



Grades K-5
English and Spanish

Exploring Science

Real Science. Real World. Right Now.



Exploring Science



Built for the Next Generation Science Standards



The Next Generation Science Standards (NGSS) are changing the way science is taught by incorporating a 3-Dimensional approach to instruction. Teachers now need to combine Disciplinary Core Ideas (DCI), Science and Engineering Practices (SEP), and Crosscutting Concepts (CCC) into each lesson to prepare students to master the Performance Expectations.

How does *Exploring Science* help teachers make these changes?

SCIENCE EDUCATION WILL INVOLVE LESS:	SCIENCE EDUCATION WILL INVOLVE MORE:	EXPLORING SCIENCE HELPS BY:
Science ideas being taught separately from their related real-world phenomena	Instruction about systems and modeling real-world phenomena to provide context for scientific ideas	Introducing real-world phenomena through Explorer and scientist experience; asking students to think critically by applying newly learned content to solve real-world problems (see pages 1–2)
Worksheets	Student-produced writing in Science Notebooks, reports, and multi-media presentations that explain and argue from evidence	Utilizing personalized Science Notebooks for each student to record data, modeling how real-world scientists and engineers work (see page 3)
Hands-on activities and labs that have pre-determined results	Varied investigations driven by student-generated questions with multiple possible outcomes that lead to deeper understanding of scientific core ideas	Providing students with a wide variety of hands-on practice activities to prepare them for the open-ended, self-guided Performance Expectation tasks (see pages 4–5)

"I have watched my students grow in their learning of science and the joy of thinking outside the box. The program is amazing."

—KARINA C., MARYLAND

Authentic National Geographic Experience

Exploring Science 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.

National Geographic Explorers

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

Each grade includes multiple 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 3



Grade 1



Grade 4



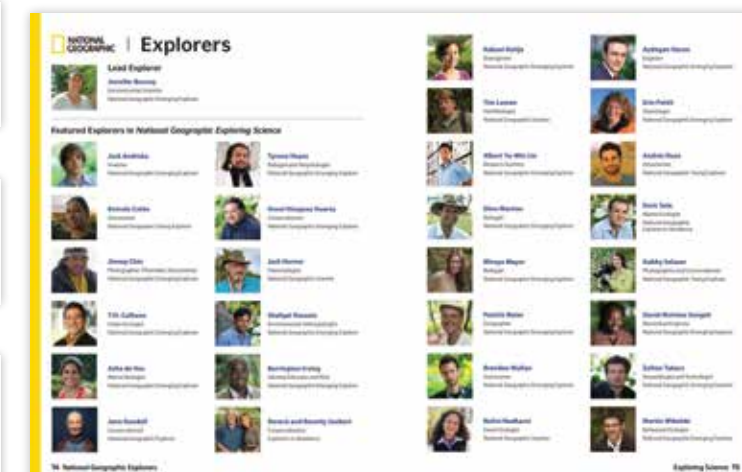
Grade 2



Grade 5



Host Explorers for each grade



Complete Explorer list, Grades K–5 — Teacher's Edition, pp. T4–T5



MindTap Digital

National Geographic Explorer videos appear in MindTap. Explorers take students into the field introducing students to science phenomena.



Science with a Human Connection

Exploring Science depicts real scientists, engineers, and photographers in the real world doing real science right now.

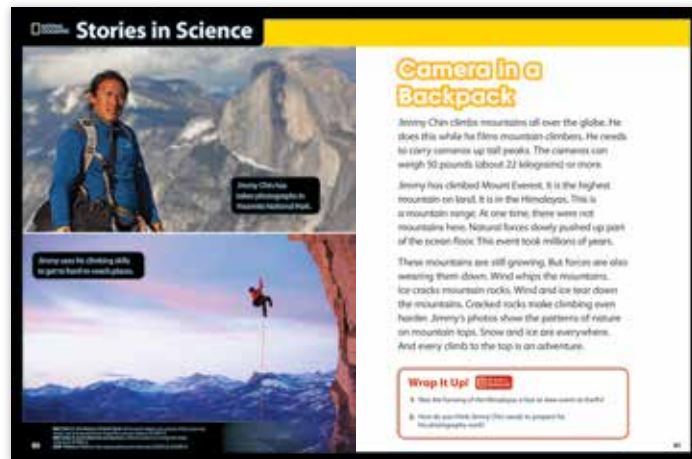
Diverse Science Role Models

Exploring Science 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.**



Stories in Science

Students are introduced to scientists and engineers from all backgrounds (culture, gender, ability). Historical and contemporary figures are shown overcoming challenges to make scientific advances and discoveries.

