

GOOD YEAR BOOKS

Sample Pages

Sample pages from this product are provided for evaluation purposes. The entire product is available for purchase at www.socialstudies.com or www.goodyearbooks.com

To browse eBook titles, visit
<http://www.goodyearbooks.com/ebooks.html>

To learn more about eBooks, visit our help page at
<http://www.goodyearbooks.com/ebookshelp.html>

For questions, please e-mail access@goodyearbooks.com

Free E-mail Newsletter—Sign up Today!

To learn about new eBook and print titles, professional development resources, and catalogs in the mail, sign up for our monthly e-mail newsletter at
<http://www.goodyearbooks.com/newsletter/>

For more information:

10200 Jefferson Blvd., Box 802, Culver City, CA 90232
Call: 800-421-4246 • Fax: 800-944-5432 (U.S. and Canada)
Call: 310-839-2436 • Fax: 310-839-2249 (International)

Copyright notice: Copying of the book or its parts for resale is prohibited.

SCIENCE CHALLENGE

ANTHONY D. FREDERICKS

Good Year Books

Dedication

To Bobbie Dempsey, for her warm editorship and loyal friendship. May they always be constants!



Good Year Books

are available for most basic curriculum subjects plus many enrichment areas. For more Good Year Books, contact your local bookseller or educational dealer. For a complete catalog with information about other Good Year Books, please write:

Good Year Books

10200 Jefferson Boulevard
Culver City, CA 90232-0802
www.goodyearbooks.com

Cover illustration, part opener illustrations, and book design by Amy O'Brien Krupp.

All other illustrations by Dave Garbot.

Text copyright ©1998 Anthony D. Fredericks.

Illustrations ©1998 Good Year Books.

All Rights Reserved.

Printed in the United States of America.

ISBN-eBook 978-1-59647-209-9

ISBN 978-0-673-36373-2

1 2 3 4 5 6 7 8 9 - PK - 04 03 02 01 00 99 98 97

Only portions of this book intended for classroom use may be reproduced without permission in writing from the publisher.

CONTENTS

INTRODUCTION1

DAILY PROBLEMS

LIFE SCIENCE7

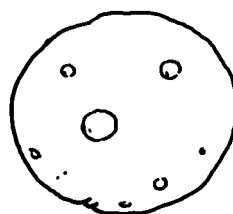
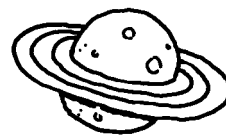
PHYSICAL SCIENCE15

EARTH SCIENCE23

SPACE SCIENCE31

EXTENDED CHALLENGES ...39

ANSWER KEY57



INTRODUCTION

All kids are fascinated with science. Each child has a natural curiosity about the world and an innate desire to learn more about things that have an impact on his or her daily life. ("Why is the sky blue?" "Where do babies come from?" "Why does my shadow follow me?") This natural curiosity can be stimulated in the elementary classroom through an active approach to science. In fact, students learn best when they take a participatory role in pursuing self-initiated questions and engaging in a "hands-on, minds-on" approach to science. *Science Challenge* is designed to help students use their scientific curiosity and knowledge in real-life explorations that expand and extend the science program in numerous ways.



NATIONAL SCIENCE EDUCATION STANDARDS

The National Science Education Standards have provided classroom teachers with a road map of what students need to know, understand, and be able to do at different grade levels in order to be scientifically literate. The Standards offer guidelines for the development and maintenance of viable and dynamic science programs. A "process approach to science" is emphasized through the Standards, and students are engaged in inquiry-based skills that emphasize critical and logical thinking. In short, students actively develop their understanding of science by combining scientific knowledge with reasoning and thinking skills.

