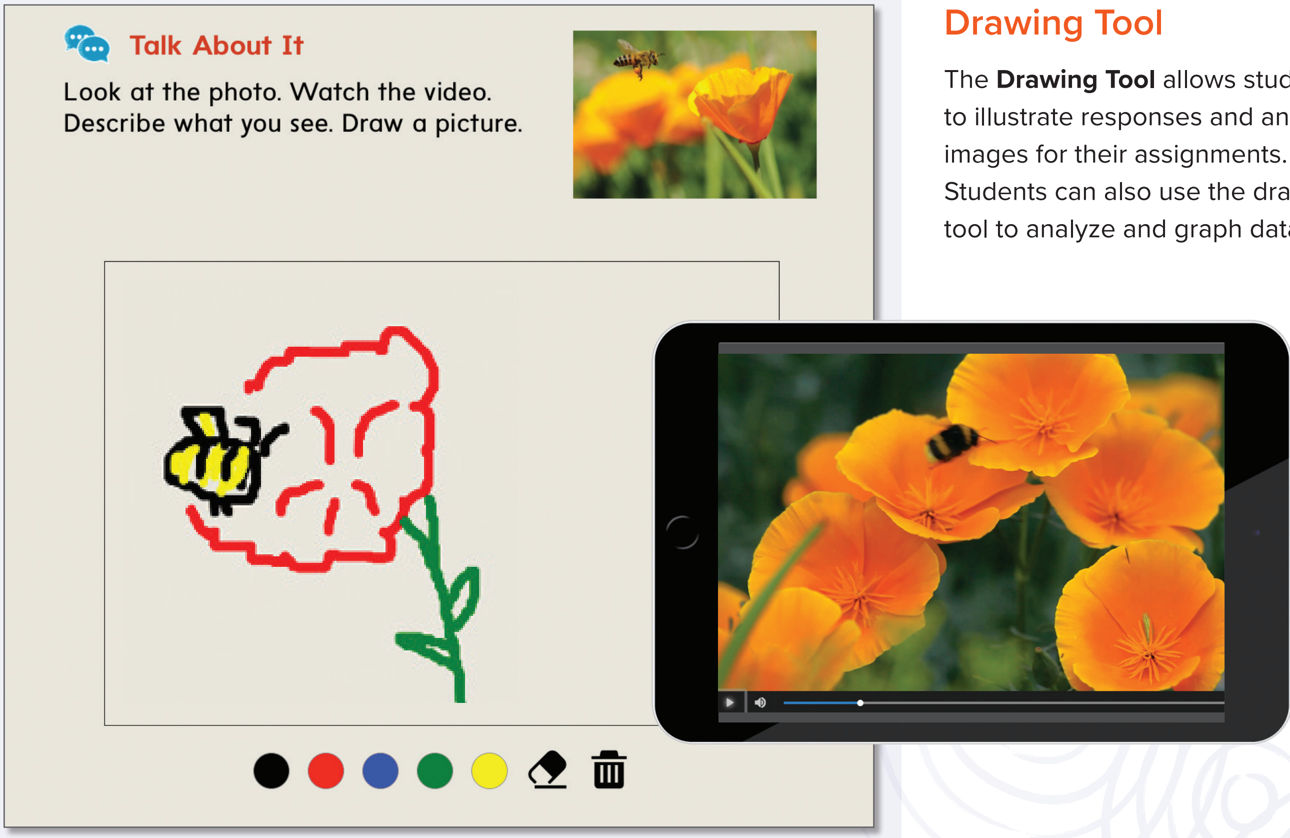
Impact News

Choose Your Path

Interactive Text



Beyond the Classroom (2-5)



Drawing Tool

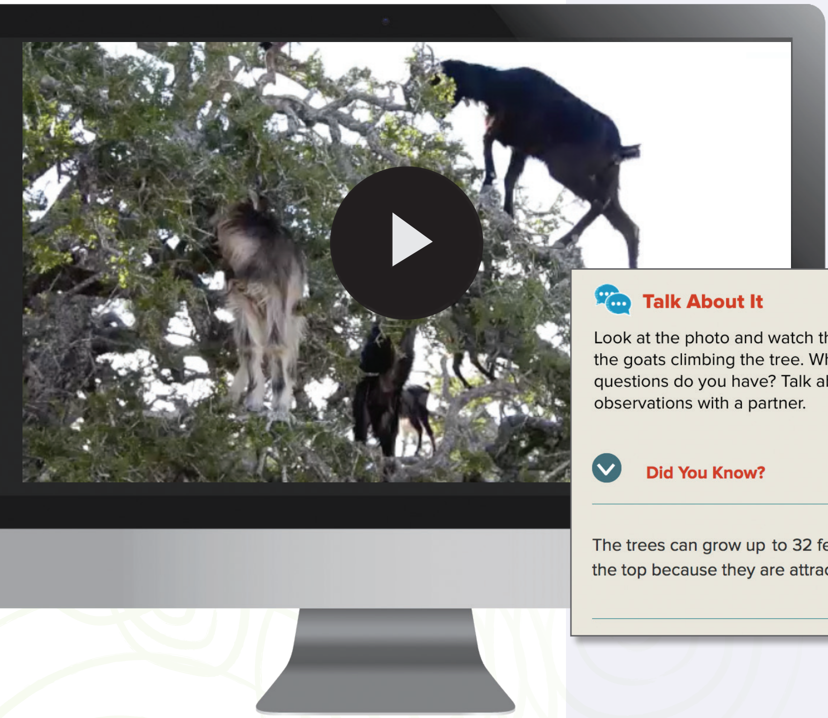
The **Drawing Tool** allows students to illustrate responses and annotate images for their assignments. Students can also use the drawing tool to analyze and graph data.

