CALIFORNIA
Science · Grades K–6

NATIONAL GEOGRAPHIC

Exploring Science

Real Science. Real World. Right Now.

Authentic National Geographic Experience

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.

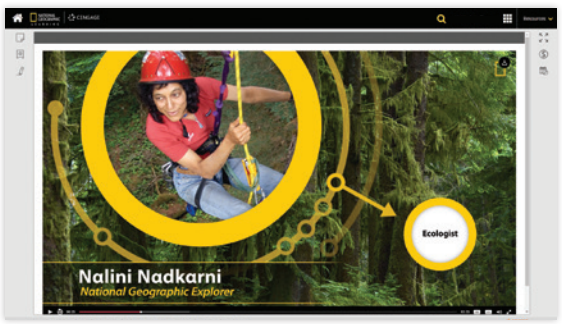
Case Studies featuring Explorers introduce real-world problems and show how scientists and engineers solve them.

Exploring Science California:

» Real Scientists

» In the Real World

» Doing Science Right Now



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

National Geographic Explorers

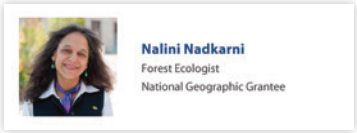
A National Geographic Explorer hosts each grade level of *Exploring Science California*, introducing students to the practices and skills scientists and engineers use to do their work.

Each grade includes other Explorers and scientists who:

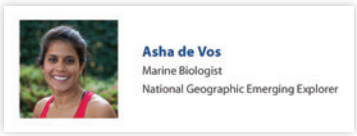
- Are role models for students and encourage them to act and think like real scientists
- Demonstrate how and why students will use their Science Notebooks
- Introduce the **phenomena** and concepts of each unit

