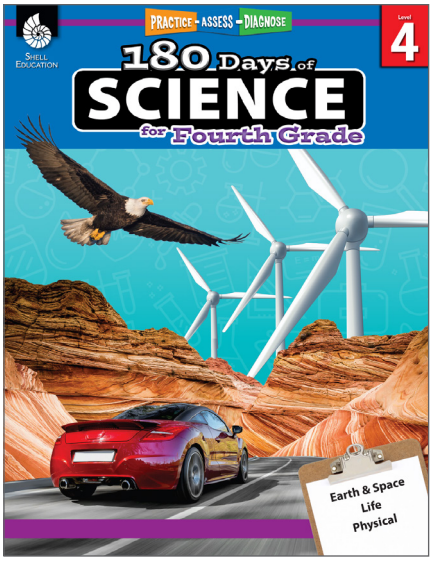
TCM Teacher Created Materials

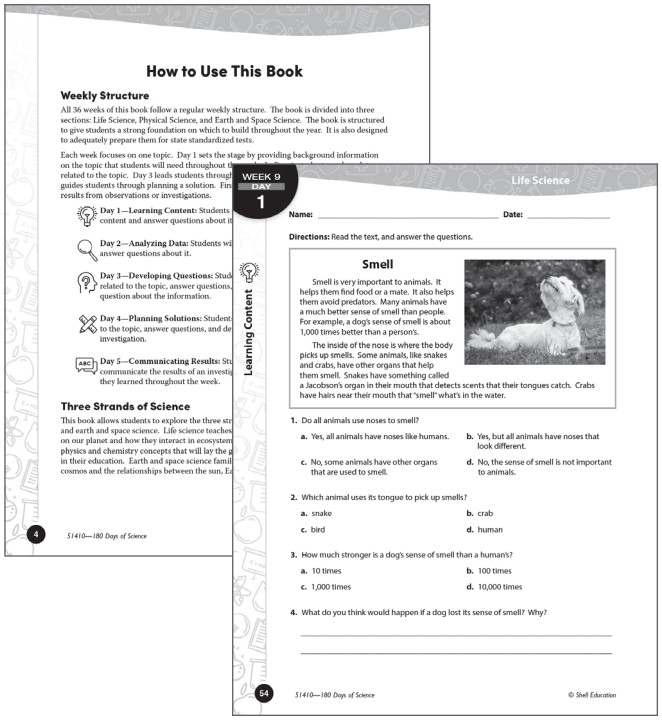
180 DAYS™

Lessons and Activities

Science for Fourth Grade

Table of Contents



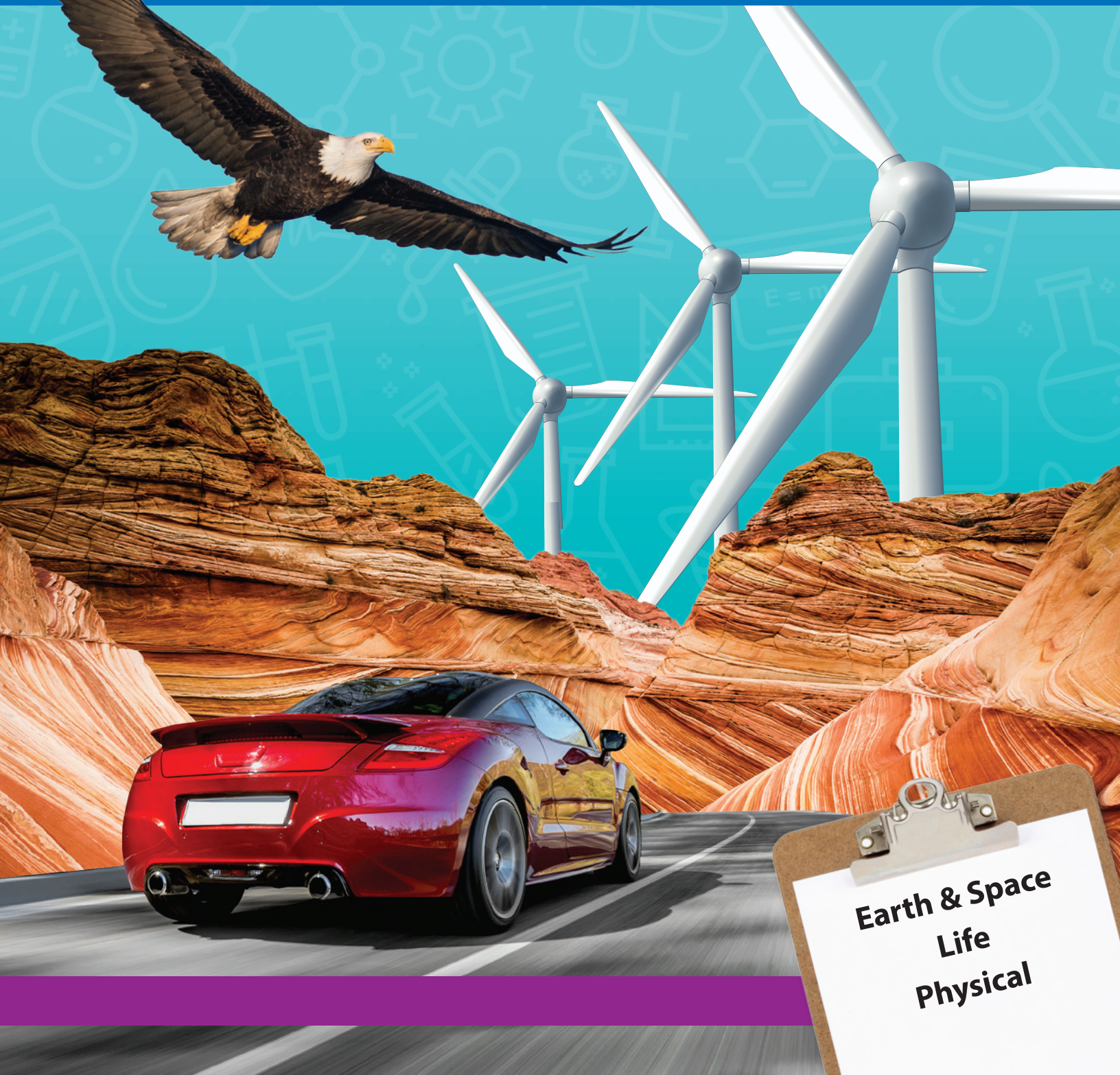


Shell Education

PRACTICE - ASSESS - DIAGNOSE

Level 4

180 Days of SCIENCE for Fourth Grade



Earth & Space
Life
Physical

Table of Contents

Introduction

With today's science and technology, there are more resources than ever to help students understand how the world works. Information about science experiments you can do at home is widely available online. Many students have experience with physics concepts from games.

While students may be familiar with many of the topics discussed in this book, it is not uncommon for them to have misconceptions about certain subjects. It is important for students to learn how to apply scientific practices in a classroom setting and within their lives.

Science is the study of the physical and natural world through observation and experiment. Not only is it important for students to learn scientific facts, but it is important for them to develop a thirst for knowledge. This leads to students who are anxious to learn and who understand how to follow practices that will lead them to the answers they seek.

The Need for Practice

To be successful in science, students must understand how people interact with the physical world. They must not only master scientific practices but also learn how to look at the world with curiosity. Through repeated practice, students will learn how a variety of factors affect the world in which they live.

Understanding Assessment

In addition to providing opportunities for frequent practice, teachers must be able to assess students' scientific understandings. This allows teachers to adequately address students' misconceptions, build on their current understandings, and challenge them appropriately. Assessment is a long-term process that involves careful analysis of student responses from discussions, projects, or practice sheets. The data gathered from assessments should be used to inform instruction: slow down, speed up, or reteach. This type of assessment is called *formative assessment*.

How to Use This Book

Weekly Structure

All 36 weeks of this book follow a regular weekly structure. The book is divided into three sections: Life Science, Physical Science, and Earth and Space Science. The book is structured to give students a strong foundation on which to build throughout the year. It is also designed to adequately prepare them for state standardized tests.

Each week focuses on one topic. Day 1 sets the stage by providing background information on the topic that students will need throughout the week. In Day 2, students analyze data related to the topic. Day 3 leads students through developing scientific questions. Day 4 guides students through planning a solution. Finally, Day 5 helps students communicate results from observations or investigations.