Impact News

Impact News is a current events news site that provides two news stories, in both English and Spanish, that are published monthly and curated specifically for Inspire Science. Each article is written at three readability levels to provide differentiation support for all learners.

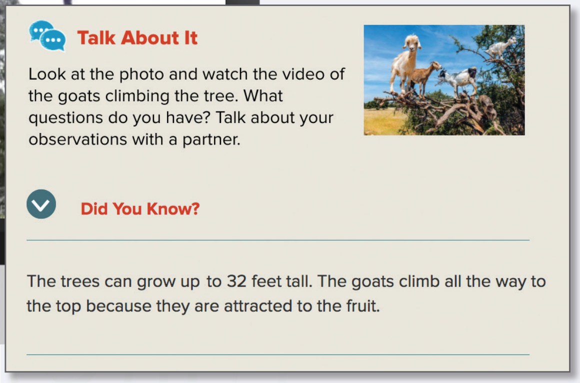
superjoseph/Shutterstock, NPS/Robb Hannawacker, Ingram Publishing, EHT Collaboration, Susan Cannon, USGS

Digital Experience



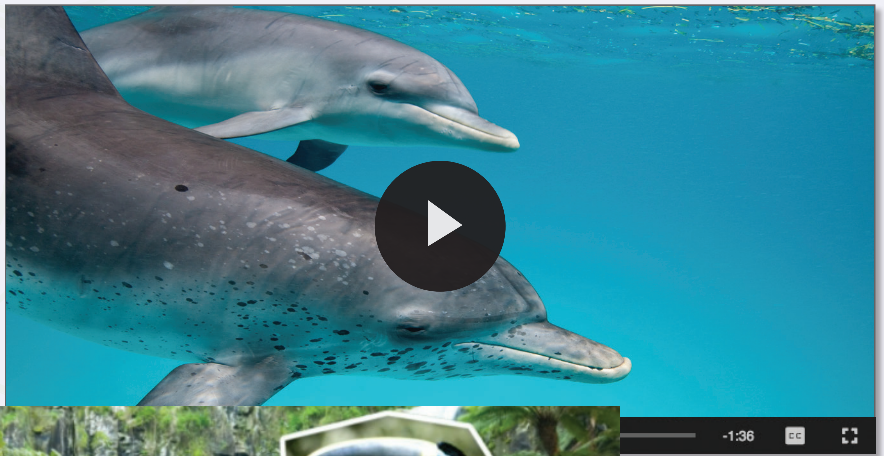
Phenomenon Videos

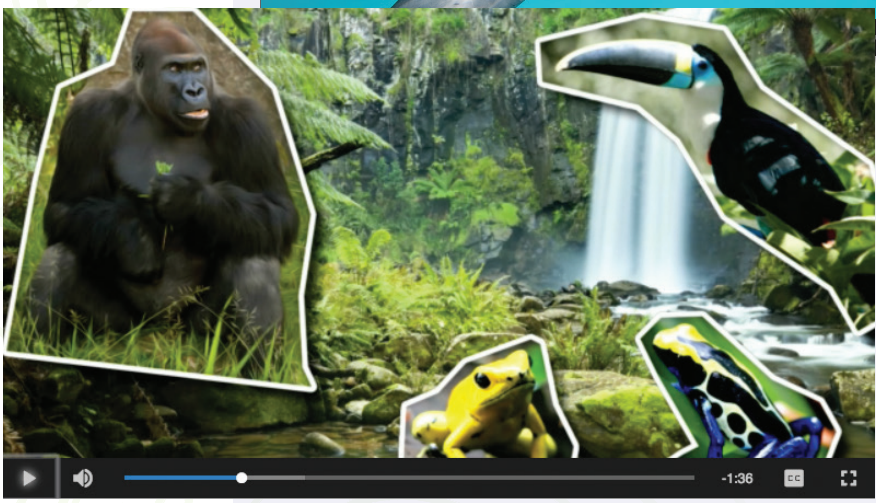
Phenomenon Videos are used to draw students into the content and provide a visual experience to encourage thinking and collaborative conversations.