Science Challenge is focused on the promotion and enhancement of

The Teaching Standards of National Science Education Standards place emphasis on:

1. understanding and responding to individual student's interests, strengths, experiences, and needs
2. selecting and adapting curriculum
3. focusing on student understanding and use of scientific knowledge, ideas, and inquiry processes
4. guiding students in active and extended scientific inquiry
5. providing opportunities for scientific discussion and debate among students
6. continuously assessing student understanding
7. sharing responsibility for learning with students
8. supporting a classroom community with cooperation, shared responsibility, and respect¹

¹ "Changing Emphases: Science Teaching Standards." National Science Education Standards. National Research Council. Washington, DC, 1996, p. 52.

the National Science Education Standards—specifically the Teaching Standards. As outlined by the National Research Council and the National Science Teacher’s Association, those standards emphasize the concepts listed in the box on page 1. Each of these concepts is embedded within the activities, problems, and processes of this book.

Science Challenge helps you facilitate the promotion of those standards, while offering your students highly engaging activities that focus on science as a problem-solving experience. As a result, your students will begin to understand science as an important and dynamic part of their everyday lives, not just as a classroom subject.

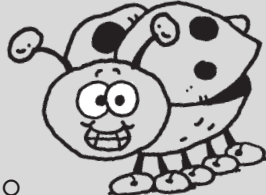
THE PROBLEM-SOLVING APPROACH

This book provides problem-solving activities in which students can use higher level thinking skills together with basic scientific information. Too frequently, students are given piles of factual data but little opportunity to think through various situations, formulate opinions, justify their responses, or interact with their classmates. The activities in this book challenge students by stimulating them to move beyond rote memorization of facts into development of complex thoughts and personal discoveries. Here is a sample problem:

LIFE SCIENCE

Which of the following is not part of an insect?

adhe
msra
rhtxao
mnbadeo



Several skills are necessary to solve this problem:

1. The student must rearrange the letters in each word in the proper sequence (language arts, spelling). Note that, in puzzles throughout this book, two-word names are treated as one name with no space between.
2. The student must obtain information about insects to identify their body parts (encyclopedia, children’s books).
3. The student must identify those body parts that belong to insects and those that do not (problem solving, critical thinking).

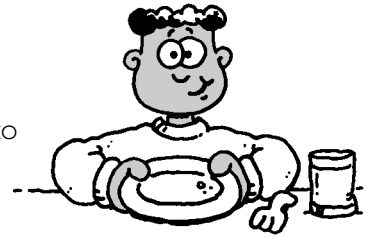
Science Challenge presents a collection of activities, in a stimulating and enjoyable format, that encourages students to actively process scientific information. Students will use science process skills such as *measuring, classifying, inferring, predicting, observing, experimenting, and communicating*. Intended for students in Grades 4 to 6, the book is also appropriate for gifted pupils in the lower grades.

CONTENT CATEGORIES

The activities and information in this book are organized in four different areas—Life Science, Physical Science, Earth Science, and Space Science.

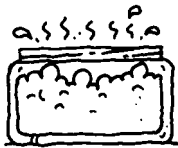
1. LIFE SCIENCE

Life: It's all around us. From Rover barking in the backyard, to the plants in the living room, to the tiny speck of mold on the kitchen counter, we are surrounded by life. Understanding how plants and animals grow, develop, and interact with each other is an important part of science. In many ways, life is the area of the scientific world with which students are most familiar and is truly a field ripe for exploration. As students gain an awareness of the life forms around them, they also gain an appreciation for their own place in the gigantic ecosystem that we all participate in every day.



2. PHYSICAL SCIENCE

From the time we get up in the morning until we climb back into bed at night, our lives are influenced by a variety of scientific laws and principles. Although we may give little thought to the soap floating in the bathtub, the static electricity in the carpet, or the mechanical can opener on the kitchen counter, they are all governed by basic tenets of science. The need to understand the forces that regulate our lives underscores the importance of physical science.