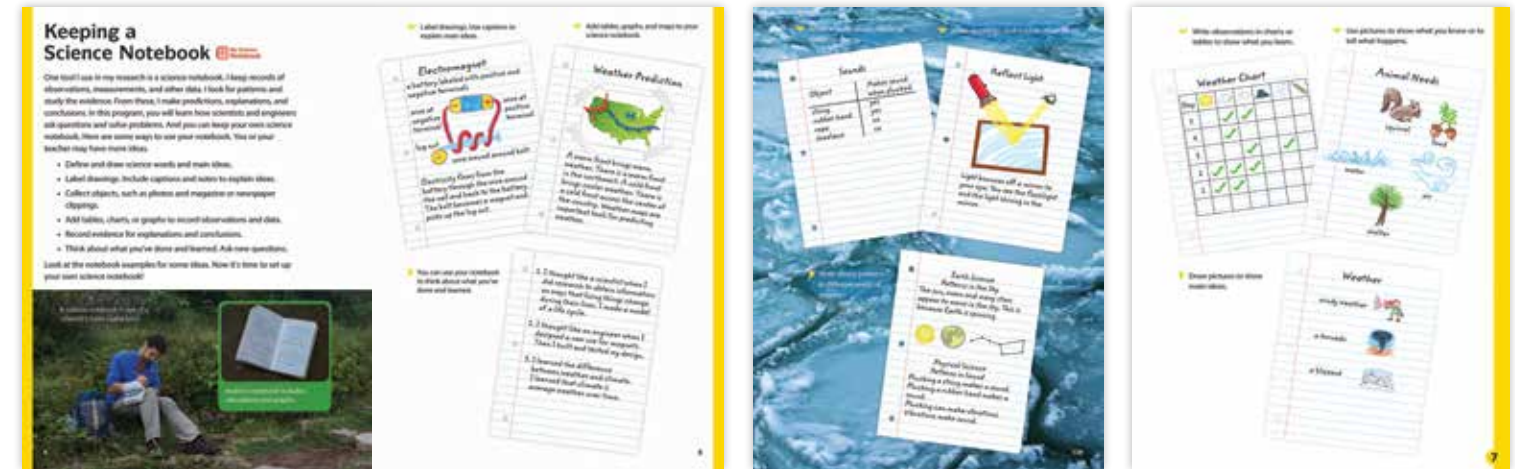


“...the inclusion of actual scientists in the textbook allows students to essentially meet someone who has found success in the science field.”

—TRACI T., NEW YORK

Real Science Applied with Science Notebooks

The Explorers in Exploring Science model for students how they use their science notebooks as they practice real-world science. Students will then apply their knowledge by creating and keeping 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.



MindTap Digital

The Interactive eBook in MindTap includes digital notebook activities and a downloadable **Science Notebook Companion.**



Data sheets for collecting data can be completed and inserted into student Science Notebooks.



Some lessons include a digital notebook option for students to draw answers to questions applying the practices of the NGSS.

Hands-on Practice for NGSS and STEM

Exploring Science integrates hands-on investigations and activities right into the content. Disciplinary Core Idea content is supported by hands-on lessons designed to apply the Science and Engineering Practices and the Crosscutting Concepts.

Hands-On STEM Practice



Investigate activities guide students through the steps to prepare for the Science and Engineering Practices in the Performance Expectations.



STEM Projects provide unique, real-world challenges for students to solve using research and engineering practices.



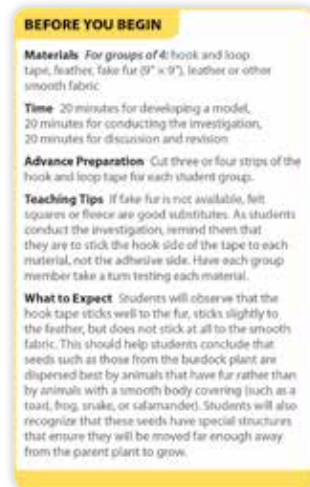
Think Like a Scientist and **Think Like an Engineer** are Performance Expectation activities where students apply their knowledge and skills in 3-D, hands-on performances.



Citizen Science projects allow students to collect real data which can be shared with scientists, contributing to real-world science research.

Teacher Support for Hands-on Lessons

The Teacher's Editions include everything teachers need to conduct the variety of hands-on lessons. Lessons include teaching multiple dimensions, differentiation support, Science Notebook support, and assessment.



"The activities are hands-on, engaging, and reach all levels of learners."

