



CALIFORNIA
Science · Grades K–6

Exploring Science

Real Science. Real World. Right Now.



Authentic National Geographic Experience



NATIONAL GEOGRAPHIC Explorer

Jennifer Burney is an environmental scientist. The work she does helps solve food problems around the world. She also helps protect the environment.

Welcome!

Hi! I am Jennifer Burney.

I am a scientist.

I study living things.

Science begins with asking questions.

I have questions about how plants grow.

I want to find ways to change how people grow plants on farms.

You can learn how scientists answer questions.

What is a question you have about how the world works?

4

5

Farmers in an African village use a watering system that is powered by solar power. Villagers and Jennifer walk toward the solar panels.

Exploring Science California connects students to real-world science and to real National Geographic Explorers, scientists, and engineers. Students learn **Science and Engineering Practices**, **Disciplinary Core Ideas**, and **Crosscutting Concepts** from real scientists and Explorers who use those skills every day to make new discoveries and to solve problems.

Think Like an Engineer Case Study

Save the Bees!

Do you like strawberries? Watermelons? Thanks to bees, we have fruits and other foods to eat. Bees pollinate many plants that make food. Some pollinated flowers transform into fruits that people eat. Dino Martins is a scientist who studies bees and other insects.

Problem

Dino Martins is worried. He's observed patterns that show there are fewer bees today than there were in the past. Fewer bees mean fewer fruits and other foods. People need food, so people need bees, too.

Solution

Dino Martins helps people protect bees. That way, there will be more bees to pollinate flowers. He teaches farmers that bees pollinate crops. Farmers who protect bees harvest more food. We need plenty of food for people to eat.

Some bees' habitats have been destroyed. Bees have lost their hives, which are their homes. So, Dino Martins shows people how to make bee houses. Bee houses are objects that help bees survive.

Wrap It Up!

1. Why are bees important?
2. What might happen if there were no bees?
3. Why do you think Dino Martins' work is important?

NATIONAL GEOGRAPHIC Explorer

Dino Martins says, "Spend five minutes a day with an insect. It will change your life." His work with insects is changing many lives.

There are many kinds of bees. Dino Martins studies bees in Africa.

Amegilla bee

Stagmopis bee and Nectar bee

One machine people use to help bees is called a beehive. The people use beehives to help the bees in their farms.

Use a field trip. Dino helps students collect insects so that they can look at them up close.

Exploring Science California:

- » Real Scientists
- » In the Real World
- » Doing Science Right Now



Case Studies featuring Explorers introduce real-world problems and show how scientists and engineers solve them.

Videos of Explorers introduce students to **phenomena**.

National Geographic Explorers

A National Geographic Explorer hosts each grade level of *Exploring Science California*, introducing students to the practices and skills scientists and engineers use to do their work.

Each grade includes other Explorers and scientists who:

- » Are role models for students and encourage them to act and think like real scientists
- » Demonstrate how and why students will use their Science Notebooks
- » Introduce the **phenomena** and concepts of each unit

Kindergarten



Lead Explorer
Jennifer Burney
Environmental Scientist
National Geographic Emerging Explorer

Grade 3 & 5



Andrés Rufo
Geoscientist
National Geographic Young Explorer

Grade 1



Nalini Nadkarni
Forest Ecologist
National Geographic Grantee

Grade 4



David Moinina Senege
Biomedical Engineer
National Geographic Emerging Explorer

Grade 2



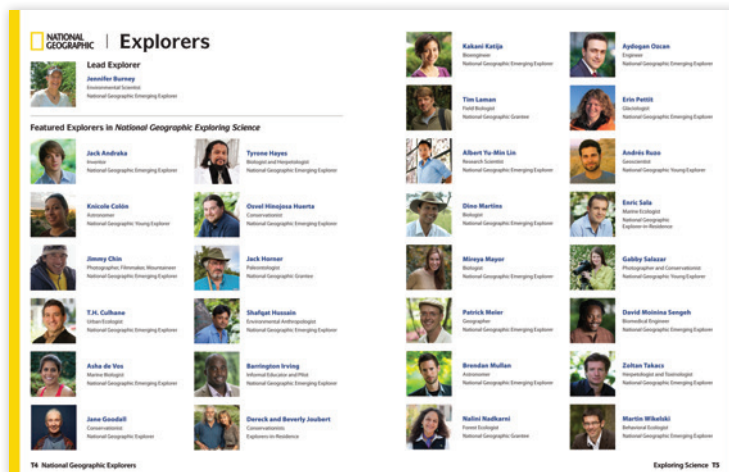
Asha de Vos
Marine Biologist
National Geographic Emerging Explorer

Grade 6



Zoltan Takacs
Herpetologist and Toxinologist
National Geographic Emerging Explorer

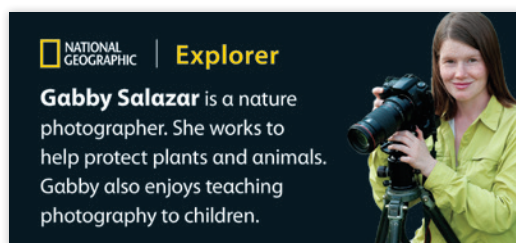
Host Explorers for each grade



Complete Explorer List, Grades K–6 — Teacher's Edition, pp. T4–T5

Diverse Science Role Models

Exploring Science California includes Explorers and scientists from all backgrounds. Students see many paths to becoming a scientist or engineer to prove that **any student of any ability can be a scientist or Explorer**.