Kindergarten

Grade 1

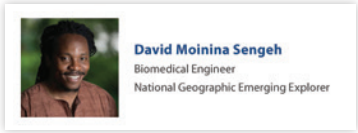


Grade 2



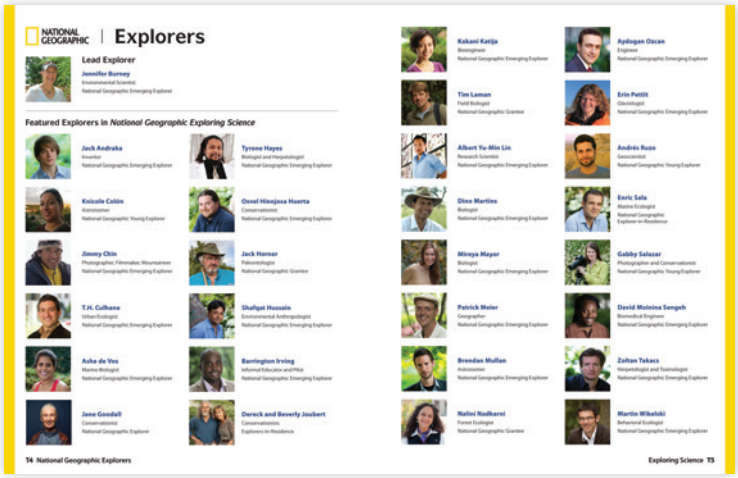
Grade 3 & 5

Grade 4



Grade 6

Host Explorers for each grade



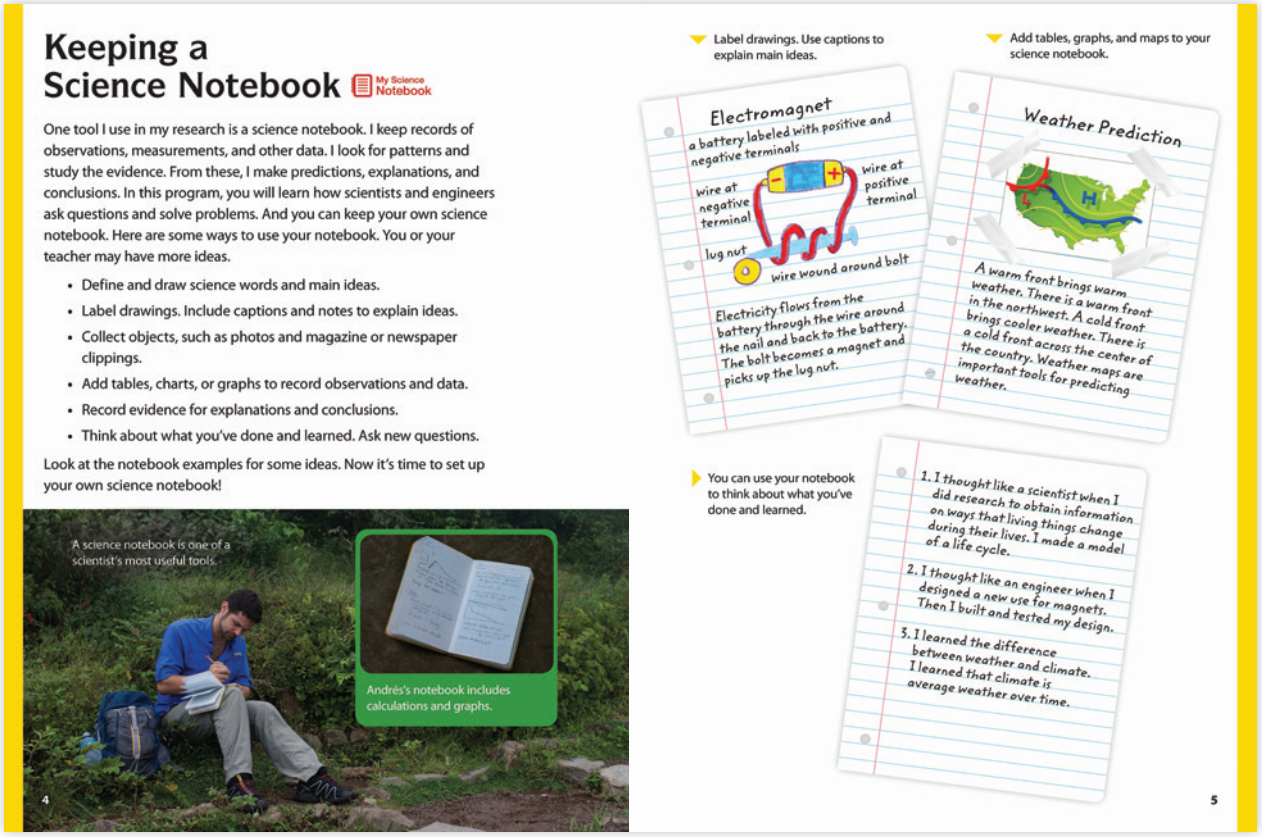
Complete Explorer list, Grades K–6 — Teacher's Edition, pp. T4–T5

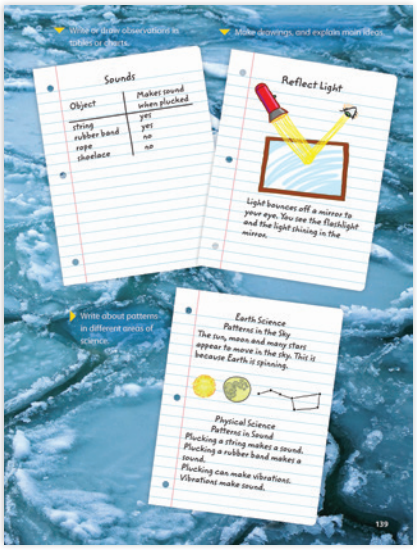
Diverse Science Role Models

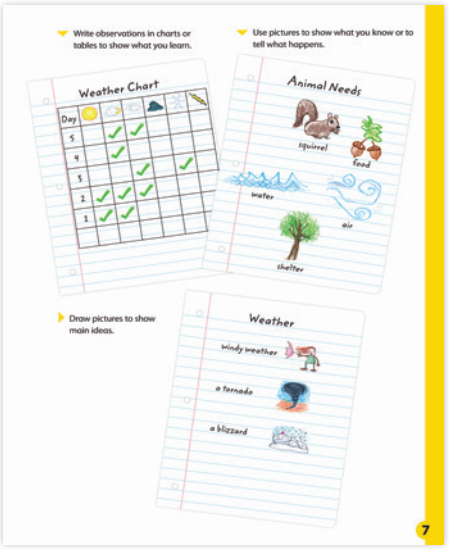
Exploring Science California includes Explorers and scientists from all backgrounds. Students see many paths to becoming a scientist or engineer to prove that **any student of any ability can be a scientist or Explorer.**

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.



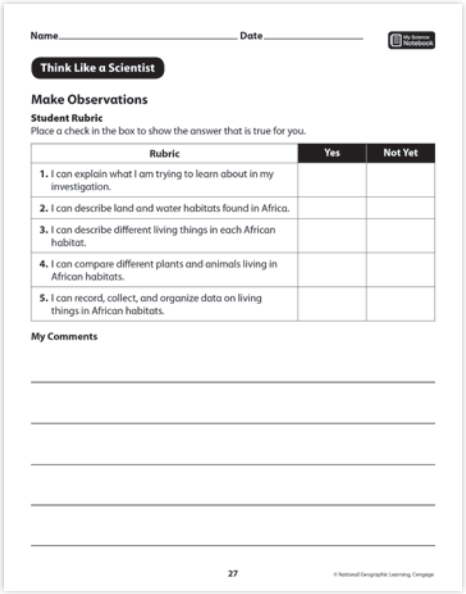




Students demonstrate their knowledge by writing, drawing, and documenting their science experience.