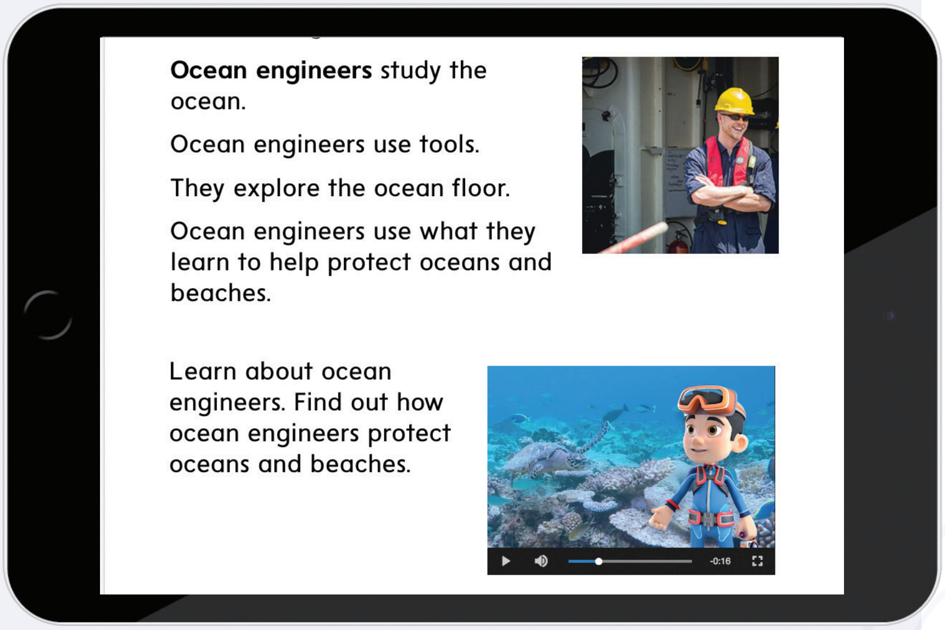
Science Content Videos

Bring interesting phenomena to life and enable students to feel like they are a part of the experience with inspiring **Science Content Videos**.



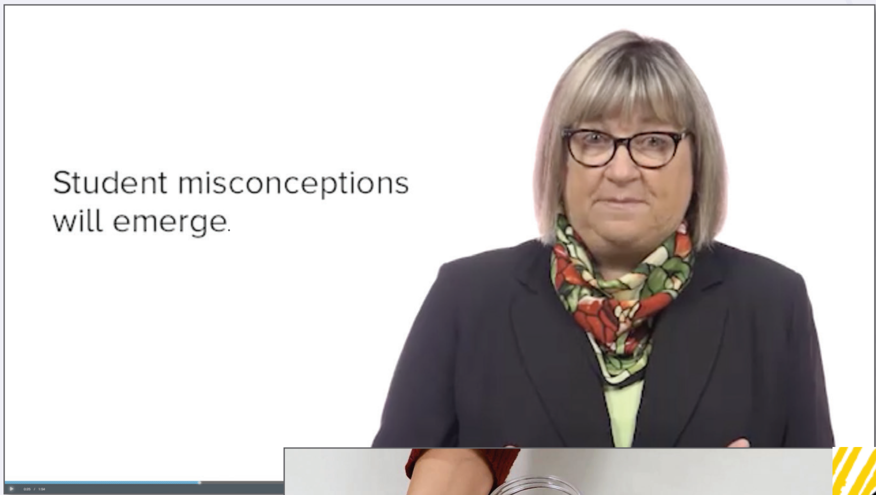


(l to r, t to b)The Visual Explorer/Shutterstock, Pavliha/iStock/Getty Images, Image Source/Getty Images, Sara Winter/Getty Images, Carol Yepes/Getty Images, Dave Moyer, Doug88888/Getty Images, ©MedioImages/SuperStock



STEM Videos

Real-world STEM Connection videos and STEM Career Kid videos (K-1) introduce a variety of interesting science and engineering professions.