Science Notebooks to Practice Real Science

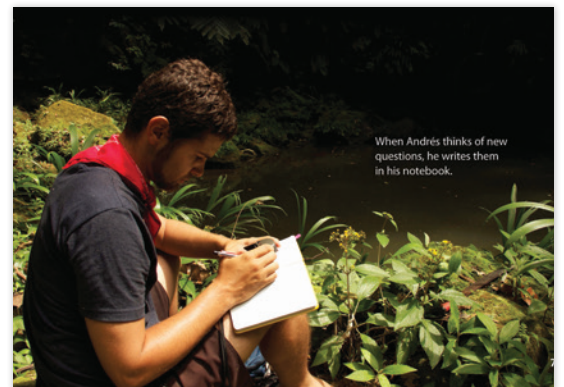
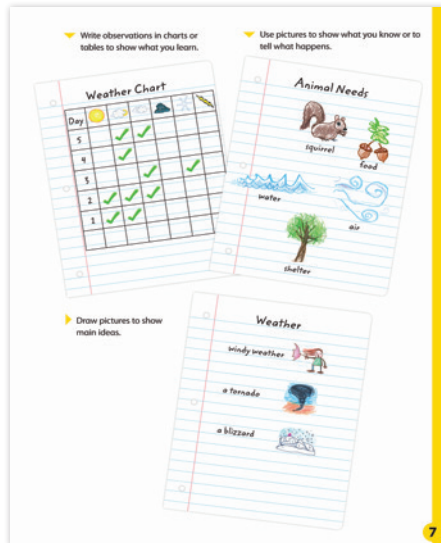
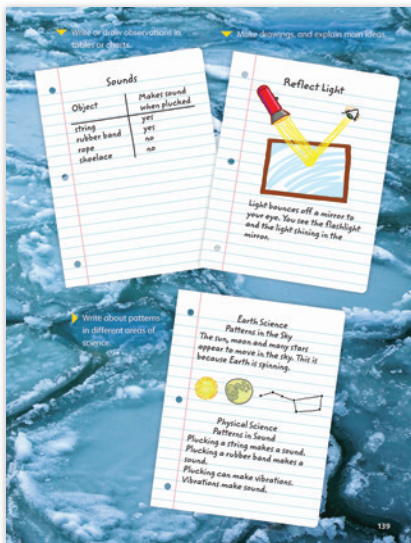
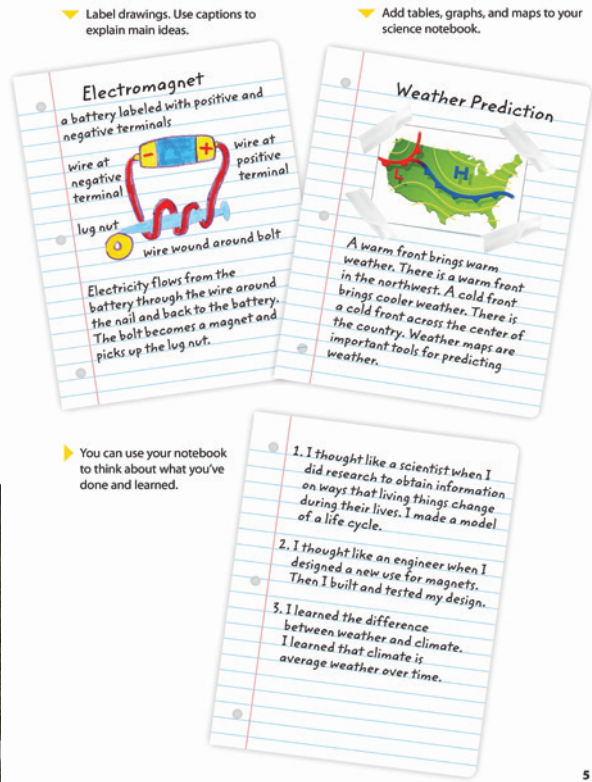
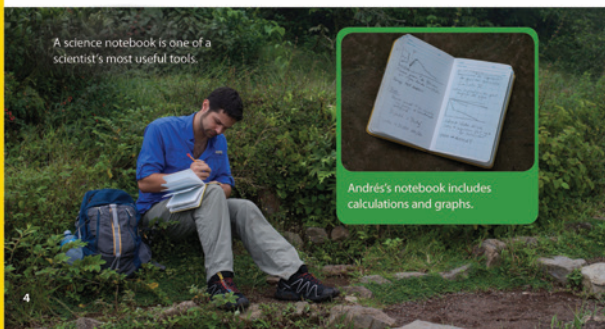
Explorers model for students how they use their notebooks. Students will then apply this knowledge while they create and develop their own Science Notebook.

Keeping a Science Notebook

One tool I use in my research is a science notebook. I keep records of observations, measurements, and other data. I look for patterns and study the evidence. From these, I make predictions, explanations, and conclusions. In this program, you will learn how scientists and engineers ask questions and solve problems. And you can keep your own science notebook. Here are some ways to use your notebook. You or your teacher may have more ideas.

- Define and draw science words and main ideas.
- Label drawings. Include captions and notes to explain ideas.
- Collect objects, such as photos and magazine or newspaper clippings.
- Add tables, charts, or graphs to record observations and data.
- Record evidence for explanations and conclusions.
- Think about what you've done and learned. Ask new questions.

Look at the notebook examples for some ideas. Now it's time to set up your own science notebook!



Students demonstrate their knowledge by writing, drawing, and documenting their science experience.

Science Notebooks offer students the opportunity to practice science and record data like real scientists.

Science Notebook Companion

Name _____ Date _____

Think Like a Scientist

Make Observations

Student Rubric
Place a check in the box to show the answer that is true for you.

Rubric	Yes	Not Yet
1. I can explain what I am trying to learn about in my investigation.		
2. I can describe land and water habitats found in Africa.		
3. I can describe different living things in each African habitat.		
4. I can compare different plants and animals living in African habitats.		
5. I can record, collect, and organize data on living things in African habitats.		

My Comments

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Student rubrics are provided for each hands-on activity for students to assess their own ability and knowledge.

Name _____ Date _____

Investigate

Erosion

Record
Record your observations and predictions in the table below.

	My Predictions
first hill	
second hill	

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Name _____ Date _____

Think Like an Engineer

Design, Test, and Refine a Device

Record
Record your observations in the tables below.

Buzzer Test 1

What I did	Sound?

Buzzer Test 2

What I did	Sound?