—LAURA F., NEW JERSEY

Hands-on lesson support includes materials needed, estimated time, what to do in advance, other tips, and what to expect for the outcome

Variety of Lessons Support 3-Dimensional Instruction

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



Disciplinary Core Ideas (DCI) and **Crosscutting Concepts** are supported in *Stories in Science* lessons which feature scientists from all backgrounds.



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



DCIs and **SEPs** 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.



MindTap Digital Lesson Enhancements

DCIs and **SEPs** 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

3-Dimensional Teacher Support

Teacher's Editions provide all of the support needed to implement and assess the 3-Dimensions of the NGSS. Master the NGSS Performance Expectations with lessons based on the 5E model of Engage, Explore, Explain, Elaborate, and Evaluate.

NGSS printed on every page

5E model for every lesson

Support for teachers on preparing for, and setting up, hands-on classroom activities

Phenomenon-based instruction guides lesson content

Multi-dimension instruction for every lesson with "Teach the Dimensions" support

Literacy, Language, and Vocabulary Support

Literacy Support for Teachers

Literacy Connection and Academic Vocabulary supports are included throughout including alignment to the Common Core State Standards. A full CCSS correlation is included in the Teacher's Edition.

LITERACY CONNECTION
Speaking & Listening
ELL Have students agree on a topic for discussion in a small group. Assign students to research a topic and prepare to share with the class. Speaking one at a time about the topic and texts under discussion.
ELL Build on others' talk in conversation by linking their comments to the results of others.
 Have partners work together to respond to the Reflect on Your Learning questions from the Life Science Check In. Have students write down answers to each question and share their answers with their partners, taking turns to listen to their partners. Encourage students to build on what their partners shared about what they learned and enjoyed the most in Life Science.

ACADEMIC VOCABULARY
Arch and Arc
 Display the words arch and arc, and have the class say the words aloud. Point to the picture of the arch. Ask: **How do you notice parts of buildings or homes with this type of shape?** Allow students time to share any relevant examples, such as doorways at schools or libraries. Explain to students that an arch is similar to an arch in that it is curved, but an arch is made by a moving object while an arch is a curved structure. Connect to the lesson concept and point out that it takes multiple pieces to construct a secure arch.

ELL Support

The Teacher's Editions include support at three levels: Starting, Developing, and Bridging. Each aid students in improving academic vocabulary, speaking and listening skills, and understanding of science content.

ELL SUPPORT
Starting Have students write the words solid and liquid on sticky notes and label the pictures of the Ask: **Are the raw eggs a liquid? Cooked eggs a solid?** Challenge each other a question.
Developing Provide sent to help students express the raw egg is a liquid. The cooked egg is a solid. The cooked egg is a solid. The cooked egg is a solid.
Bridging Have students write sentences to describe the egg photos. Then have other liquids and solids and sentences about each.

ELL SUPPORT
Starting Have students use the text structure to help them better access the content of the lesson. Ask: **How is this lesson organized, in terms of a narrative or both?** (Start with part of the lesson tells you steps to follow. The first or second part of the second part) Have students discuss with a partner which words could replace the numbered shape (first, next, then, and finally).
Developing Have students work with a partner to read the steps of the investigation in order. Before they progress to the next step, ask them to make a prediction about what they will do next and what the outcome will be.
Bridging Ask students if the text in this lesson is explanatory/informative or opinion (informative/opinion). Then have them go back into the text to find details to support their response. Ask students why certain topics such as this one—how do plants survive—work better within a certain text structure than other topics. Then have them complete this sentence: *In the lesson, I learned that plants adapted to growing in dry environments*....

Writing for Science

Writing is incorporated throughout *Exploring Science* as students utilize their Science Notebooks for each lesson. STEM Research Projects include report writing or creating posters, booklets, and presentations.

Exploring Science Through Literacy

Optional leveled science readers are available separately to enrich the science curriculum with a wide variety of informational texts.

The Challenge
 Observe a body of water by research. Write a paragraph that gives factual information and make a model of the body of water.

1. Select a topic.
2. Plan and conduct research.
3. Write a draft.
4. Present your report.

Unit Planning Guide

Provides Anchoring Phenomenon ideas, outlines Assessment Resources, and overviews 3-D Lesson Sequences that build towards Performance Expectation activities.

Differentiation and Discipline Connections

Additional support boxes help teachers differentiate instruction for all types of students (Below-Level, Students with Disabilities, Girls in Science, Gifted and Talented), provide Science Background, and provide connections to Math and Environmental Science.