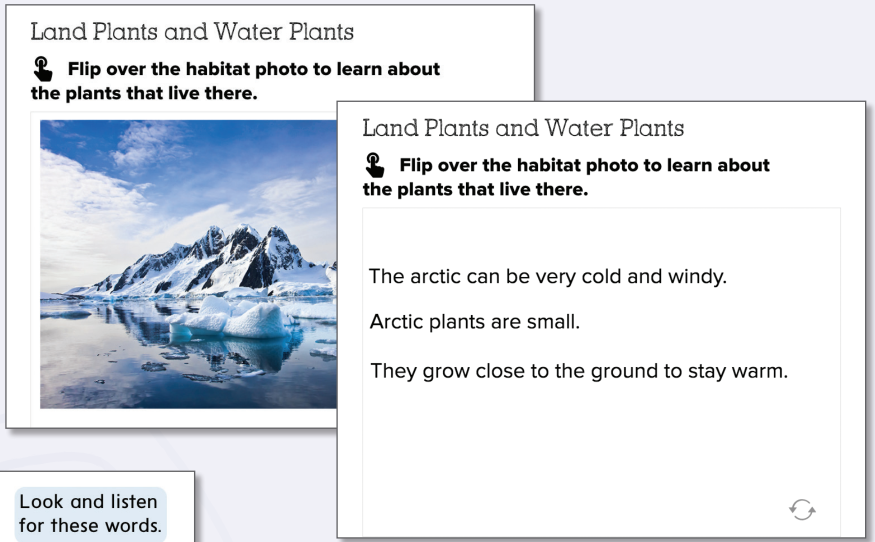


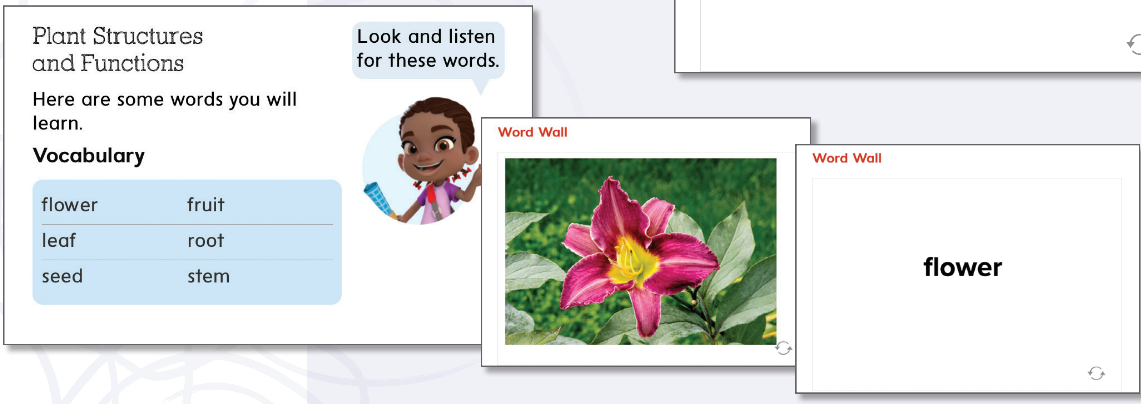
Professional Learning Videos

Inspire Science comes with library of relevant, self-paced, **Professional Learning Videos** and modules to support you from implementation through ongoing instructional progression.

Flash Cards

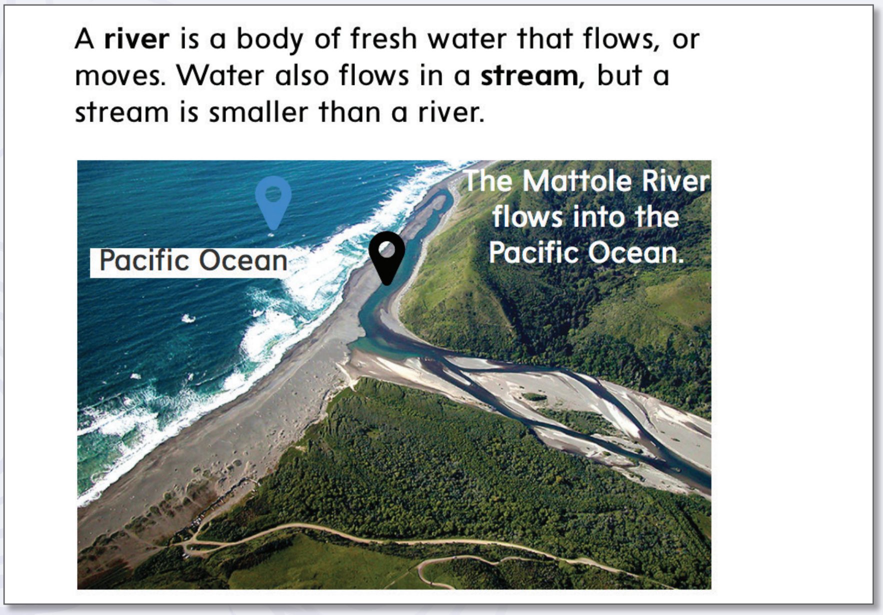
Flash Cards are used to present information with interactive text. Vocabulary Flash Cards include the vocabulary term on one side and the definition on the back. Activity flashcards can be used to present images and text describing before and after events.

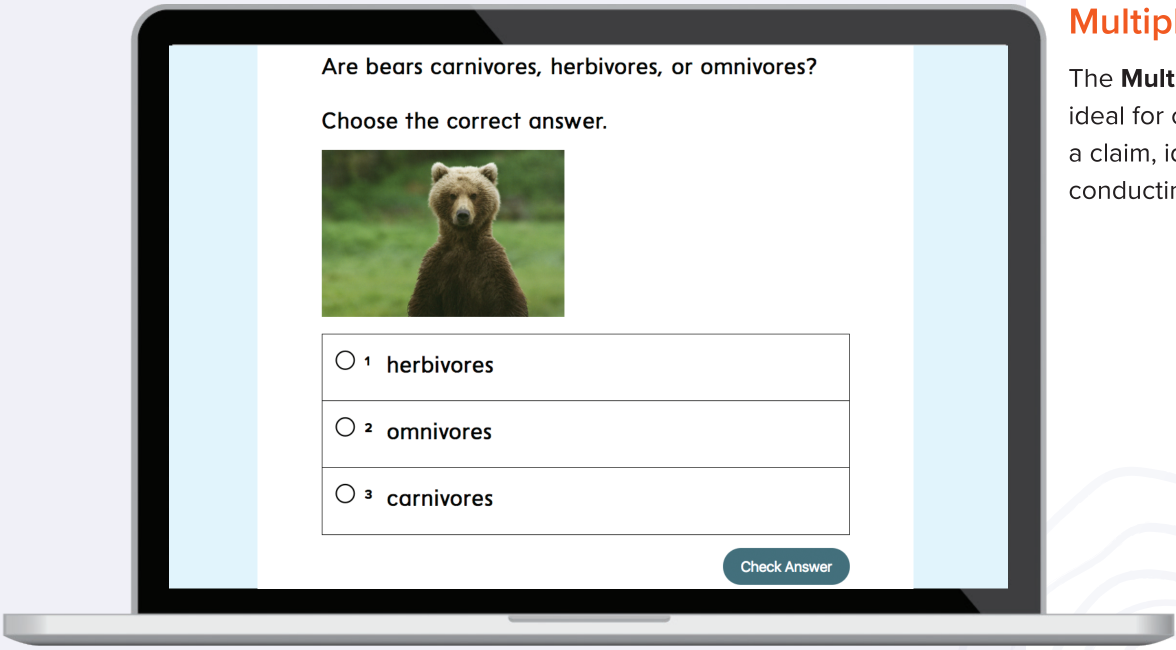




Pop Tips

Pop Tips allows students to interact with images and connect to related information in order to support understanding of core content.