3. EARTH SCIENCE

Four and a half billion: a number almost too large to comprehend. Yet, that's how many years the earth has been in existence. During that time, it has undergone some remarkable changes. Rocks have formed, primeval seas have ebbed and flowed across vast continents, and dramatic weather conditions have contributed to the geography and structure of our planet. The ground beneath our feet, its composition and design, and the forces that continue to shape it are magnificent and spectacular—and their study can be equally so within the science curriculum.



4. SPACE SCIENCE



It's amazing to realize that planet Earth is only a microcosm in the vastness of the universe. It's but one particle in a galaxy of stars, satellites, meteorites, and other celestial bodies. Humans have been constantly fascinated with what's "out there." Telescopes,

observatories, and complex space probes have revealed some of the mysteries of the universe. They have also underscored the incredible amount of information we still need to learn. Given the media's emphasis on space exploration, it is one of the most intriguing areas for discovery within the elementary science program.

The data presented within these activities have been checked against many science texts normally used in the intermediate grades. These problems represent a cross section of the information commonly presented within each of the four sciences. Students thus have many opportunities to use their prior knowledge along with their problem-solving skills to work out appropriate responses.

DAILY PROBLEMS AND EXTENDED CHALLENGES



The activities in this book are organized into two groups—Daily Problems and Extended Challenges.

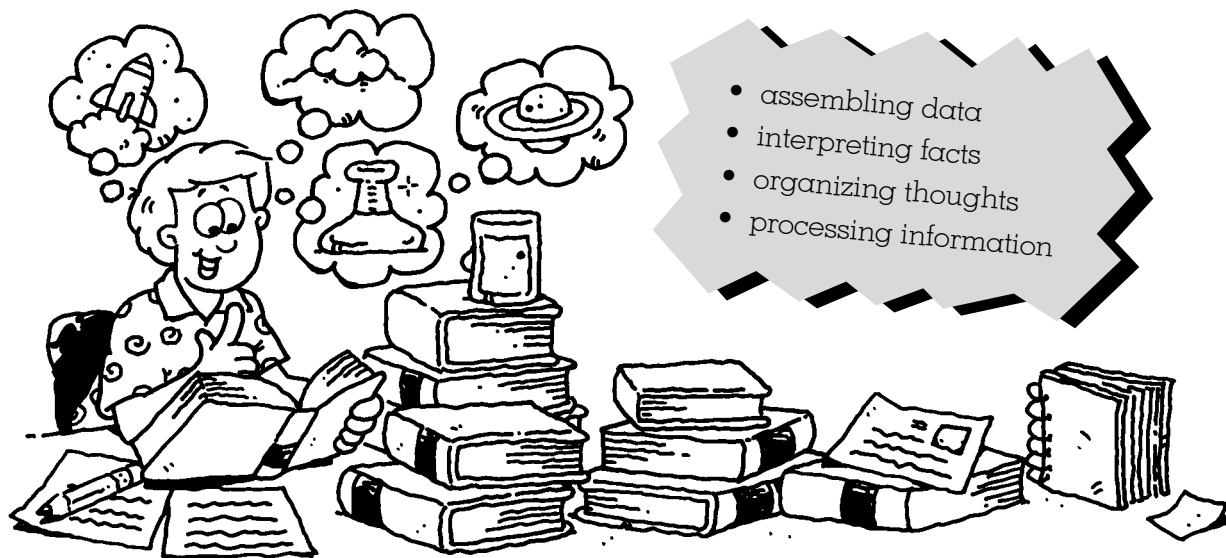
DAILY PROBLEMS

The book contains 192 Daily Problems—enough for every day of the school year. There are 48 problems in Life Science, 48 in Physical Science, 48 in Earth Science, and 48 in Space Science. Initially, you may wish to remove these pages from the book, duplicate them, paste them on oaktag, laminate them, and cut them into cards. Arrange the cards in a file box in sequential order or randomly. The problems can be used in one or more of the following ways:

1. When students arrive in the morning, or during a few minutes at the end of the day, ask them each to select a card at random and work on the listed problem. Personal charts can be initiated and individually maintained to record the problems each pupil solves.
2. Depending on the structure of your science text, you may wish to have students work in one area (Life, Physical, Earth, or Space) until most or all of the problems in that section have been solved. Students can then move on to another section.
3. Post one card on the bulletin board for all students to solve during their free time.
4. Have students work in pairs, exchanging ideas and working together toward a mutual solution. This technique is particularly appropriate for below-level students.
5. Assign one card per day per student as a homework assignment.

