

Introduction

It is important for all students to have a basic understanding of general science concepts and how science works in the world around them. The *PCI General Science Series* is PCI's answer to the growing need for general science teaching materials. This basic, comprehensive series provides teachers with a low-reading-level, age-appropriate resource to teach general science to students who are struggling with reading.

This unique series was designed for middle-school and high-school students who need help learning the basic concepts covered in general science courses. In order to help struggling readers understand complex science concepts, the student text, worksheets, laboratory activities, reviews, and tests in each program are written at a 3.0–4.5 reading level.

The Student Texts and Teacher's Guides in the *PCI General Science Series* are effective tools for students with learning differences, attention or behavior problems, and limited reading skills. This program is also helpful for at-risk students, ESL students, and adult learners.

Each program in the *PCI General Science Series* features a Student Text, activity sheets, demonstrations, laboratory activities, reviews, and tests. The *Earth and Space Science* Student Text was developed as an abbreviated version of a traditional textbook. The Student Text covers information that all students should know, and the activity sheets and other activities in the *Earth and Space Science* Teacher's Guide reinforce that information.

The *Earth and Space Science* program features an 80-page, full-color Student Text and a 202-page, reproducible Teacher's Guide. Provide each student with a Student Text, and reproduce the accompanying worksheets from the Teacher's Guide to reinforce the information in the Student Text. Perform the demonstrations for the students, and guide them through the laboratory activities to further enhance student learning.

The nine chapters in the Student Text are divided into short sections. Each section features a list of vocabulary words; full-color visual aids, such as charts and diagrams; and full-color photographs and illustrations.

The corresponding worksheets in the Teacher's Guide allow students to practice reading-comprehension skills while answering content-area recall questions. The worksheets include a variety of activities, including multiple-choice, true/false, matching, fill-in-the-blank, short-answer, and crossword-puzzle activities.

For visual learners, one teacher demonstration is included for each chapter. The demonstrations include materials lists and directions on how to perform the demonstration. These can be used at the beginning of a chapter as an introduction to the material, at the end of a chapter as a way to tie key concepts together, or in any way the teacher wishes.

This program has a hands-on component. One laboratory activity is included for each chapter. Students will practice the steps of the scientific method, including hypothesis, procedure, data collection, analysis, and conclusion, while they synthesize what they have learned from reading the Student Text.

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Since laboratory safety is one of the first things taught and reinforced in every science course, PCI assumes that all students will demonstrate safe practices during laboratory investigations. Teachers and students should follow school district safety guidelines and use common sense while performing the demonstrations and laboratory investigations described in this Teacher's Guide.

For assessment purposes, each of the nine chapters has a corresponding review and test. Once students have read a chapter and completed the accompanying worksheets, you can test their knowledge of the information in the chapter by having them complete the review and test. Students can use the review worksheets to prepare for the test.

Earth and Space Science contains age-appropriate examples and high-interest demonstrations to pique students' interest in science concepts. The program has been written with the state standards and the National Science Education Standards in mind.

The *Earth and Space Science* Student Text and Teacher's Guide focus on the most basic, general concepts of earth and space science. Students will learn about the systems of the earth, the biosphere, the geosphere, the atmosphere, the hydrosphere, and the solar system.

OBJECTIVES

After completing this program, the student will be able to:

- identify the three layers of the earth: the core, mantle, and crust.
- explain and understand the theory of plate tectonics.
- explain the different ways tectonic plates move and the results of that movement.
- identify the parts and types of volcanoes as well as where they form.
- explain how and where earthquakes form.
- categorize, identify, and classify minerals using their six properties.
- explain the rock cycle and how rocks form and change.
- understand that crystals make minerals and minerals make rocks.
- identify and describe the three types of rocks.
- demonstrate an understanding of how rock layers and fossils can be used to date rocks.
- understand that weathering changes the earth's surface and is a major part of the rock cycle.

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- understand that erosion changes the earth's surface and is a major part of the rock cycle.
- describe the layers of soil and how soil is created.
- describe the oxygen and carbon dioxide cycle and the nitrogen cycle.
- explain the greenhouse effect.
- explain how clouds form and identify the three main types of clouds.
- identify and explain attributes of the atmosphere like precipitation, humidity, and weather.
- define climate and identify the earth's climate zones.
- explain the process and function of the water cycle.
- identify the types, sources, and properties of freshwater and salt water.
- explain how temperature and salinity create and maintain ocean currents.
- identify land, marine, and freshwater ecosystems and their attributes.
- understand how humans impact the earth.
- identify examples of land, air, and water pollution and describe their causes and preventions.
- explain how reducing, reusing, and recycling benefit the environment and give examples of how to do each.
- identify the sun, the planets, and other bodies that make up the solar system.
- define the words "orbit," "rotation," and "revolution," and explain how they relate to the solar system.
- explain the role of the sun in the solar system.
- explain how the movement of the earth causes days, nights, years, and seasons.
- describe the phases of the moon and explain how its location in relation to the sun and the earth causes these phases.
- explain how solar and lunar eclipses occur.
- explain the influence of the moon's gravity on the earth, including high and low tides.
- describe the projects and explorations that have been designed to study our solar system, our galaxy, and what lies beyond.

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HOW TO USE

Student Text

Provide each student with a copy of the Student Text. Depending on the type of classroom setting and the comfort level of the students, the Student Text can be read aloud in class or read silently by individual students. Students should read a section of the Student Text and then complete the worksheets in the Teacher's Guide that correspond to that section.

Worksheets

Each set of worksheets in this reproducible Teacher's Guide corresponds to a section in the Student Text. Students can refer to the Student Text while completing the worksheets. Each set of worksheets lists the pages in the Student Text to which students can refer. Remind students that some of the activities review material from previous sections. Students can complete the worksheets individually, in pairs, or in small groups.

Demonstrations

A teacher demonstration suggestion is included for each chapter. Each simple demonstration requires minimal preparation time and only a few materials. You can use the demonstrations as a catalyst for classroom discussion.

Laboratory Activities

A laboratory activity is included for each chapter. Guide students through each laboratory activity after they have read the corresponding chapter and completed the worksheets. Each laboratory activity has a page with instructions to help facilitate the investigation.

Chapter Reviews

To help students study for each chapter test, a set of review worksheets is provided. Allow the students to use the Student Text when they answer the review questions. The completed review worksheets should be taken home and studied before the chapter test.

Chapter Tests

A chapter test is provided for each chapter of the Student Text. The tests assess the most important information covered in each chapter and determine whether students have mastered each objective.

Answer Key

For your convenience, an answer key for the worksheets, reviews, and tests is included at the end of the Teacher's Guide. Answers for the laboratory activities are included on each laboratory activity teacher notes page.