Multiple Choice

The **Multiple Choice** interactive is ideal for classifying content, making a claim, identifying key terms, and conducting formative assessment.

Layer Reveal

The **Layer Reveal** interactive enables students to easily visualize cause-and-effect scenarios and focus on specific areas of an image, one focused section at a time.

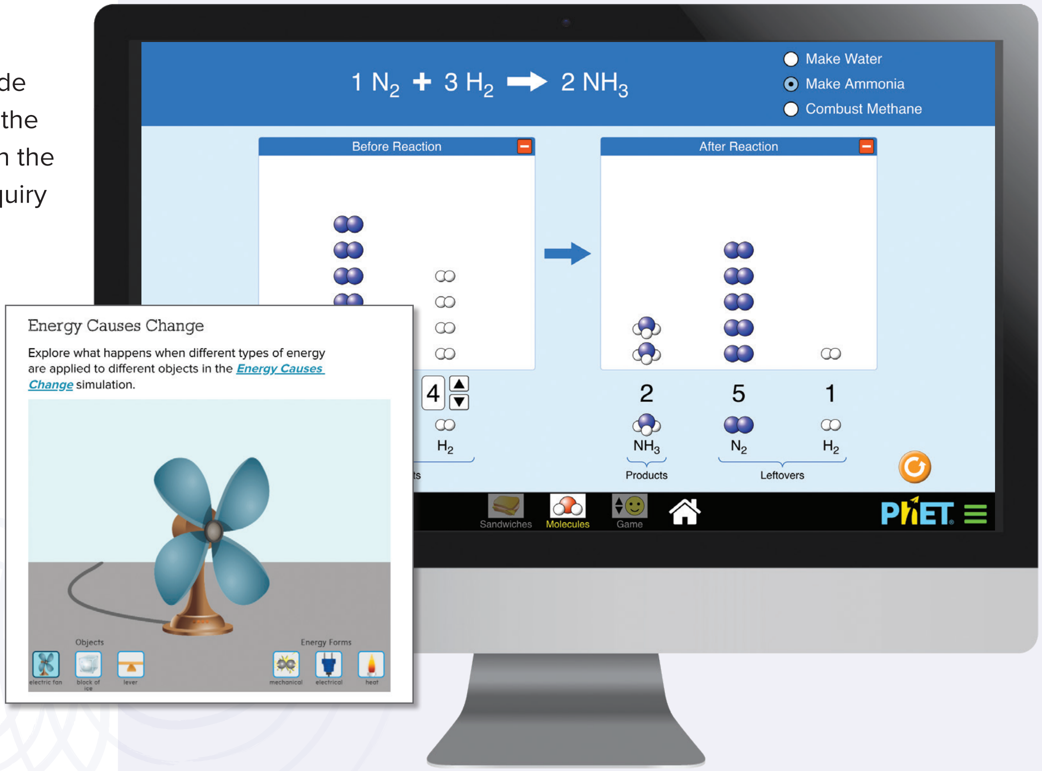
Digital Experience

Simulations

Simulations are used to provide students an experience when the activity isn't easily replicated in the classroom with a hands-on inquiry activity.