EXTENDED CHALLENGES

The Extended Challenges require long-term investigations by students. These pages are designed to challenge students in:



A word of caution

is in order. Both the Daily Problems and the Extended Challenges are designed as reinforcing activities and are not intended for the initial learning of scientific information. Both kinds of activities are most appropriate as a follow-up to the data and concepts taught through your science curriculum. All these activities can be used to strengthen and promote important ideas enumerated in your science textbook. Thus they serve as a valuable adjunct to the entire science curriculum.

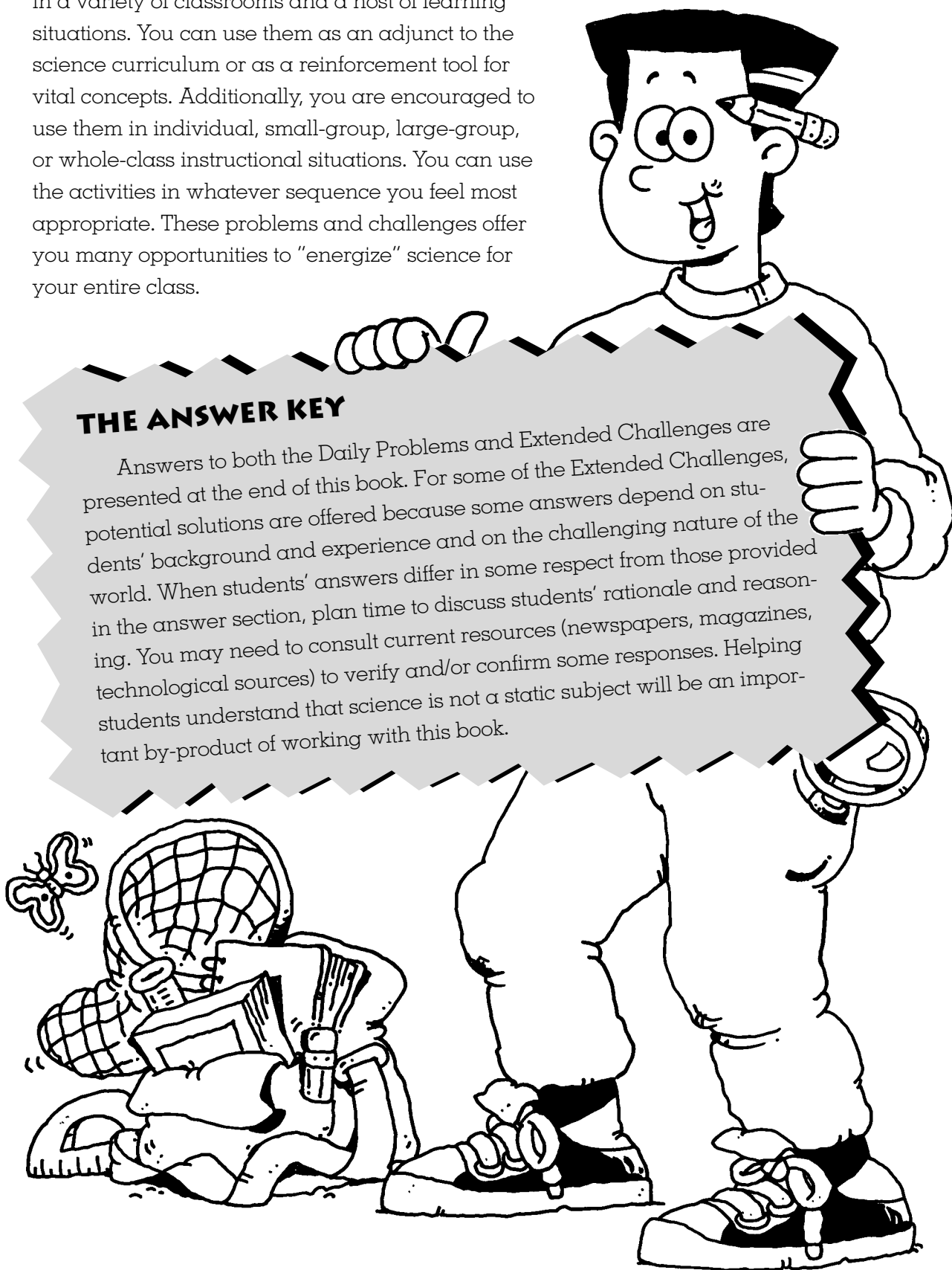
Students will need to use various types of reference materials, such as encyclopedias, children's books, technological resources, and the like to solve the problems successfully. You may wish to post an Extended Challenge on the bulletin board at the beginning of the week and provide multiple opportunities for students, either individually or in groups, to complete the page. These challenges can be used as homework assignments, too. However you plan to use these pages, it will be important for you to plan some time to discuss and share students' findings.