MATH CONNECTION
 Use Geometry: Have students work with a partner to create a drawing of a shape. Have students use a ruler to measure the sides of the shape. Have students use a protractor to measure the angles of the shape. Have students use a compass to draw a circle. Have students use a straightedge to draw a line. Have students use a pair of compasses to draw an arc.

SCIENCE BACKGROUND
Saltwater Lakes
 Although most lakes contain fresh water, some lakes contain a high concentration of salt and other dissolved minerals. The Great Salt Lake in Utah is an example of a saltwater lake. It is three to five times saltier than the ocean. Although no fish can live in the Great Salt Lake, the brine shrimp population is abundant. Brine shrimp are the major source of food for the millions of shorebirds that migrate in the spring and fall.

DIFFERENTIATED INSTRUCTION
Support Level Learners Give each student a drawing of a shape. Have students use each sense to describe the shape. Have students use a ruler to measure the sides of the shape. Have students use a protractor to measure the angles of the shape. Have students use a compass to draw a circle. Have students use a straightedge to draw a line. Have students use a pair of compasses to draw an arc.

DIFFERENTIATED INSTRUCTION
Girls in Science
 Share information about careers in Earth science to expose all students, boys and girls, to careers tied to GIS technologies and other work related to mapping the Earth, its land, and bodies of water. Introduce cartography, sharing how women created some of the earliest maps and continue to work in GIS.

MINDTAP From Cengage

MindTap Digital Digital Lesson Support

Teacher support for using the enhanced MindTap™ features including Virtual Labs, Videos, and Photo Galleries

Virtual Lab
 Have students carry out the virtual lab, "Build It," to help them understand building something from many small pieces.
Time: 30 minutes
Teaching Tip: Help students connect the animation to the core concepts of the lesson. Ask: **What happened in this lab?** Possible answer: Build a model, look at a video, record data, build small pieces to build something bigger.
What to Expect: Students will manipulate the model to see how the pieces fit together. They will also see how the pieces fit together. They will also see how the pieces fit together.

Animation
 Have students select the animation of "Seasons" from the Resources and watch it. Have students use a ruler to measure the sides of the shape. Have students use a protractor to measure the angles of the shape. Have students use a compass to draw a circle. Have students use a straightedge to draw a line. Have students use a pair of compasses to draw an arc.

Featured Photo
 Have students study the "Warm Seas" photo within the Life Science Gallery and read the caption. Have students connect the image to the core concepts of the lesson by having them compare it to the building illustration in the lesson. Ask: **Which structures shown in the photo carry water and food for the plant?** (The red-colored tubes.)

Text to speech audio support

On-screen definitions



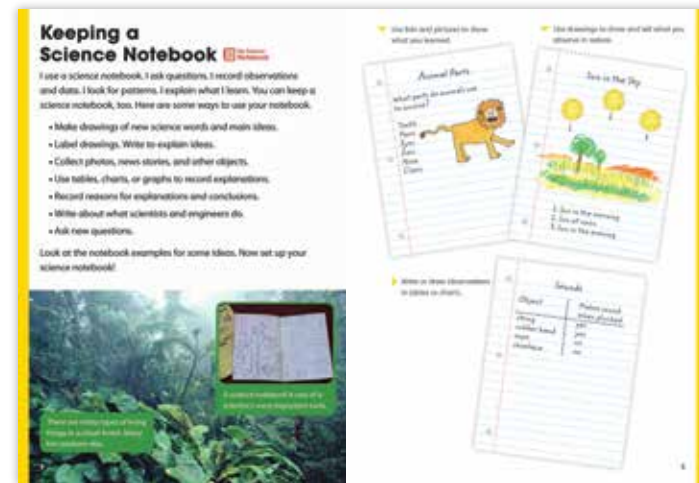
Digital Literacy Support

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.

Assessments in a Variety of Formats

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

Student Self-Assessment



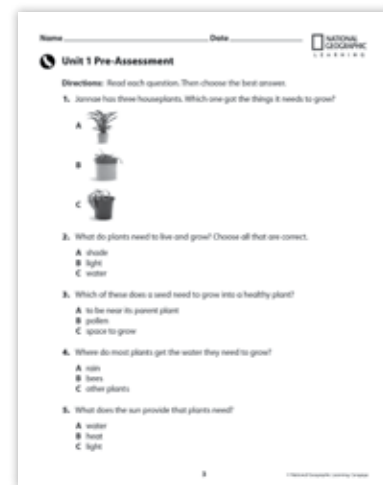
Science Notebooks help students monitor their own learning and reflect on their thinking and understanding of key concepts and practices.