Day 1—Learning Content: Students will read grade-appropriate content and answer questions about it.

Day 2—Analyzing Data: Students will analyze scientific data and answer questions about it.

Day 3—Developing Questions: Students will read a scenario related to the topic, answer questions, and formulate a scientific question about the information.

Day 4—Planning Solutions: Students will read a scenario related to the topic, answer questions, and develop a solution or plan an investigation.

Day 5—Communicating Results: Students accurately communicate the results of an investigation or demonstrate what they learned throughout the week.

Three Strands of Science

This book allows students to explore the three strands of science: life science, physical science, and earth and space science. Life science teaches students about the amazing living things on our planet and how they interact in ecosystems. Physical science introduces students to physics and chemistry concepts that will lay the groundwork for deeper understanding later in their education. Earth and space science familiarizes students with the wonders of the cosmos and the relationships between the sun, Earth, moon, and stars.

How to Use This Book *(cont.)*

Weekly Topics

The following chart shows the weekly focus topics that are covered during each week of instruction.

Unit	Week	Science Topic
Life Science	1	Vertebrates and Invertebrates
	2	Land and Water Animals
	3	Plant Structures
	4	Nocturnal Animals
	5	How Birds Fly
	6	How Animals Use Their Legs
	7	How Fish Breathe Underwater
	8	Sight
	9	Smell
	10	Hearing
	11	How Animals Change Their World
	12	How Humans Change Our World
Physical Science	1	Speed and Energy
	2	Converting Potential Energy to Kinetic Energy
	3	Why Do Light Bulbs Get Hot?
	4	Converting Electricity into Sound
	5	How Does a Hairdryer Dry Hair?
	6	Energy Transfer in Collisions
	7	Collisions Can Cause Objects to Change Direction
	8	What Kind of Light Bulbs Are the Most Energy-Efficient?
	9	Waves
	10	Morse Code
	11	Sending Messages Over Long Distances
	12	How Light Helps Us See
Earth and Space Science	1	Earthquakes
	2	Patterns in Rock Formation
	3	Learning from Fossils in Rock Formations
	4	How Does Erosion Happen?
	5	Water Erosion
	6	Wind Erosion
	7	Topographic Maps
	8	Volcanoes and Earthquakes
	9	The Cost and Benefits of Dams
	10	Wind Power
	11	Reducing the Impact of Tsunamis
	12	Predicting Volcanic Eruptions and Earthquakes

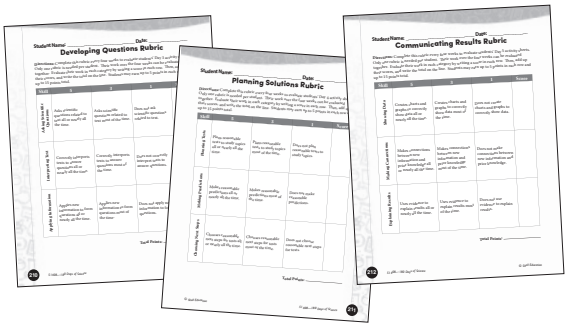
How to Use This Book *(cont.)*

Best Practices for This Series

- Use the practice pages to introduce important science topics to your students.
- Use the Weekly Topics chart on page 5 to align the content to what you're covering in class. Then, treat the pages in this book as jumping off points for that content.
- Use the practice pages as formative assessment of the science strands and key topics.
- Use the weekly themes to engage students in content that is new to them.
- Encourage students to independently learn more about the topics introduced in this series.
- Lead teacher-directed discussions of the vocabulary and concepts presented in some of the more complex weeks.
- Support students in practicing the varied types of questions asked throughout the practice pages.
- When possible, have students participate in hands-on activities to answer the questions they generate and do the investigations they plan.

Using the Resources

An answer key for all days can be found on pages 194–207. Rubrics for Day 3 (developing questions), Day 4 (planning solutions), and Day 5 (communicating results) can be found on pages 210–212 and in the Digital Resources. Use the answer keys and rubrics to assess students' work. Be sure to share these rubrics with students so that they know what is expected of them.



Name: _____ Date: _____

Directions: Read the text, and answer the questions.