Although these activities are designed to enhance and extend your science program, you should also encourage students to create similar problems and challenges for their classmates. This type of activity promotes the concept of active participation and stimulates a participatory approach to the mastery of scientific concepts. Student involvement in designing other activities makes the study of science exciting and dynamic. In turn, students are motivated to learn more about the world in which they live.

These activities have been formulated for use in a variety of classrooms and a host of learning situations. You can use them as an adjunct to the science curriculum or as a reinforcement tool for vital concepts. Additionally, you are encouraged to use them in individual, small-group, large-group, or whole-class instructional situations. You can use the activities in whatever sequence you feel most appropriate. These problems and challenges offer you many opportunities to "energize" science for your entire class.

THE ANSWER KEY

Answers to both the Daily Problems and Extended Challenges are presented at the end of this book. For some of the Extended Challenges, potential solutions are offered because some answers depend on students' background and experience and on the challenging nature of the world. When students' answers differ in some respect from those provided in the answer section, plan time to discuss students' rationale and reasoning. You may need to consult current resources (newspapers, magazines, technological sources) to verify and/or confirm some responses. Helping students understand that science is not a static subject will be an important by-product of working with this book.



CARDS
1-48

Daily Problems

LIFE SCIENCE

.....



LIFE SCIENCE

1

Which of the following is the largest of all human organs?

nksi ctmhots rhtae veril

LIFE SCIENCE

2

Tanisha ties a swing to a branch of an oak tree. The seat of the swing is 60 cm from the ground. If the tree grows 20 cm a year, how far off the ground will the swing be in 4 1/2 years?

LIFE SCIENCE

3

In what part of the body would you find the retina, the cornea, and the iris?

LIFE SCIENCE

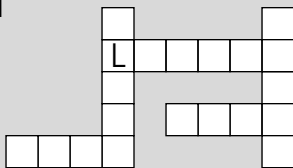
4

Carrie, 14 years old, broke three bones in her right arm and two ribs when she was in a car accident. How many bones in her body remain unbroken?

LIFE SCIENCE

5

Fill in the puzzle with the names of small groups of animals. (For example, fish often travel in a *school*.)



LIFE SCIENCE

6

Which of the following is *not* a mollusk?

alnis iqsd sroetbl pocstou

LIFE SCIENCE

7

Carnivorous plants are able to do something no other plants can do. What is it?

LIFE SCIENCE

8

For a long time people referred to me as a **Brontosaurus**. But now I have a new name. What am I called now?