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

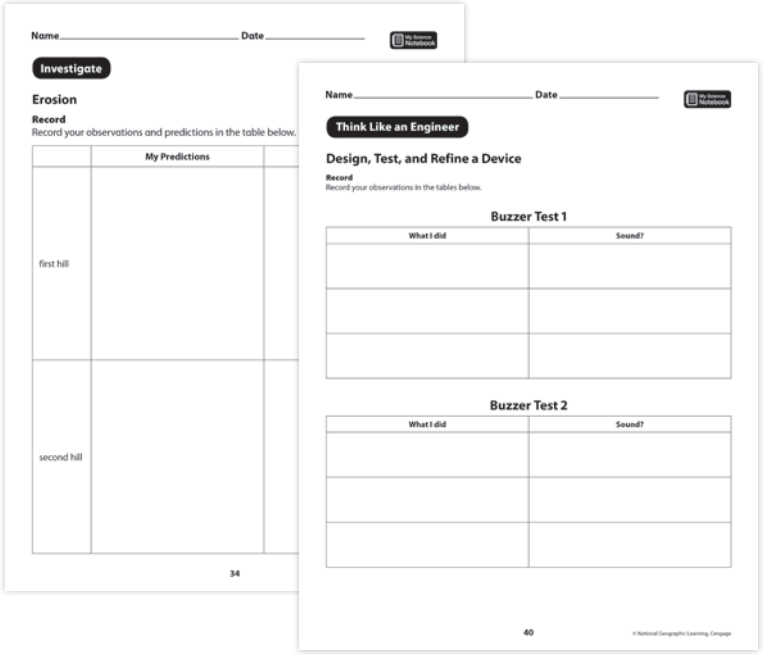
Student Rubric
Place a check in the box to show the answer that is true for you.

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

27

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		

34

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?

40

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 bean plants? 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.

Planting beans in rows gives them space to spread their roots and get enough sunlight.

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.

1 **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.

2 **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.

3 **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.

4 **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.

44 45

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.

These students are looking for bugs.

Boxelder bugs lay eggs on tree branches and leaves.

An adult milkweed bug will only live for about a month.

Wrap It Up!

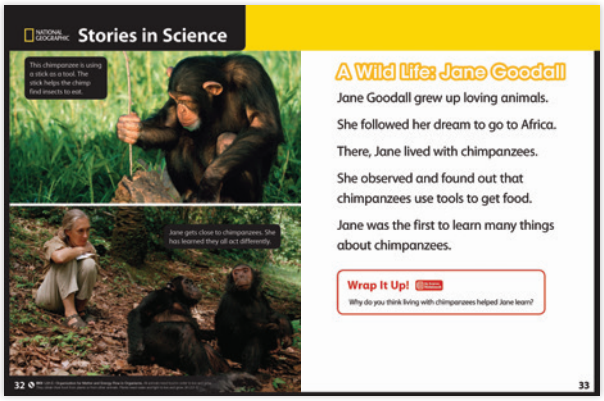
1. What data about bugs do citizen scientists record?
2. What was your data like? Where did you find bugs? How many?

42 43

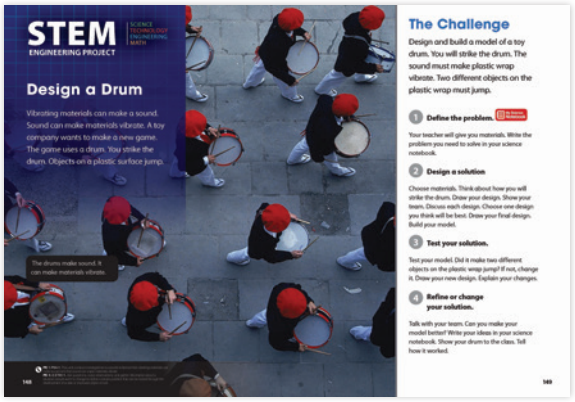
Students practice real science and record data in their Science Notebooks through *Citizen Science* projects.

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.

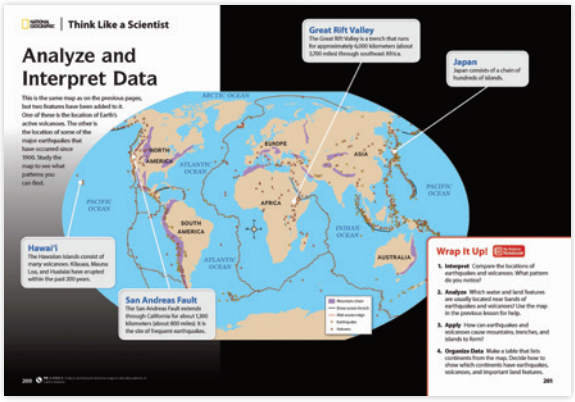


Disciplinary Core Ideas (DCI) and **Crosscutting Concepts (CCC)** are supported in *Stories in Science* lessons which feature scientists from all backgrounds (culture, gender, ability) along with their scientific contributions and discoveries.