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Data sheets for collecting data can be completed and inserted into the Science Notebook.

STEM
ENGINEERING PROJECT

Design a Seed Spreader

Have you ever seen a field of crops planted in rows? Farmers grow them in long, neat rows. That way, each plant gets enough light and water. Most farmers use big machines to plant the seeds. These machines are called "seeders."

A farmer wants to plant beans in a small field. You and your team will help. You will design a seeder. Your seeder must deposit seeds evenly, so the plants will have enough space to grow.

The Challenge

Your challenge is to build a model of a farm seeder. Your model must deposit all the seeds and distribute the seeds evenly in each row.

- Define the problem.** Your model must place some seeds in each row marked on chart paper. Think about the problem you are solving. What does your model need to do? Write the problem in your science notebook.
- Design a solution.** Look at the materials you can use. How can you use them to make your model? Look at the seeds. How can you control how fast the seeds are spread? Draw a design for your seeder. Share it with your team.
- Test your solution.** Try your design. Test your seeder on the chart paper. Count the seeds in each row. Graph your results. Did your seeder deposit the seeds evenly? Can you make your seeder better? Write your ideas in your science notebook. Design a second model, and test it. Compare your results.
- Share.** Show your model to the class. Share the graph of your test results, too. Tell what worked well and what did not. Answer questions about your design.

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STEM Projects encourage students to use their Science Notebooks as they solve real-world problems through engineering challenges.

Citizen Science

Bugs in Our Backyard

Be a Citizen Scientist

Scientists want to bug you! They want to learn more about insects called bugs. Bugs have six legs and wings folded over their backs. Bugs also have special mouthparts. They use their mouths to pierce plants and suck the juices.

Scientists have many questions about bugs. Where do they live? What do they eat? But scientists can't be everywhere. Ordinary people help them. They live in different places. These people are citizen scientists.

Citizen scientists make observations. They look for patterns. Their observations are data. An organization called Bugs in Our Backyard collects their data. Scientists use the data to answer questions about bugs.

You can collect data about bugs, too. Learn about common bugs in your area. Search for bugs, and record what you see. Share what you find with others.

Wrap It Up!

- What data about bugs do citizen scientists record?
- What was your data? Where did you find bugs? How many?

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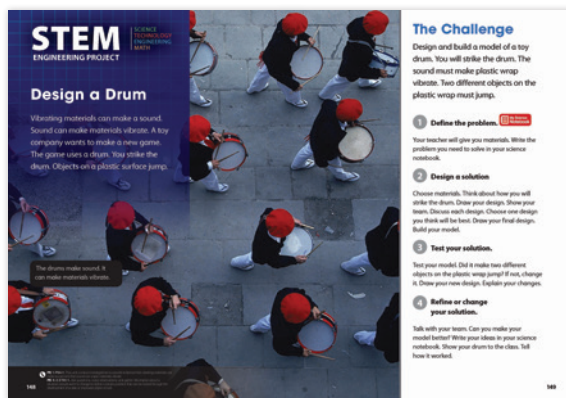
Students practice real science and record data in their Science Notebooks through Citizen Science projects.

Variety of Lessons Support 3-Dimensional Instruction

Each unit introduces the 3-Dimensions of the CA NGSS from different perspectives through a variety of lesson types.

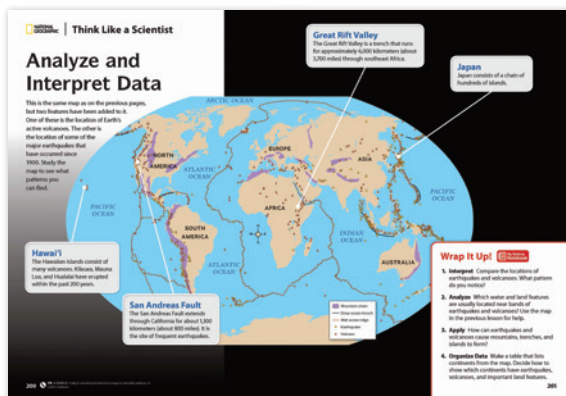


Disciplinary Core Ideas (DCI) and **Crosscutting Concepts (CCC)** are supported in *Stories in Science* lessons which feature scientists from all backgrounds (culture, gender, ability) along with their scientific contributions and discoveries.



Science and Engineering Practices (SEP) are applied in hands-on *Investigate* activities where students explore aspects of specific **DCI's**.

DCI's and **SEP's** are supported with *STEM Projects* that engage students in defining real world problems and developing and refining solutions.



Performance Expectation activities are presented in *Think Like a Scientist* and *Think Like an Engineer* lessons that engage students in applying all 3 Dimensions in one hands-on **performance task**.

Lesson Sequences Target Performance Expectations

Anchoring Phenomenon
for the unit

These lessons focus on preparing students
for the **Performance Expectation**

MindTap Digital Resources include
videos and Virtual Labs

Unit 1 Planning Guide

Forces and Interactions

Building on Prior Learning

This unit builds upon what students learned about forces and motion in kindergarten. It takes their intuitive models of forces and extends them to incorporate multiple forces as well as forces that act at a distance. Students also learn to use diagrams to model forces and motion.

- Use the Unit Pre-Assessment and Formative Assessment activity (Assessment Handbook, pp. 3–5) to determine students' level of familiarity with concepts of force and motion and to assess their readiness for applying the SEPs Developing and Using Models and Planning and Carrying out Investigations.

Selecting an Anchoring Phenomenon

The lessons and activities in this unit lend themselves naturally to the anchoring phenomenon, "Sports and playground activities all involve a variety of forces (pushes and pulls)." However, you may choose to focus instruction on another phenomenon that is relevant to your students' lives, cultures, and experiences.

Advance Planning

The investigations and engineering activities in this unit all use inexpensive and readily available materials. You may want to plan ahead to make sure you have a variety of bar magnets, which students will use in several activities.

Assessment Resources

The following assessment tools are available for this unit.