PhET INTERACTIVE SIMULATIONS
University of Colorado Boulder

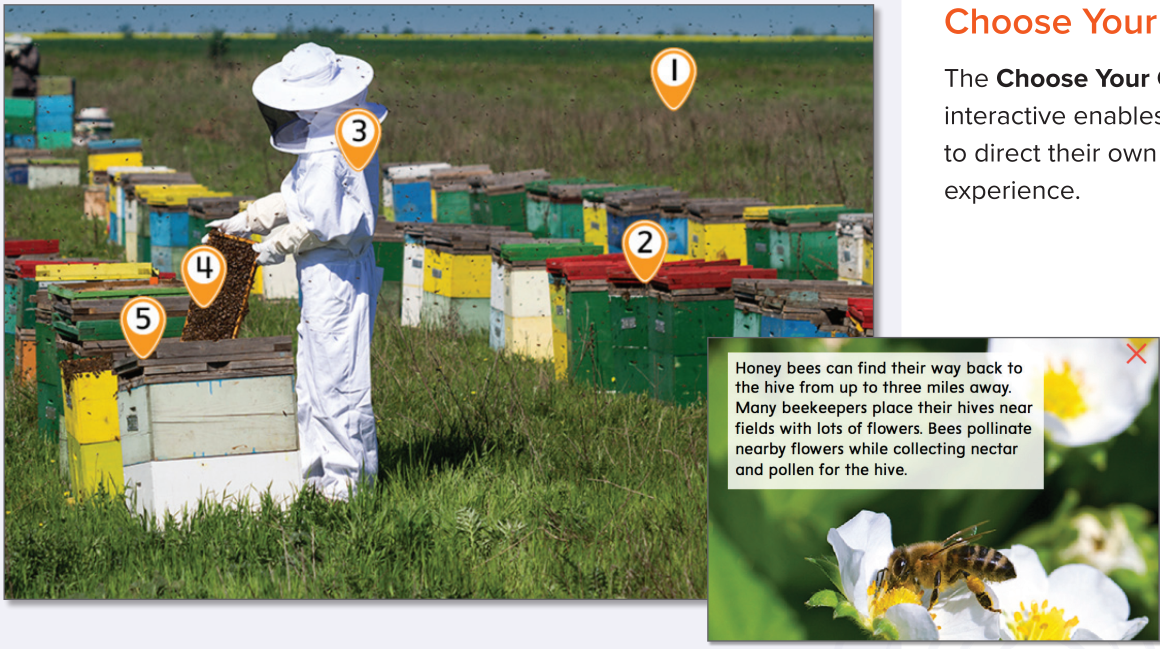
The Concord Consortium



Games

Digital learning games reinforce deeper conceptual science understanding by immersing students in experiential learning.

FilamentGames



Choose Your Own Path

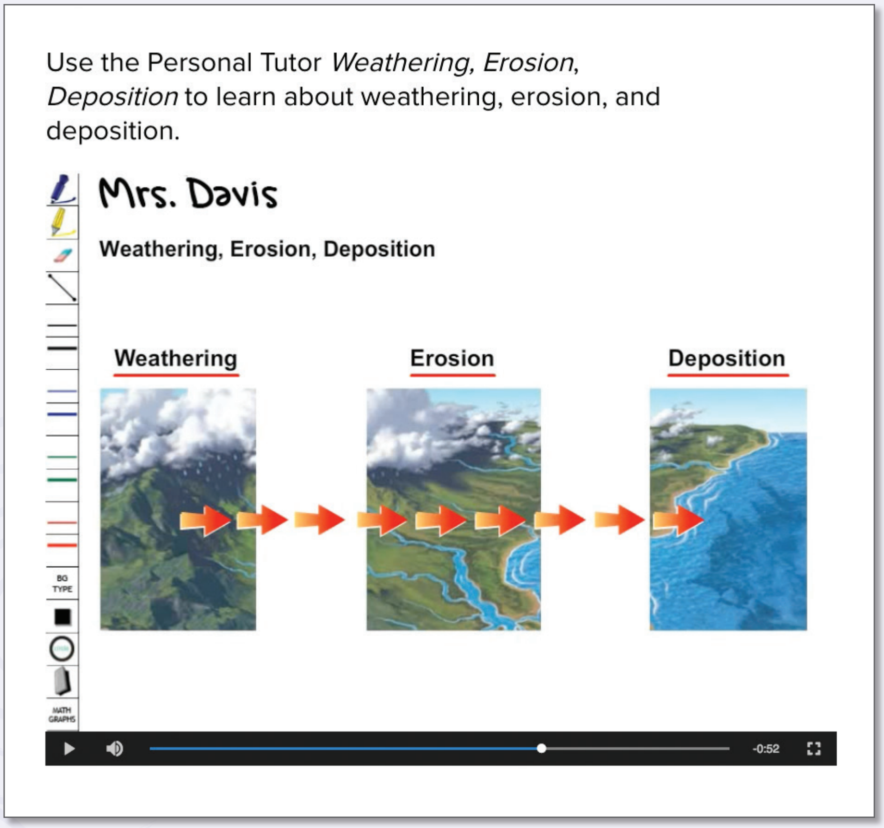
The **Choose Your Own Path** interactive enables students to direct their own learning experience.

Slide Line Plus

The **Slide Line Plus** feature allows students to progress through a storyline of images or highlight focused areas of visuals to concentrate on one element of a schematic at a time.