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.



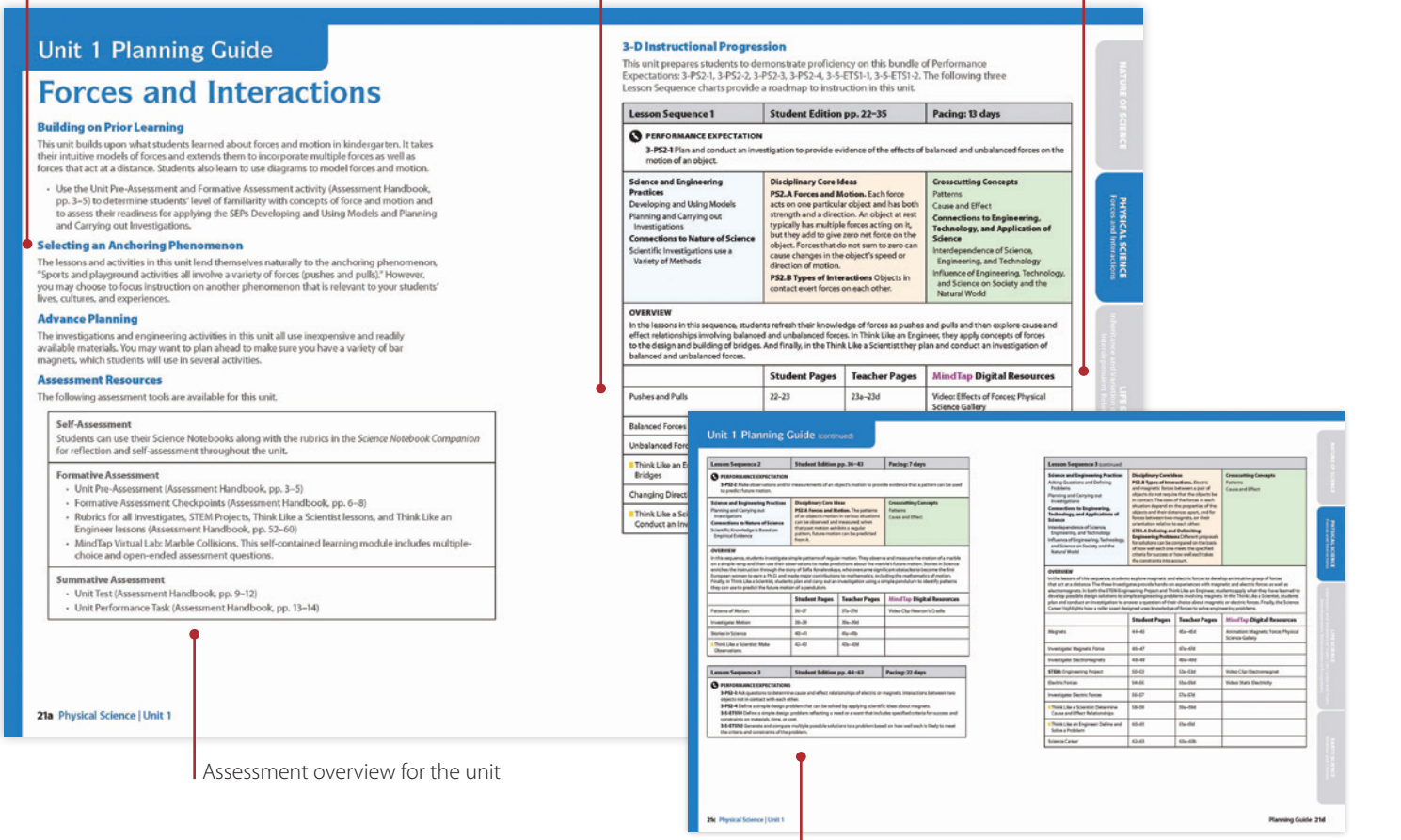
Performance Expectation activities are presented in *Think Like a Scientist* and *Think LIke an Engineer* lessons that engage students in applying all 3 Dimensions in one hands-on **performance task.**