Self-Assessment

Students can use their Science Notebooks along with the rubrics in the Science Notebook Companion for reflection and self-assessment throughout the unit.

Formative Assessment

- Unit Pre-Assessment (Assessment Handbook, pp. 3–5)
- Formative Assessment Checkpoints (Assessment Handbook, pp. 6–8)
- Rubrics for all Investigations, STEM Projects, Think Like a Scientist Lessons, and Think Like an Engineer Lessons (Assessment Handbook, pp. 52–60)
- MindTap Virtual Lab: Marble Collisions. This self-contained learning module includes multiple-choice and open-ended assessment questions.

Summative Assessment

- Unit Test (Assessment Handbook, pp. 9–12)
- Unit Performance Task (Assessment Handbook, pp. 13–14)

3-D Instructional Progression

This unit prepares students to demonstrate proficiency on this bundle of Performance Expectations: 3-PS2-1, 3-PS2-2, 3-PS2-3, 3-PS2-4, 3-5-ETS1-1, 3-5-ETS1-2. The following three Lesson Sequence charts provide a roadmap to instruction in this unit.

Lesson Sequence 1	Student Edition pp. 22–35	Pacing: 13 days
PERFORMANCE EXPECTATION 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.		
Science and Engineering Practices Developing and Using Models Planning and Carrying out Investigations Connections to Nature of Science Scientific Investigations use a Variety of Methods	Disciplinary Core Ideas PS2.A Forces and Motion. 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. PS2.B Types of Interactions Objects in contact exert forces on each other.	Crosscutting Concepts Patterns Cause and Effect Connections to Engineering, Technology, and Application of Science Interdependence of Science, Engineering, and Technology Influence of Engineering, Technology, and Science on Society and the Natural World
OVERVIEW In the lessons in this sequence, students refresh their knowledge of forces as pushes and pulls and then explore cause and effect relationships involving balanced and unbalanced forces. In Think Like an Engineer, they apply concepts of forces to the design and building of bridges. And finally, in the Think Like a Scientist they plan and conduct an investigation of balanced and unbalanced forces.		
	Student Pages Pushes and Pulls Balanced Forces Unbalanced Forces	Teacher Pages 22a–23d MindTap Digital Resources Video: Effects of Forces; Physical Science Gallery

Unit 1 Planning Guide (continued)

Lesson Sequence 2	Student Edition pp. 36–43	Pacing: 7 days
PERFORMANCE EXPECTATION 3-PS2-2 Make a model to describe motion in terms of forces acting on an object.		
Science and Engineering Practices Planning and Carrying out Investigations Connections to Nature of Science Scientific Investigations use a Variety of Methods	Disciplinary Core Ideas PS2.A Forces and Motion. The patterns of motion that objects follow can be described and measured without reference to the forces that caused the motion. Newton's laws of motion are a model for describing the patterns of motion.	Crosscutting Concepts Patterns Cause and Effect
OVERVIEW In this sequence, students investigate and model patterns of motion. They observe and measure the motion of a marble as it moves down a ramp. They then use their knowledge of forces to describe the motion. They use their knowledge of forces to describe the motion of a marble as it moves down a ramp. They use their knowledge of forces to describe the motion of a marble as it moves down a ramp.		
	Student Pages Forces of Motion Investigate Motion Motion in Science Think Like a Scientist: Marble Collisions	Teacher Pages 36a–37d 38a–39d 40a–41d MindTap Digital Resources Video: Clay Newton's Cradle

Lesson Sequence 3	Student Edition pp. 44–53	Pacing: 10 days
PERFORMANCE EXPECTATION 3-PS2-3 Make a model to describe the motion of an object in terms of forces acting on it.		
Science and Engineering Practices Planning and Carrying out Investigations Connections to Nature of Science Scientific Investigations use a Variety of Methods	Disciplinary Core Ideas PS2.A Forces and Motion. The patterns of motion that objects follow can be described and measured without reference to the forces that caused the motion. Newton's laws of motion are a model for describing the patterns of motion.	Crosscutting Concepts Patterns Cause and Effect
OVERVIEW In this sequence, students investigate and model patterns of motion. They observe and measure the motion of a marble as it moves down a ramp. They then use their knowledge of forces to describe the motion. They use their knowledge of forces to describe the motion of a marble as it moves down a ramp. They use their knowledge of forces to describe the motion of a marble as it moves down a ramp.		
	Student Pages Forces of Motion Investigate Motion Motion in Science Think Like a Scientist: Marble Collisions	Teacher Pages 44a–45d 46a–47d 48a–49d MindTap Digital Resources Video: Clay Newton's Cradle

Assessment overview for the unit

Every lesson builds towards a specific **Performance Expectation**



MindTap Digital Lesson Enhancements

DCI's and SEP's come to life even more in the MindTap interactive lessons, Virtual Labs, and Explorer videos. Students experience the 3-Dimensions digitally to further prepare them for mastering the **Performance Expectations**.