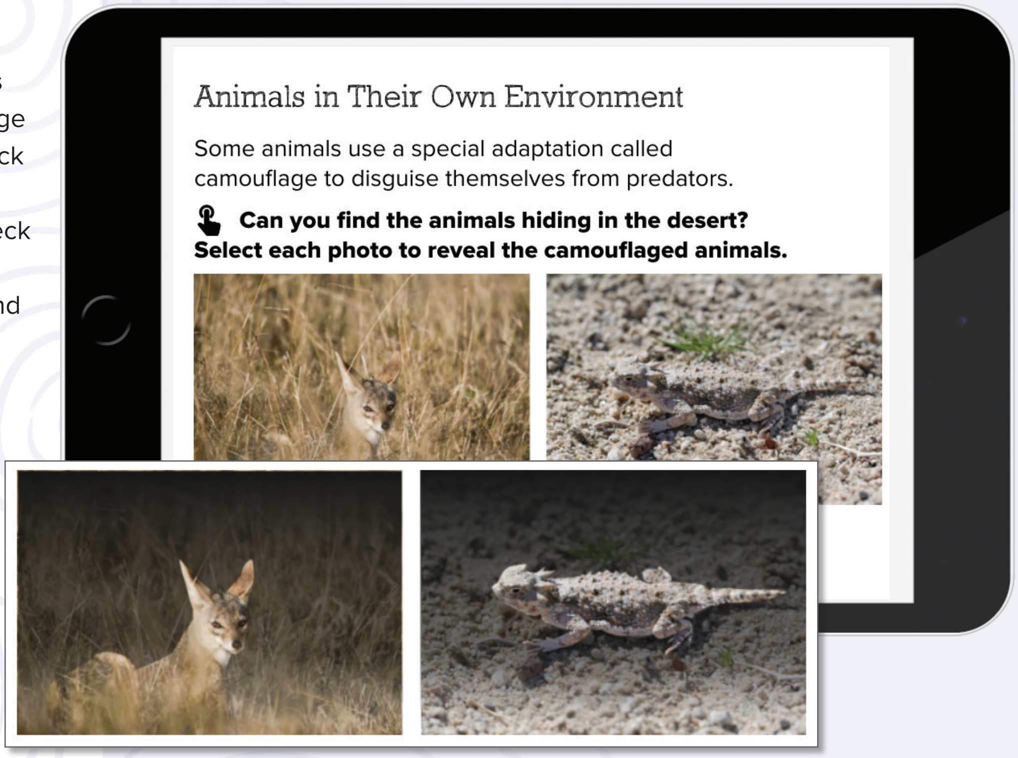
Personal Tutors

Students have access to **Personal Tutors** when they need extra support learning new concepts.

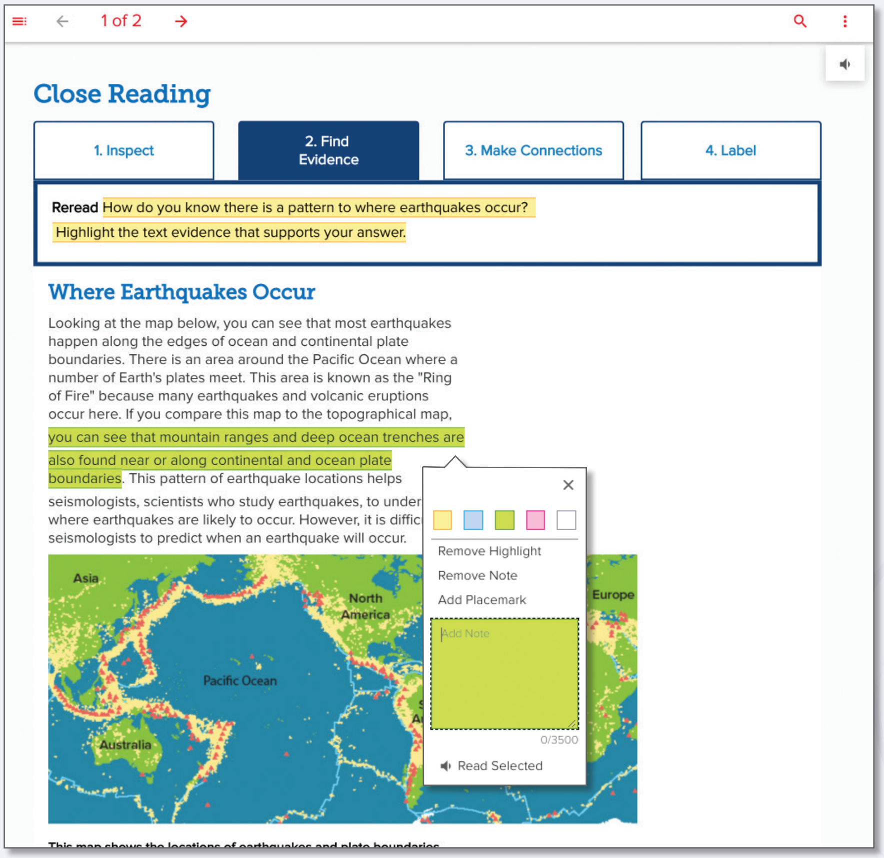


Click Change

The **Click Change** interactive is used to allow students to engage with images. Students might click through images to select the correct one in a vocabulary check or click through images in an activity to identify similarities and differences.



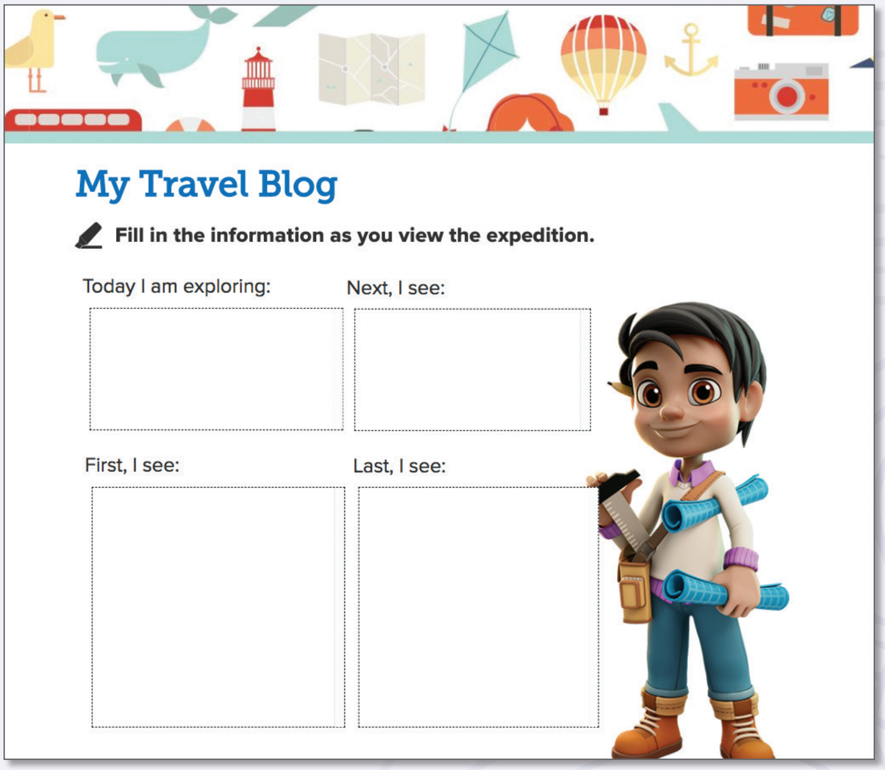
(t)McGraw-Hill Education, (bl)Kit Korzun/Shutterstock, (br)NPS Photo by Robb Hannawacker