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



Assessment overview for the unit

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

MINDTAP
From Cengage

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.**

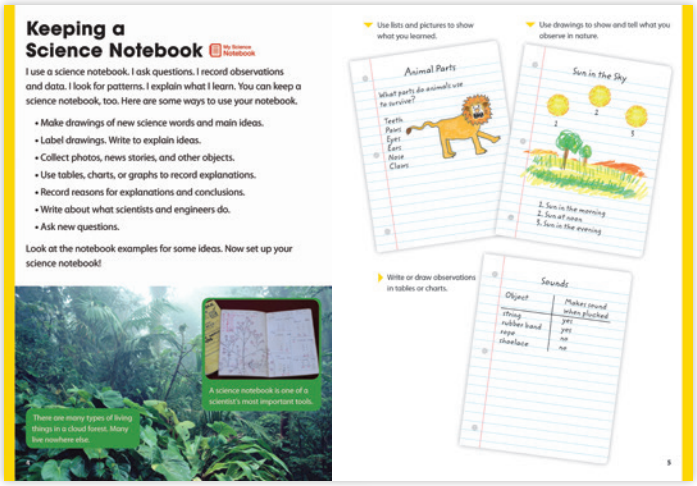
Interactive Digital Lessons

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

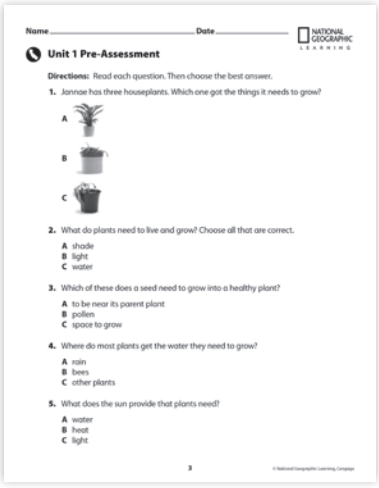


Science Notebooks help students monitor their own learning and reflect on their thinking and understanding of key concepts and practices.

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.

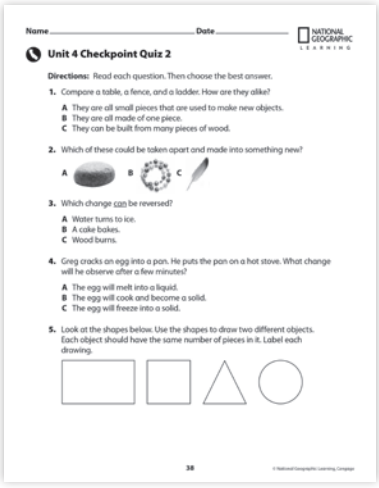
Formative Assessment

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.

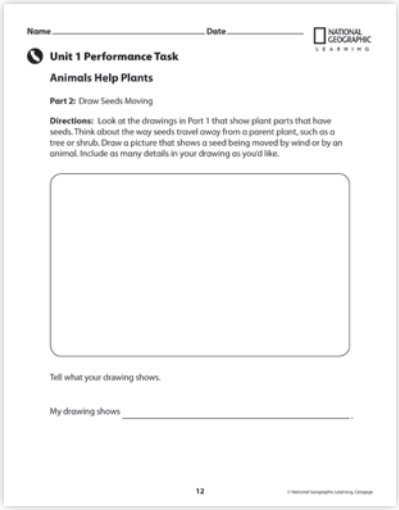


Quizzes provide a formative check of students' learning at the end of each lesson sequence.

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

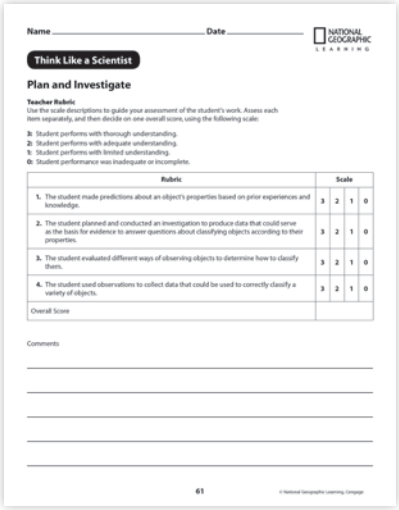
Directions: Look at the drawings in Part 1 that show plant parts that have seeds. Think about the way seeds travel away from a parent plant, such as a tree or shrub. Draw a picture that shows a seed being moved by wind or by an animal. Include as many details in your drawing as you'd like.

Tell what your drawing shows.

My drawing shows _____.

12

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.**



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:

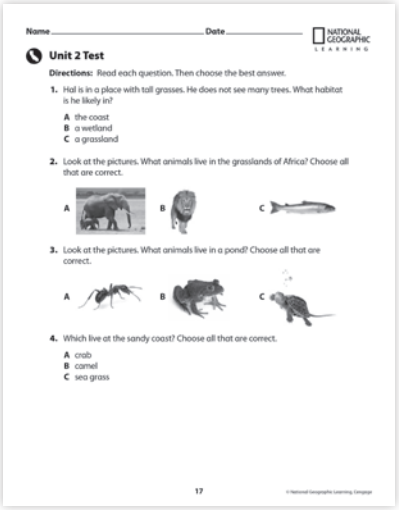
3: Student performs with thorough understanding.
2: Student performs with adequate understanding.
1: Student performs with limited understanding.
0: Student performance was inadequate or incomplete.