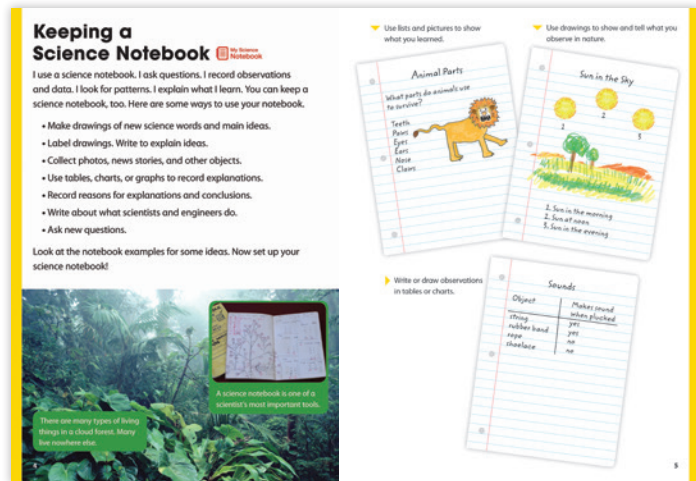
Interactive Digital Lessons

Virtual Labs

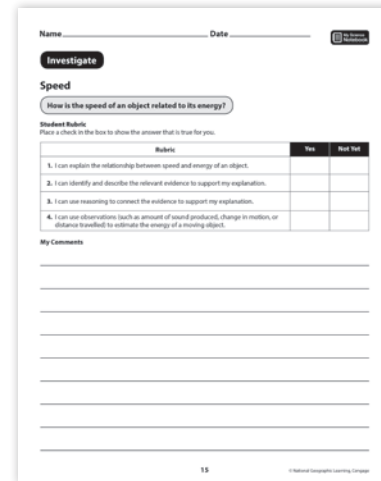
Assessments in a Variety of Formats

Exploring Science California provides teachers with a variety of self-assessments, formative assessments, and summative assessments to support instruction and to assess student progress.

Student Self-Assessment



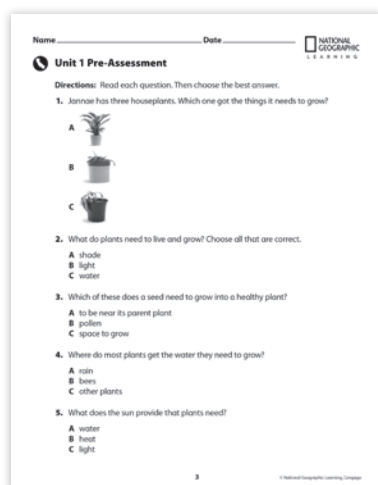
Science Notebooks help students monitor their own learning and reflect on their thinking and understanding of key concepts and practices.



Student Rubrics for each type of hands-on lesson are available in the Science Notebook Companion. Students monitor their progress and record comments and questions in their notebooks.

Formative Assessment

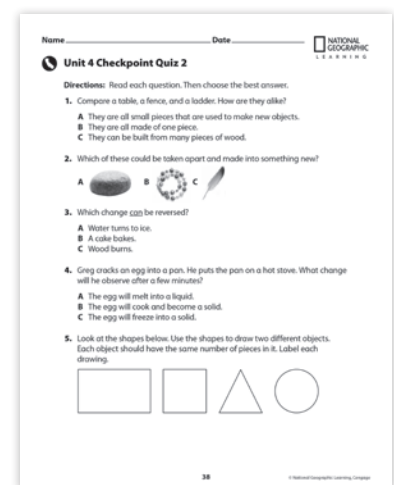
Formative assessment is available in the student book *Wrap It Up!* questions for each lesson and in the Assessment Handbook. The Assessment Handbook includes:



Unit Pre-Assessments help assess student prior knowledge of the **DCI's** for the unit.



Unit Opening Activities provide additional insight into student thinking about **DCI's** and their readiness to apply one or more of the **SEP's** targeted in the unit.



Quizzes provide a formative check of students' learning at the end of each lesson sequence.

Available in
English and
Spanish

Summative Assessment

The Assessment Handbook provides multiple summative assessment components to measure student progress and mastery of the 3-Dimensions.

Name _____ Date _____

Unit 1 Performance Task
Animals Help Plants

Part 2: Draw Seeds Moving

Directions: Look at the drawings in Part 1 that show plant parts that have seeds. Think about the way seeds travel away from a parent plant, such as a tree or shrub. Draw a picture that shows a seed being moved by wind or by an animal. Include as many details in your drawing as you'd like.



Tell what your drawing shows.

My drawing shows _____

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Name _____ Date _____

Think Like a Scientist
Plan and Investigate

Teacher Rubric:
Use the scale descriptions to guide your assessment of the student's work. Assess each item separately, and then decide on one overall score, using the following scale:

Rubric	Scale
1. The student made predictions about an object's properties based on prior experiences and knowledge.	3 2 1 0
2. The student planned and conducted an investigation to produce data that could serve as the basis for evidence to answer questions about classifying objects according to their properties.	3 2 1 0
3. The student evaluated different ways of observing objects to determine how to classify them.	3 2 1 0
4. The student used observations to collect data that could be used to correctly classify a variety of objects.	3 2 1 0

Overall Score _____







Comments _____

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Name _____ Date _____

Unit 2 Test

Directions: Read each question. Then choose the best answer.

1. Hal is in a place with tall grasses. He does not see many trees. What habitat is he likely in?
A the coast
B a wetland
C a grassland
2. Look at the pictures. What animals live in the grasslands of Africa? Choose all that are correct.
A  B  C 
3. Look at the pictures. What animals live in a pond? Choose all that are correct.
A  B  C 
4. Which live at the sandy coast? Choose all that are correct.
A crab
B camel
C sea grass

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Unit Performance Tasks use a variety of formats that require students to demonstrate at least two of the three Dimensions associated with particular **Performance Expectations**.

Rubrics for all *Investigate* activities, *STEM Projects*, *Think Like a Scientist*, and *Think Like an Engineer* activities align with the CA NGSS.

Unit Tests use a combination of constructed response and selected response items to assess student mastery of the targeted **Performance Expectation**.



MindTap Digital Gradebook

The MindTap Gradebook and its analytics tools allow teachers to track and analyze an individual student's progress and view the class grades for each activity. Teachers can view assignment details such as the distribution of answers by item, view the scores and answers for each individual student, and categorize assignments for different assessments.