Interactive Text

Students become more engaged in close reading activities with **interactive text** features:

- Text highlighting
- Place marking capabilities
- Note-taking
- Text-to-speech reading



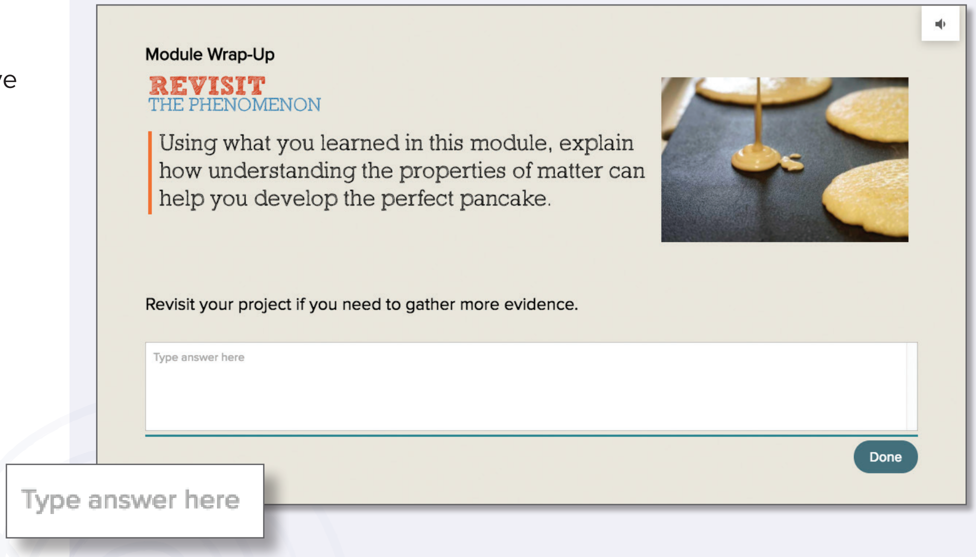
openeyed/Shutterstock

Beyond the Classroom

Beyond the Classroom is a virtual field trip experience. It provides students tools to help document their Google Expeditions® journey.

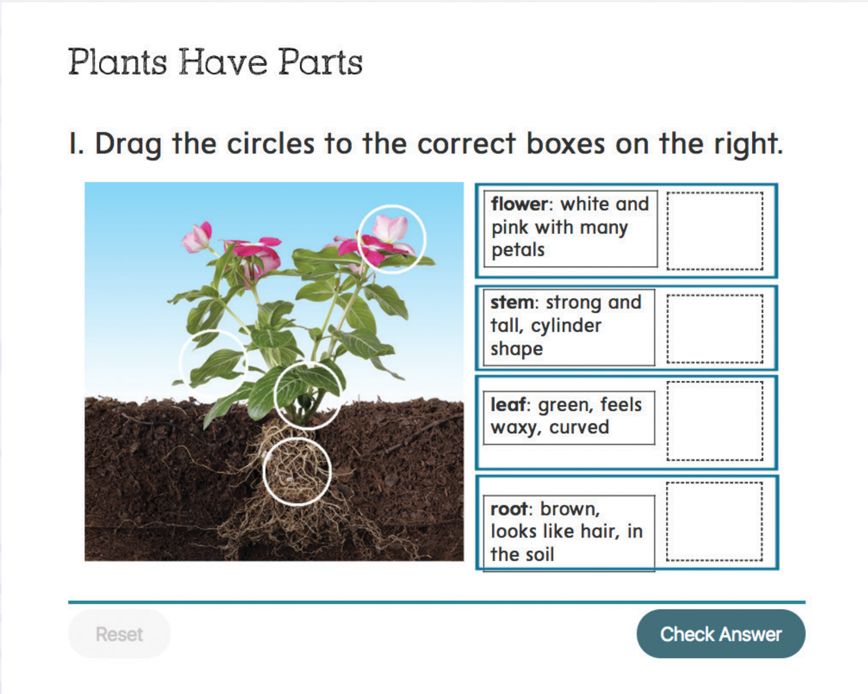
Type Entry

Students can record, edit, and save their assignment responses.



Drag and Drop

The **Drag and Drop** interactive is used to support students with sorting and classifying content such as vocabulary terms.



Inspire Science

Thank you for all you do to inspire your students to be curious, to investigate, and to innovate.

Let's Explore Our Phenomenal World!

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Inspire Science

Explore Our Phenomenal World

Inspire Curiosity

Inspire Investigation

Inspire Innovation

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