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

61

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



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

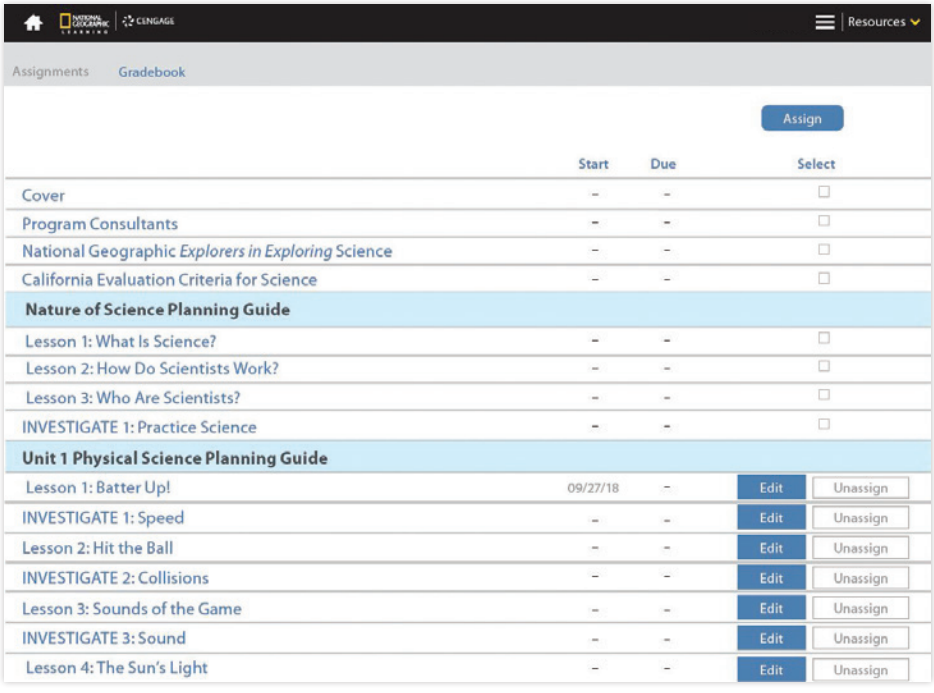
17

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

MINDTAP
From Cengage

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.



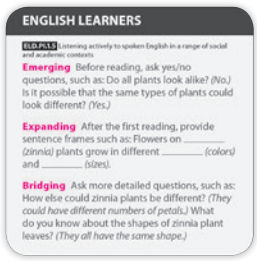
Resources

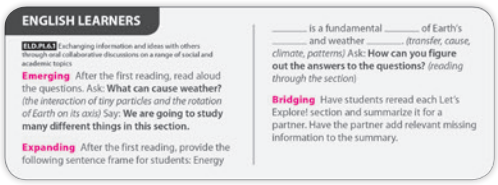
Assignments | Gradebook

Assign

	Start	Due	Select		
Cover	-	-	☐		
Program Consultants	-	-	☐		
National Geographic *Explorers in Exploring* Science	-	-	☐		
California Evaluation Criteria for Science	-	-	☐		
Nature of Science Planning Guide					
Lesson 1: What Is Science?	-	-	☐		
Lesson 2: How Do Scientists Work?	-	-	☐		
Lesson 3: Who Are Scientists?	-	-	☐		
INVESTIGATE 1: Practice Science	-	-	☐		
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





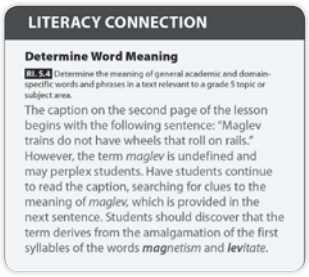
ELD Support

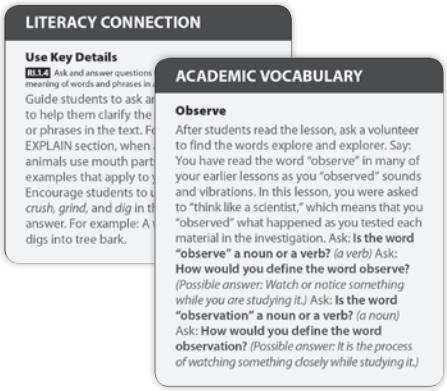
The Teacher's Editions include support for the three CA levels of instruction: Emerging, Expanding, and Bridging. These strategies aid all students in improving academic vocabulary and their understanding of science content.

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.