Assignments				
Gradebook				
	Start	Due	Select	
Cover	—	—	<input type="checkbox"/>	
Program Consultants	—	—	<input type="checkbox"/>	
National Geographic Explorers in Exploring Science	—	—	<input type="checkbox"/>	
California Evaluation Criteria for Science	—	—	<input type="checkbox"/>	
Nature of Science Planning Guide				
Lesson 1: What Is Science?	—	—	<input type="checkbox"/>	
Lesson 2: How Do Scientists Work?	—	—	<input type="checkbox"/>	
Lesson 3: Who Are Scientists?	—	—	<input type="checkbox"/>	
INVESTIGATE 1: Practice Science	—	—	<input type="checkbox"/>	
Unit 1 Physical Science Planning Guide				
Lesson 1: Batter Up!	09/27/18	—	Edit	Unassign
INVESTIGATE 1: Speed	—	—	Edit	Unassign
Lesson 2: Hit the Ball	—	—	Edit	Unassign
INVESTIGATE 2: Collisions	—	—	Edit	Unassign
Lesson 3: Sounds of the Game	—	—	Edit	Unassign
INVESTIGATE 3: Sound	—	—	Edit	Unassign
Lesson 4: The Sun's Light	—	—	Edit	Unassign

Integrated Literacy

ENGLISH LEARNERS

ELD.1.1 Listening actively to spoken English in a range of social and academic contexts.

Emerging Before reading, ask yes/no questions, such as: Do all plants look alike? (No.) Is it possible that the same types of plants could look different? (Yes.)

Expanding After the first reading, provide sentence frames such as: Flowers on _____ (zinnia) plants grow in different _____ (colors) and _____ (sizes).

Bridging Ask more detailed questions, such as: How else could zinnia plants be different? (They could have different numbers of petals.) What do you know about the shapes of zinnia plant leaves? (They all have the same shape.)

ENGLISH LEARNERS

ELD.1.1 Exchanging information and ideas with others through oral collaborative discussions on a range of social and academic topics.

Emerging After the first reading, read aloud the questions. Ask: What can cause weather? (the interaction of tiny particles and the rotation of Earth on its axis) Say: We are going to study many different things in this section.

Expanding After the first reading, provide the following sentence frame for students: Energy _____ is a fundamental _____ of Earth's _____ and weather _____ (transfer, cause, climate, pattern). Ask: How can you figure out the answers to the questions? (reading through the section)

Bridging Have students reread each Let's Explore! section and summarize it for a partner. Have the partner add relevant missing information to the summary.

ELD Support

The Teacher's Editions include support for the three CA levels of instruction: Emerging, Expanding, and Bridging. These strategies aid all students in improving academic vocabulary and their understanding of science content.

Literacy Through Science

Write Opinion Pieces

W.5.1 Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book (e.g., My favorite book is...).

Present the book *Summer Is the Best!*, a persuasive writing mentor text. Discuss what an opinion is, sharing examples. Point to the title of the book, reading it aloud. Explain that the title gives an opinion. Connect with students' background knowledge by reviewing the types of weather you've already studied: sunny, cloudy, and windy weather. Share that summer is a season that can have different kinds of weather. Have students



3 Draft your report.
Your report will be in the form of a booklet, poster, or computer slide presentation. In your report, summarize the main ideas. The information you present should be in your own words. Your report should include the following for each product:

- the name and picture of the product
- an explanation of how the product works or what it does
- a description of who can use the product and the advantages and disadvantages of it
- a description of how the product affects the environment
- two interesting facts about the product

Review and revise the draft of your report to make it the best it can be. Do more research to add additional information as needed. Make the final draft of your booklet, poster, or computer slide presentation.

4 Present your report.
Work with your partner to decide who will give each part of the presentation. Decide how you will display visual information. Practice giving your part of the report aloud. Your oral presentation should express main ideas that are supported by significant details. Ask your partner to give you feedback you can use to make your part of the presentation better. With your partner, present your report to the class. Put information in a logical order. Use descriptions, facts, and details to describe the wind and solar products. Remember to give two additional interesting facts about each product. Listen as your classmates present their reports. How many different wind and solar energy products did your classmates identify and report on?

LITERACY CONNECTION

Determine Word Meaning

RI.5.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.

The caption on the second page of the lesson begins with the following sentence: "Maglev trains do not have wheels that roll on rails." However, the term *maglev* is undefined and may perplex students. Have students continue to read the caption, searching for clues to the meaning of *maglev*, which is provided in the next sentence. Students should discover that the term derives from the amalgamation of the first syllables of the words *magnetism* and *levitate*.

LITERACY CONNECTION

Use Key Details

RI.5.4 Ask and answer questions to demonstrate understanding of words and phrases in a text relevant to a grade 5 topic or subject area. Guide students to ask and answer questions to help them clarify the meaning of words and phrases in the text. For example, in the EXPLAIN section, when students use mouth parts to describe how animals use mouth parts, encourage students to use words like *crush*, *grind*, and *dig* in their answer. For example: A beaver digs into tree bark.

ACADEMIC VOCABULARY

Observe
After students read the lesson, ask a volunteer to find the words *observe* and *explorer*. Say: You have read the word "observe" in many of your earlier lessons as you "observed" sounds and vibrations. In this lesson, you were asked to "think like a scientist," which means that you "observed" what happened as you tested each material in the investigation. Ask: Is the word "observe" a noun or a verb? (a verb) Ask: How would you define the word *observe*? (Possible answer: Watch or notice something while you are studying it.) Ask: Is the word "observation" a noun or a verb? (a noun) Ask: How would you define the word *observation*? (Possible answer: It is the process of watching something closely while studying it.)

Writing for Science

Writing is incorporated throughout *Exploring Science California* as students interact with their Science Notebooks for each lesson. Grades K–2 use *Write About Science* Big Books for writing practice.

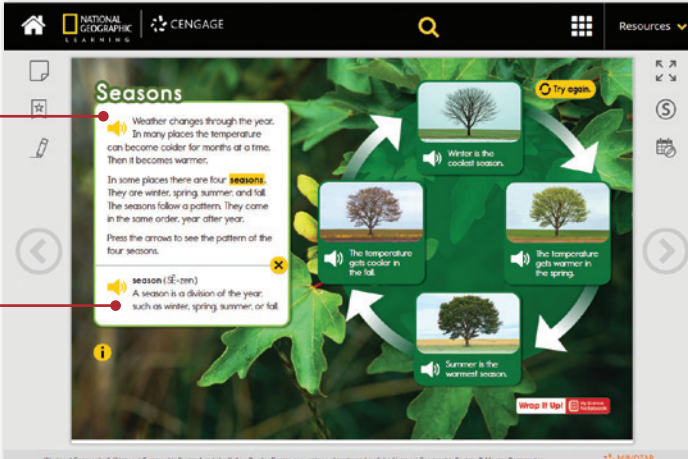
STEM Research Projects for grades K–6 include report writing and shared media such as posters, booklets, or slide presentations.