Learning Content

Smell

Smell is very important to animals. It helps them find food or a mate. It also helps them avoid predators. Many animals have a much better sense of smell than people. For example, a dog's sense of smell is about 1,000 times better than a person's.

The inside of the nose is where the body picks up smells. Some animals, like snakes and crabs, have other organs that help them smell. Snakes have something called a Jacobson's organ in their mouth that detects scents that their tongues catch. Crabs have hairs near their mouth that "smell" what's in the water.

1. Do all animals use noses to smell?

a. Yes, all animals have noses like humans.

b. Yes, but all animals have noses that look different.

c. No, some animals have other organs that are used to smell.

d. No, the sense of smell is not important to animals.

2. Which animal uses its tongue to pick up smells?

a. snake

b. crab

c. bird

d. human

3. How much stronger is a dog's sense of smell than a human's?

a. 10 times

b. 100 times

c. 1,000 times

d. 10,000 times

4. What do you think would happen if a dog lost its sense of smell? Why?

_____

_____

Name: _____ Date: _____

Directions: Read the text, and study the chart. Then, answer the questions.

Analyzing Data

Humans change the world in many ways. Changes can be both good and bad. Many changes help humans and hurt the environment at the same time.

Change	How it Affects the World
cut down trees for wood	provides building materials, removes animal homes
plant trees	provides a home and food for birds and other animals
build farms	provides food for people, pollutes water with fertilizer
build factories	provides products for many people, pollutes the air
recycle	reduces garbage in landfills, reduces pollution

1. What is something humans can do that doesn't hurt the environment?

a. plant trees
b. cut down trees for wood
c. build farms
d. build factories

2. Which human action contributes to air pollution?

a. building farms
b. building factories
c. recycling
d. planting trees

3. Which human action reduces garbage in landfills?

a. building factories
b. recycling
c. cutting down trees
d. building farms

Name: _____ **Date:** _____

Directions: Read the text, and answer the questions.

Deepak gets a pair of wireless headphones for his birthday. After he listens to them for a while, the battery dies. He can't hear his music anymore. The battery is where the electricity comes from. Deepak has to plug in the headphones to charge the battery.

1. Why can't he hear the music through the headphones when the battery dies?

a. The battery stores the music.

b. They need electricity to create sound waves.

c. They need sound waves to create electricity.

d. They need heat to create sound waves.

2. If Deepak charges his headphones, what will happen?

a. The headphones will no longer have electricity.

b. The headphones will have electricity to work again.

c. The headphones will have electricity but won't work.

d. The battery in the headphones cannot be charged.

3. What can Deepak ask about the headphones?

_____

_____

_____

4. List some other things you can think of that convert electricity into sound.

_____

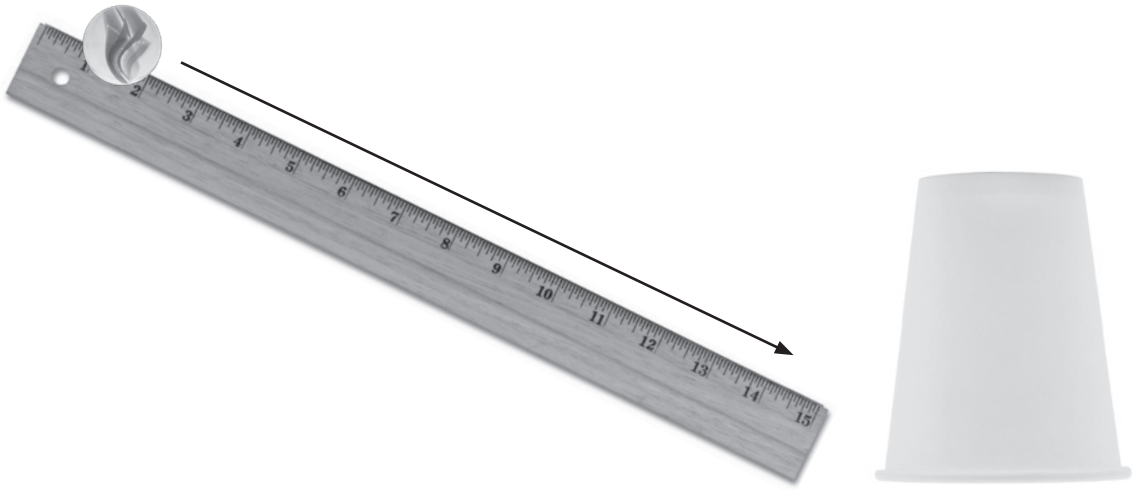
_____

_____

Name: _____ **Date:** _____

Directions: Read the text, and answer the questions.