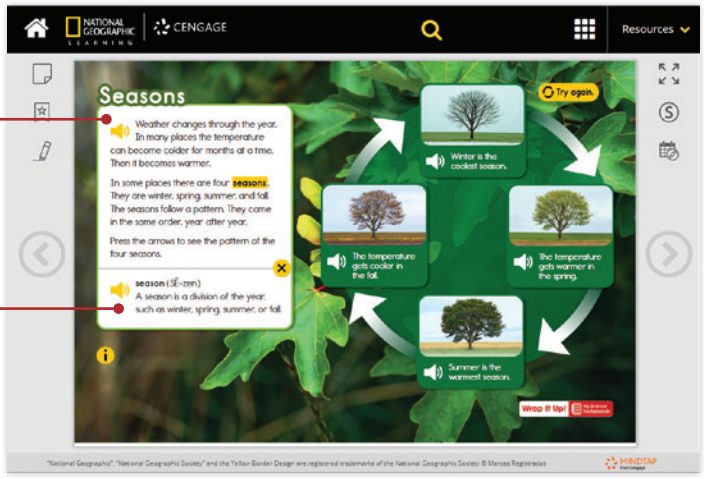
STEM Research Projects for grades K–6 include report writing and shared media such as posters, booklets, or slide presentations.





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

MINDTAP
From Cengage

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

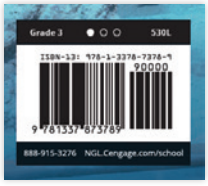
Exploring Science Through Literacy is an optional library of leveled readers that enriches the science curriculum by providing access for all students to a wide variety of informational texts.

- 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

The content and vocabulary is the same for each leveled reader, but the text complexity and length varies.

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

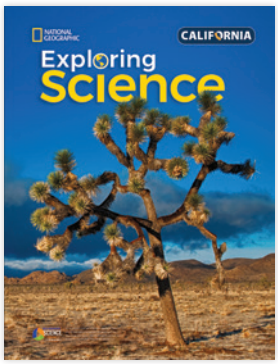
Balanced Instruction to Meet the Needs of Your Classroom

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.

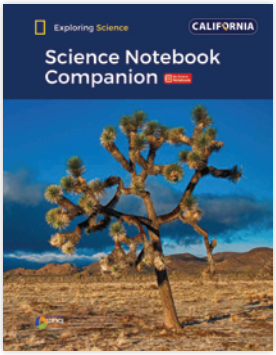
Flexible Print and Digital Paths

Print

Big Books for Kindergarten



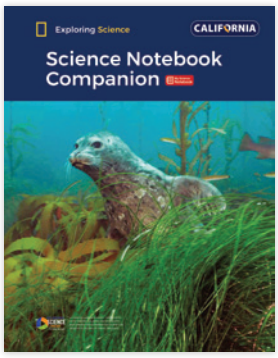
Hard cover student books for Grades 1–6



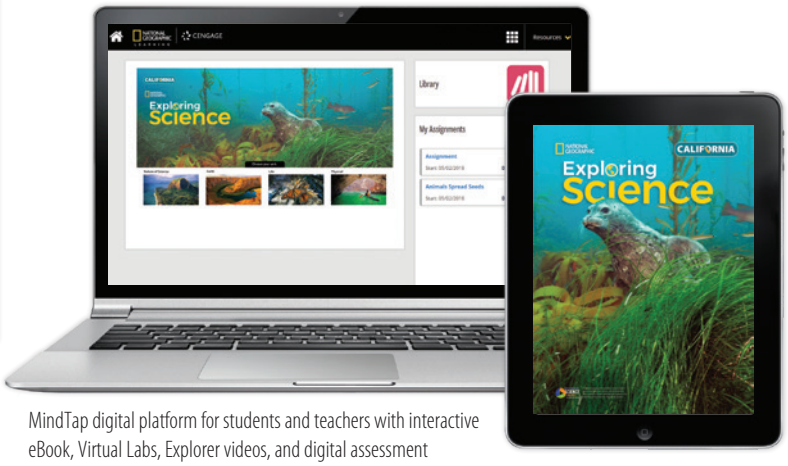
Science Notebook Companion

Print and Digital

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

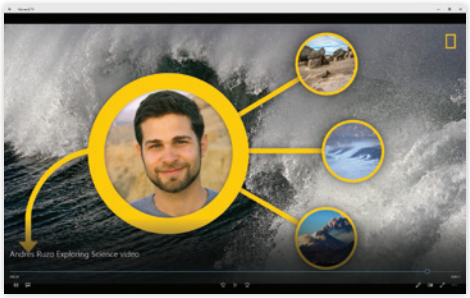


Science Notebook Companion



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

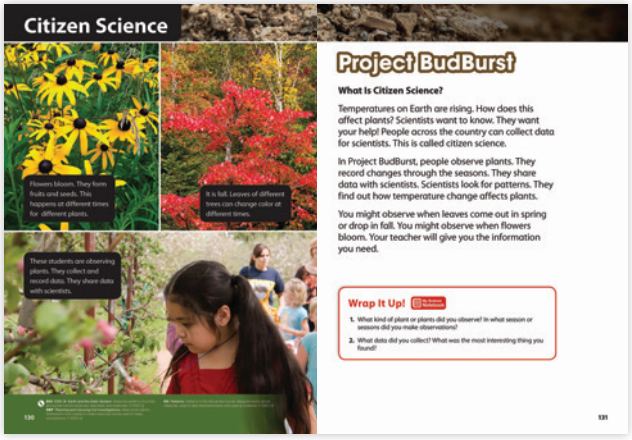
Digital Path



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.