Literacy Support for Teachers

The Teacher's Editions provide additional Literacy Connection and Academic Vocabulary supports throughout the unit.

Text to speech audio support

On-screen definitions



The screenshot shows a digital interface for a lesson titled "Seasons". It features a central text area with a background image of a tree. To the right, there are four circular icons representing the seasons: Winter (a snow-covered tree), Fall (a tree with orange leaves), Spring (a tree with green leaves), and Summer (a tree with green leaves). Each icon has a text box next to it: "Winter is the coldest season.", "The temperature gets cooler in the fall.", "The temperature gets warmer in the spring.", and "Summer is the warmest season." Below the text area, there is a section titled "season (si-zən)" with a definition: "A season is a division of the year, such as winter, spring, summer, or fall." The interface also includes a search bar at the top, a "Resources" dropdown, and a "Try open" button.



MindTap Digital Literacy Support

The MindTap digital platform includes pop-up definitions for vocabulary words as well as a built-in text reader for extra audio support. Students can also highlight key content and take notes digitally.

Exploring Science Through Literacy

Exploring Science Through Literacy is an optional library of leveled readers that enriches the science curriculum by providing access for all students to a wide variety of informational texts.

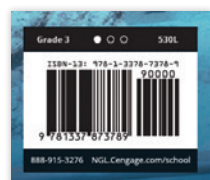
- » Support **Disciplinary Core Ideas**
- » Differentiate content for three reading levels
- » Extend the National Geographic experience

Optional sets of readers for each grade present the same content and vocabulary at three reading levels. This allows students of all abilities to equally access **Disciplinary Core Idea** concepts and vocabulary.

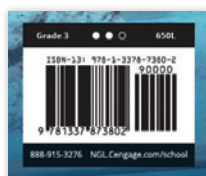
Grade 3 example, from the title *Hidden Discoveries*



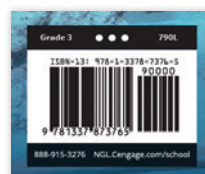
Below-Level



On-Level



Above-Level



Grade, level, and Lexile® are indicated on the back of each book

Balanced Instruction to Meet the Needs of Your Classroom

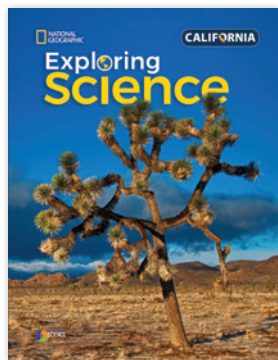
Exploring Science California is smartly designed to fit the needs of any school or classroom with flexible components and a broad range of content lessons, hands-on investigations, and literacy options.

Flexible Print and Digital Paths

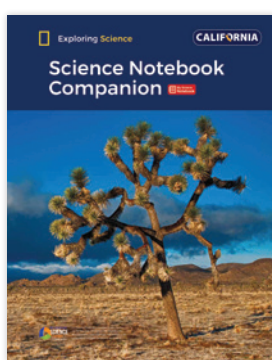
Print



Big Books for Kindergarten



Hard cover student books for Grades 1–6

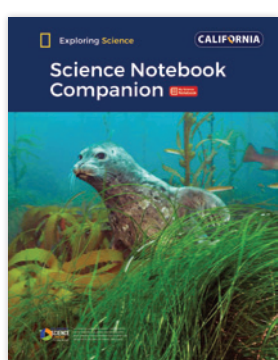


Science Notebook Companion

Print and Digital



Hard cover student books for Grades 1–6
(Big Books for Kindergarten)

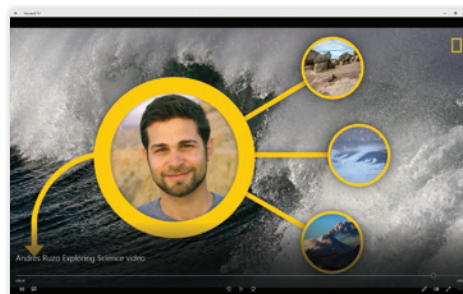


Science Notebook Companion



MindTap digital platform for students and teachers with interactive eBook, Virtual Labs, Explorer videos, and digital assessment

Digital Path



MindTap digital platform for students and teachers with interactive eBook, Virtual Labs, Explorer videos, and digital assessment

Integrated Hands-on Activities Balanced with Content

National Geographic-quality lessons targeting the **Disciplinary Core Idea** content are supported by a variety of hands-on investigations and activities.

Investigate
Thermometers

How does a thermometer work?

Many thermometers contain a liquid in a narrow tube. As the temperature changes, the pressure within the tube changes, and the level of the liquid in the tube rises or falls. Markings on the tube indicate the temperature in degrees. On the Fahrenheit temperature scale, the freezing point of water is 32°F, and the boiling point is 212°F. On the Celsius scale, the freezing point of water is 0°C, and the boiling point is 100°C. The Celsius scale is used in science. In this investigation, you will make your own thermometer and observe how it works.

Materials

plastic bottle	alcohol solution	food coloring
thermometer	cold water	tap water
clear glass	hot water	permanent marker

1. Fill the plastic bottle half full with the alcohol solution. Add three drops of food coloring, and mix well.
2. Place the thermometer in the bottle. Use tape to completely seal the mouth of the bottle around the stem.
3. Add ice water to the bottle. Measure and record its temperature. Then place the bottle in the water and record your observations.
4. Now the tap water out of the bottle. Add hot tap water to the bottle, and measure and record its temperature. Then place the bottle in the water and record your observations.