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

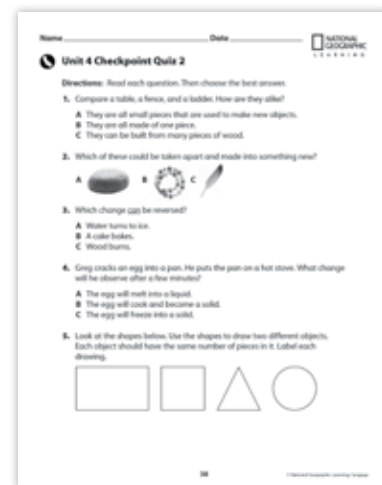
Formative assessment is available in the student book *Wrap It Up!* questions for each lesson and in the Assessment Handbook. The Assessment Handbook includes:



Unit Pre-Assessments help assess student prior knowledge of the **DCIs** for the unit.



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



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



Summative Assessment

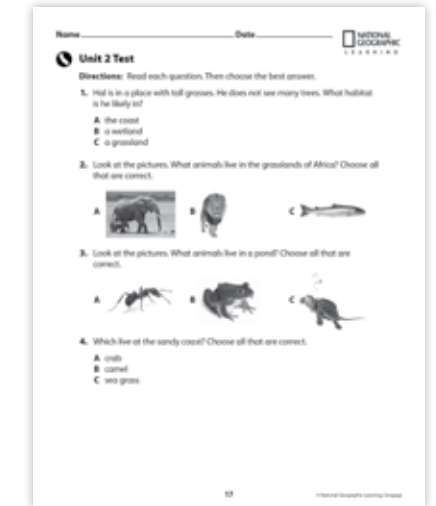
The Assessment Handbook provides multiple summative assessment components to measure student progress and mastery of the 3-Dimensions.



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 NGSS.



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

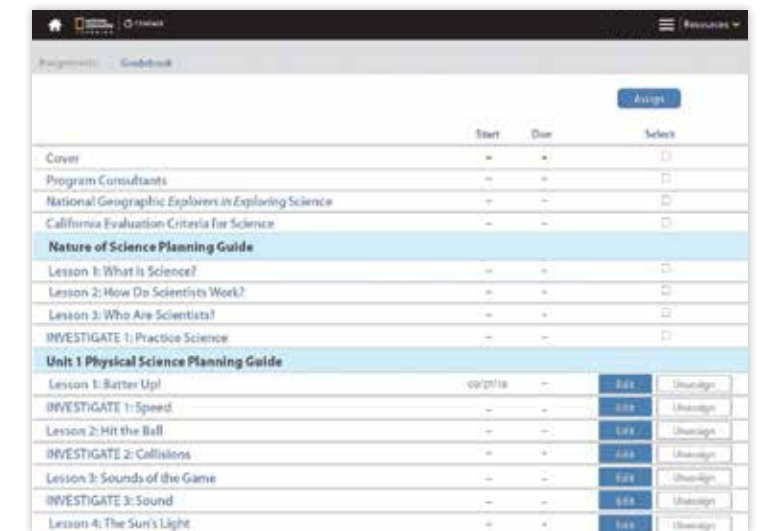


MindTap Digital Gradebook

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.

ExamView

Create and customize tests from a variety of question types based on Disciplinary Core Ideas and Performance Expectations from the NGSS. Print or export tests in various file formats.



“I love science, and I love this book!
I even read it when I’m not supposed to!”

—2ND GRADE STUDENT, MARYLAND

Components

Kindergarten



MindTap Digital (English and Spanish)



Big Books (Life, Earth, Physical, Let's Do Science)

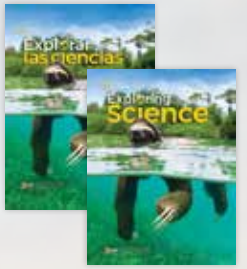


Teacher's Edition

Grade 1



MindTap Digital (English and Spanish)



English and Spanish Student Editions



Teacher's Edition

Grade 2



MindTap Digital (English and Spanish)



English and Spanish Student Editions



Teacher's Edition

Grade 3



MindTap Digital (English and Spanish)



English and Spanish Student Editions



Teacher's Edition

Grade 4



MindTap Digital (English and Spanish)



English and Spanish Student Editions

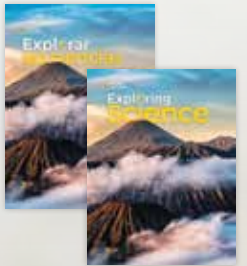


Teacher's Edition

Grade 5



MindTap Digital (English and Spanish)



English and Spanish Student Editions



Teacher's Edition

For more information, visit
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