Investigation Kits Available

Available in Print, Digital, and Spanish

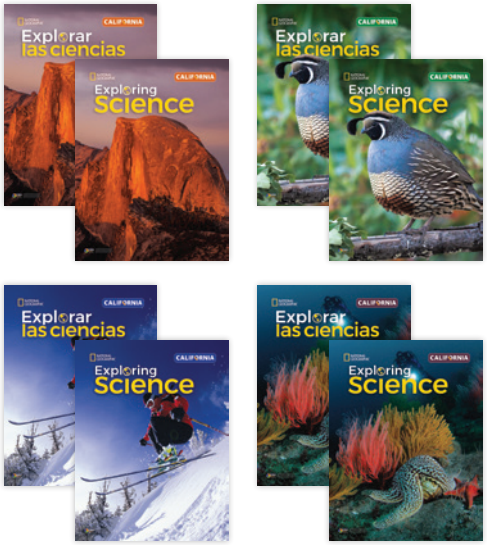
100% English and Spanish

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

Core Components for Students

Available in Print, Digital, and Spanish

Kindergarten Big Books



Earth, Life, Physical, Let's Do Science

Hard Cover Student Books

Grade 1

Grade 2

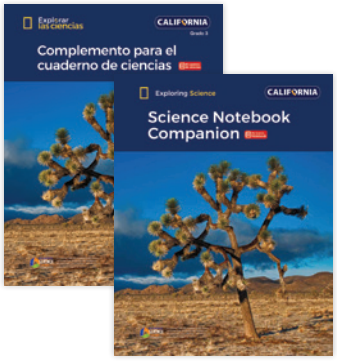
Grade 3

Grade 4

Grade 5

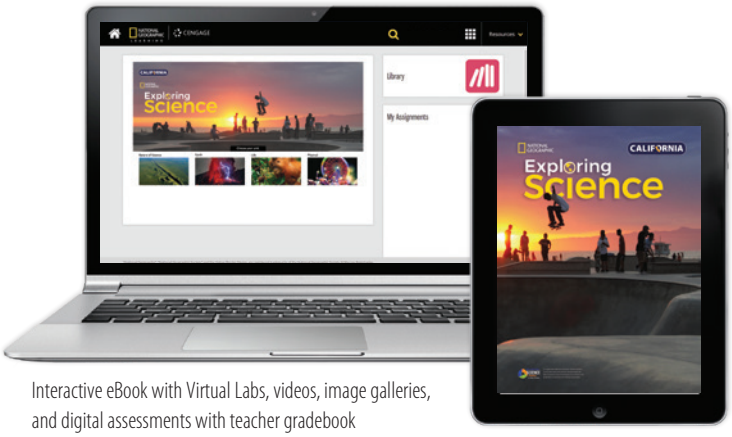
Grade 6

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

Grades K–6

Core Components for Teachers

Teacher's Editions

Kindergarten

Grade 1

Grade 2

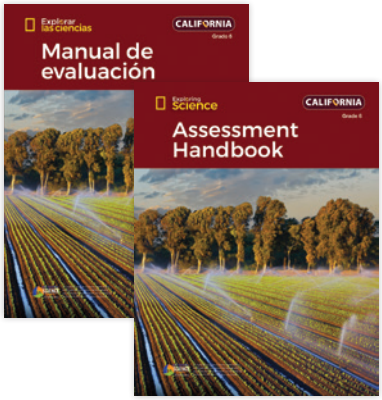
Grade 3

Grade 4

Grade 5

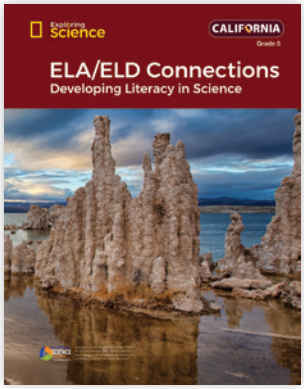
Grade 6

Assessment Handbook



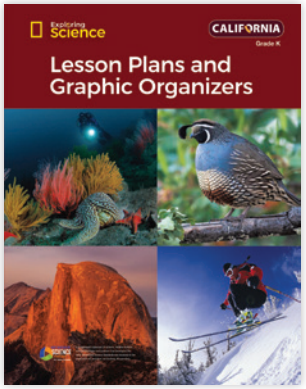
Includes Quizzes, Unit Pre-Assessments, Opening Activities, **Performance Tasks**, and Tests, as well as Teacher Rubrics for each type of hands-on lesson

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.

NATIONAL GEOGRAPHIC

CALIFORNIA
Science · Grades K–6

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**

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ISBN-13: 978-03571-93297
ISBN-10: 03571-93296
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