Wrap It Up!

1. Compare: How did the height of the alcohol solution when the bottle was in ice water and hot water compare?
2. Infer: If you put the bottle in a bowl of room-temperature water, how high would you expect the alcohol solution to rise in the bottle?
3. Apply: How could you add a scale to your thermometer?

STEM
ENGINEERING PROJECT

Design a Lunch Box

It's bitterly cold, and the wind is blowing hard. But inside their quilted coats, the hikers are nice and warm. When the hikers stop for lunch, the crates in their thermoses are steaming hot. What keeps the hikers and their cocoa so warm? Insulation.

As you have learned, thermal insulators are materials that do not conduct heat well. Cloth and glass are good thermal insulators. Air is an excellent insulator, especially when it's trapped between layers of cloth or inside small spaces.

Because insulation slows the flow of heat, it can serve two purposes. On a winter day, it can keep the thermal energy of warm objects from escaping into the cold air. But on a summer day, insulation can slow the flow of heat from the air into objects that people want to keep cool. In this project, you will use what you've learned about thermal insulators to design a lunch box that can keep food warm or cool.

The Challenge

Your engineering challenge is to design and build an insulated lunch box. Your lunch box must:

- keep one bottle of water cold
- keep a second bottle of water warm
- hold both bottles firmly in place

SCIENCE
in a SNAP

Reflections

1. Shine a flashlight on a mirror. See what happens. Now move the light. See what happens.
2. Now move the mirror. Shine the flashlight on it again.

What happened when you moved the light? The mirror?

Citizen Science

Project BudBurst

What is Citizen Science?

Temperatures on Earth are rising. How does this affect plants? Scientists want to know. They want your help! People across the country can collect data for scientists. This is called citizen science.

In Project BudBurst, people observe plants. They record changes through the seasons. They share data with scientists. Scientists look for patterns. They find out how temperature change affects plants.

You might observe when leaves come out in spring or drop in fall. You might observe when flowers bloom. Your teacher will give you the information you need.

Wrap It Up!

1. What kind of plant or plants did you observe? In what season or seasons did you make observations?
2. What data did you collect? What was the most interesting thing you found?

Investigation Kits Available

Available in Print, Digital, and Spanish

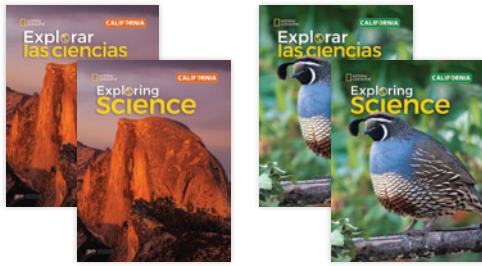
100% English and Spanish

All student resources and assessments are available in English and Spanish.



Core Components for Students

Kindergarten Big Books



Earth, Life, Physical, Let's Do Science

Hard Cover Student Books



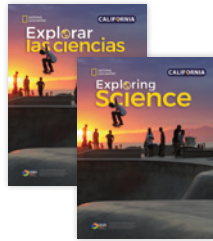
Grade 1



Grade 2



Grade 3



Grade 4



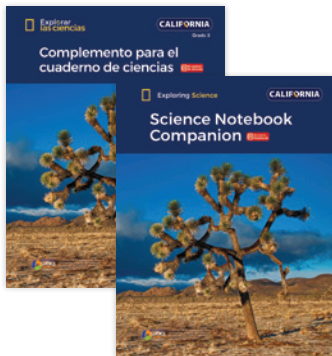
Grade 5



Grade 6

Available in
Print, Digital,
and Spanish

Science Notebook Companion



Includes black line master data tables and student rubrics

MindTap Digital



Interactive eBook with Virtual Labs, videos, image galleries,
and digital assessments with teacher gradebook

Additional Components

Investigation Kits



Investigation Kits are available for each grade which include all materials needed to conduct each *Investigate* activity, *STEM Project*, *Think Like a Scientist*, *Think Like an Engineer*, and *Science in a Snap* lesson.

Exploring Science Through Literacy



Leveled science readers provide additional opportunities to extend access to science informational texts

Core Components for Teachers

Teacher's Editions



Kindergarten



Grade 1



Grade 2



Grade 3



Grade 4



Grade 5



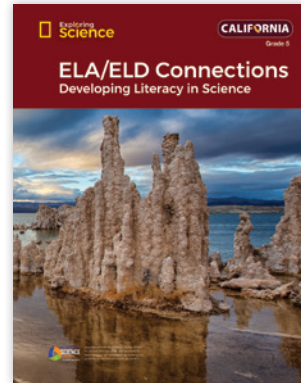
Grade 6

Assessment Handbook



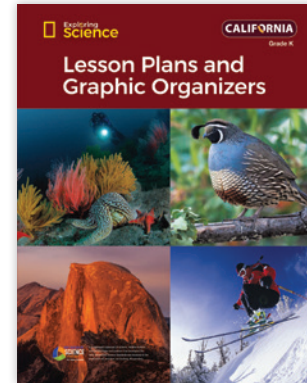
Includes Quizzes, Unit Pre-Assessments, Opening Activities, **Performance Tasks**, and Tests, as well as Teacher Rubrics for each type of hands-on lesson

ELA/ELD Connections



Includes scaffolded activities and more activities to develop literacy in science

Lesson Plans and Graphic Organizers



Includes an overview of each lesson and graphic organizer masters

MindTap Digital

Includes access to all student content and an interactive Teacher's Edition. It also includes the ability to create assignments, a robust gradebook with analytics, and a CA NGSS correlation tool.



Exploring Science

- » Authentic National Geographic experience with Explorers doing real science right now
- » Science Notebooks to practice real science
- » Variety of lessons support 3-Dimensional instruction
- » Integrated literacy combines science content and literacy skills development
- » Balanced instruction to meet the needs of your classroom

YOUR CALIFORNIA TEAM GRADES K–6

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