Marcy rolls a marble down a ruler and hits a cup. It pushes the cup. Marcy wants to know how she can push the cup farther.



1. How can Marcy change the speed of the marble?

a. Change its placement on the ruler.

b. Change the height of the ruler.

c. Change the placement of the cup.

d. any of these

2. If Marcy replaces the cup with a heavier cup, how could the results of the experiment change?

a. The cup would move a little farther.

b. The cup wouldn't move as far.

c. The cup would move twice as far.

d. The cup would move toward the marble.

3. Plan an experiment to figure out how far Marcy can push the cup.

_____

_____

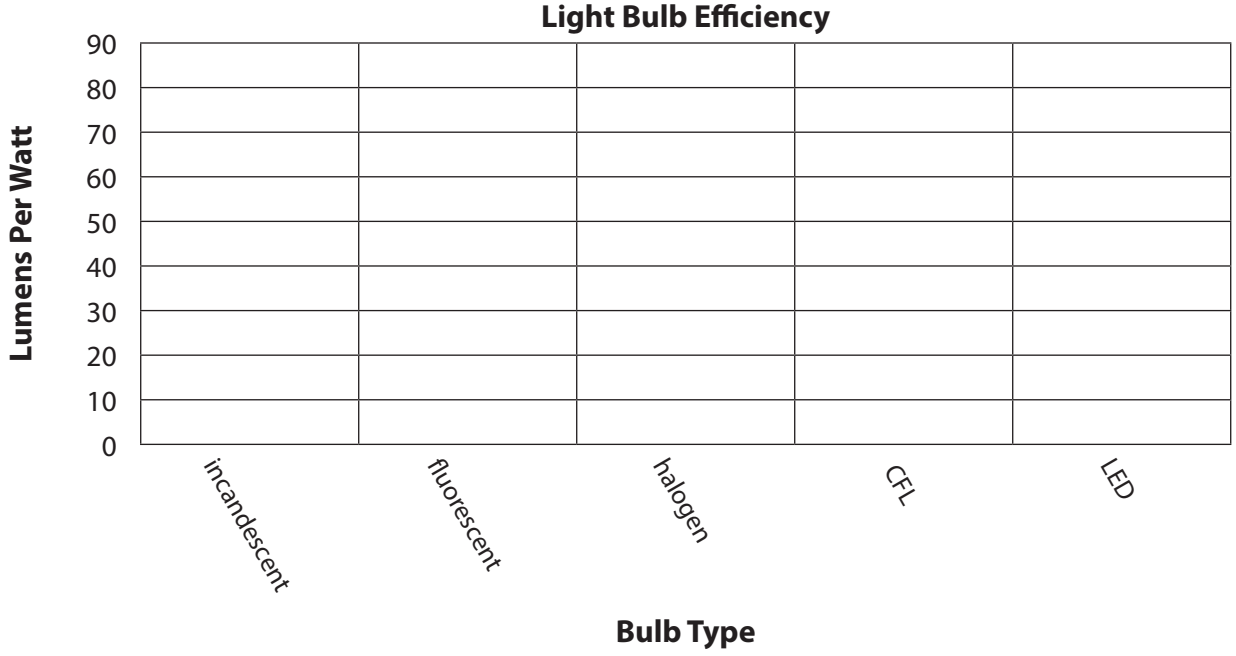
_____

_____

Name: _____ **Date:** _____

Directions: Study the chart. Graph the lumens per watt, and answer the question.

	Incandescent	Fluorescent	Halogen	CFL	LED
Lumens	850	2,600	1,200	800	800
Watts	60	40	50	13	9.5
Lumens per Watt	14	65	24	62	84



1. If you can't afford LED lights, what would be your next two choices of bulbs? Why?

_____

_____

_____