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*DEVELOPING  
READING SKILLS FOR  
SCIENCE AND TECHNOLOGY*

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*NANCY DUKE S. LAY*

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NANCY DUKE S. LAY  
*CITY COLLEGE OF NEW YORK*

COLLIER  
MACMILLAN

**Library of Congress Cataloging-in-Publication Data**

Lay, Nancy Duke S., date

Developing reading skills for science and technology / Nancy Duke S. Lay.

p. cm.

ISBN 0-02-368500-X

1. Readers—Science. 2. Readers—Technology. 3. English language—Scientific English. 4. English language—Textbooks for foreign speakers. 5. College readers. I. Title.

PE1127.S3L38 1988

428.6'4'0245—dc19

87-29800  
CIP

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To my parents, Duke S. Lay and Cheong Choy Ping

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Printing: 1 2 3 4 5 6 7      Year: 8 9 0 1 2 3 4

Collier Macmillan  
ESL/EFL Department  
866 Third Avenue  
New York, NY 10022

Printed in the U.S.A.

ISBN 0-02-368500-X

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# INTRODUCTION

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*Developing Reading Skills for Science and Technology* is aimed at students of English as a Second Language who plan to study in some area of the sciences. These students hope to become physicians, computer scientists, engineers, or nurses. In general, intermediate and advanced ESL textbooks do not concentrate on these areas but rather emphasize history, culture, and social issues. Although these topics are important, they do not provide ESL students with the skills to interpret and analyze scientific material—material they are likely to encounter in their majors.

This text is designed to provide students with the necessary reading skills to approach scientific and technological subject matter. It is intended to bridge the gap between ESL and academic courses, providing a transition from material that has been intentionally simplified for the nonnative reader to authentic texts.

The thirteen selections in *Developing Reading Skills for Science and Technology* have been excerpted from nonfiction trade books, scientific journals, and general-interest magazines. For the sake of clarity and presentation, paragraphs have been omitted and/or rearranged, but in all cases, the original sentence structure, vocabulary, and internal paragraph organization have been retained.

*Developing Reading Skills for Science and Technology* teaches and sharpens advanced rhetorical skills, preparing students to use and understand the language they will encounter in college textbooks. Each of the thirteen chapters includes the following sections:

## **Pre-Reading**

This section precedes the actual reading passage and is designed to encourage students to draw on their prior knowledge about the subject of the selection they are about to read. The **Pre-Reading** questions



ask students to anticipate and predict general concepts discussed in the text and elicit opinions about issues raised by the author of the reading passage.

### **True or False?**

A series of true-false statements measures comprehension skills, while enabling students to practice and strengthen scanning skills as they look for information within the passage to support their answers.

### **Vocabulary Development**

Much technical and scientific vocabulary is based on Latin and Greek. This section familiarizes students with these roots and helps them understand the meanings of words composed of such roots. There are also exercises designed to give students practice in getting meaning from context, recognizing synonyms, completing sentences, paraphrasing, and using the dictionary.

### **Grammar**

When reading technical material, students often experience difficulties with complex structures. The **Grammar** section focuses on function words, cohesive markers, parallel structures, and specific parts of speech. Students are also given practice in recognizing and analyzing comparison and contrast and cause-and-effect relationships.

### **Definitions**

This section provides clues to recognizing key words within sentences and to locating definitions of terms within a passage. Exercises give students practice in identifying context clues and in defining unfamiliar words or expressions.

### **Meaning**

The **Meaning** section in each chapter expands students' ability to distinguish between the common, or "everyday," meaning of a word and its meaning as used in the reading passage. Students also receive valuable practice in using the dictionary, as they compare general meanings with specific definitions.

### **Ideas and Examples**

Readers of scientific texts are often frustrated by the apparent complexity of the ideas they encounter. The **Ideas and Examples** section asks students to identify ideas presented by the author of the passage and to locate the examples used to illustrate those ideas.

### **Classification**

The ability to recognize organizational elements found in scientific and technical material is a useful reading skill. The **Classification** section helps students understand how writers organize and develop their ideas and indicate relationships. The exercises in this section are designed to strengthen note-taking skills.



**Presupposition**

When students are able to break down sentences into information actually given by the author and that which he/she expects readers to infer—from previous knowledge and/or experience—they will read with more confidence. The **Presupposition** exercises allow students to analyze their own assumptions and to compare them with those of the writer of each of the reading passages.

**Follow-up**

While comprehension questions usually appear immediately after a reading selection, the discussion questions in this book have been placed at the end of each chapter so as to allow students to talk (and debate) about the topics after they have analyzed the topic and presentation from several different angles. Students can prepare their answers to the **Comprehension Questions** in pairs or in small groups.

The **Writing Topics** section completes each chapter. In this exercise, students practice interpretive paraphrasing and free writing on topics directly and indirectly related to the subject discussed in the reading passage that appears earlier in the chapter.



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## *ACKNOWLEDGMENTS*

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I do have many people to thank.

First, I want to thank my colleagues at the City College of New York for providing me with materials, suggestions, services, and access to the research laboratories in their departments and schools: Deans Charles Watkins and S. Oh, School of Engineering; Sheldon Weinbaum and Peter Ganatos, Mechanical Engineering; Joseph Johnson III and Yuan Chi, Physics; Betty Popper, Speech; William Summers and Lenny Edmond, Television and Media Production Center; Anthea Tillyer and Elizabeth Rorschach, ESL. I appreciate the efforts made by Gloria Silverstein, Matthew Guillen, Sean Dugan, Brenda Jack, Barry Antokoletz, and Allyson Richmond in trying out some of these materials in their ESL classes at City College and discussing with me their opinions about the materials.

Among my colleagues outside of City College, I am indebted to Diana Berkowitz, Hostos Community College and Hofstra University, who read my entire manuscript and offered valuable advice and comments, and to Brenda Oded, Bar Ilan University, Ramat Gan, Israel and City College of New York, for her insights and suggestions. I also want to thank the following reviewers: Dean W. Engel of New York University, Robert Kantor and Louis Holschuh of the Ohio State University, and William Biddle of Harvard University.

A special thanks goes to the many ESL students in the ESL Department at the City College of New York for giving me opportunities to understand their needs a little better, and to strive to become a better teacher for this special population of which I am a part.

This text would not be possible without the help, understanding, and encouragement of my editor, Mary Jane Peluso, and her staff.

Other friends have also contributed to this text. I want to thank Sun Liju for sharing his skills in photography, Dorothy Joyce for being



an understanding friend, Gwen Richardson and Norman Levine for assisting me with the IBM computer every time I got stuck, Walter Barcia for helping me with my “crutches” when I sprained my ankle, and lastly my family: Manuel, Manchiu, Rosie, Addellia, Manhoo, and Eva for giving me the strength and the spirit to “go on.”

N D S L



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*PART I*

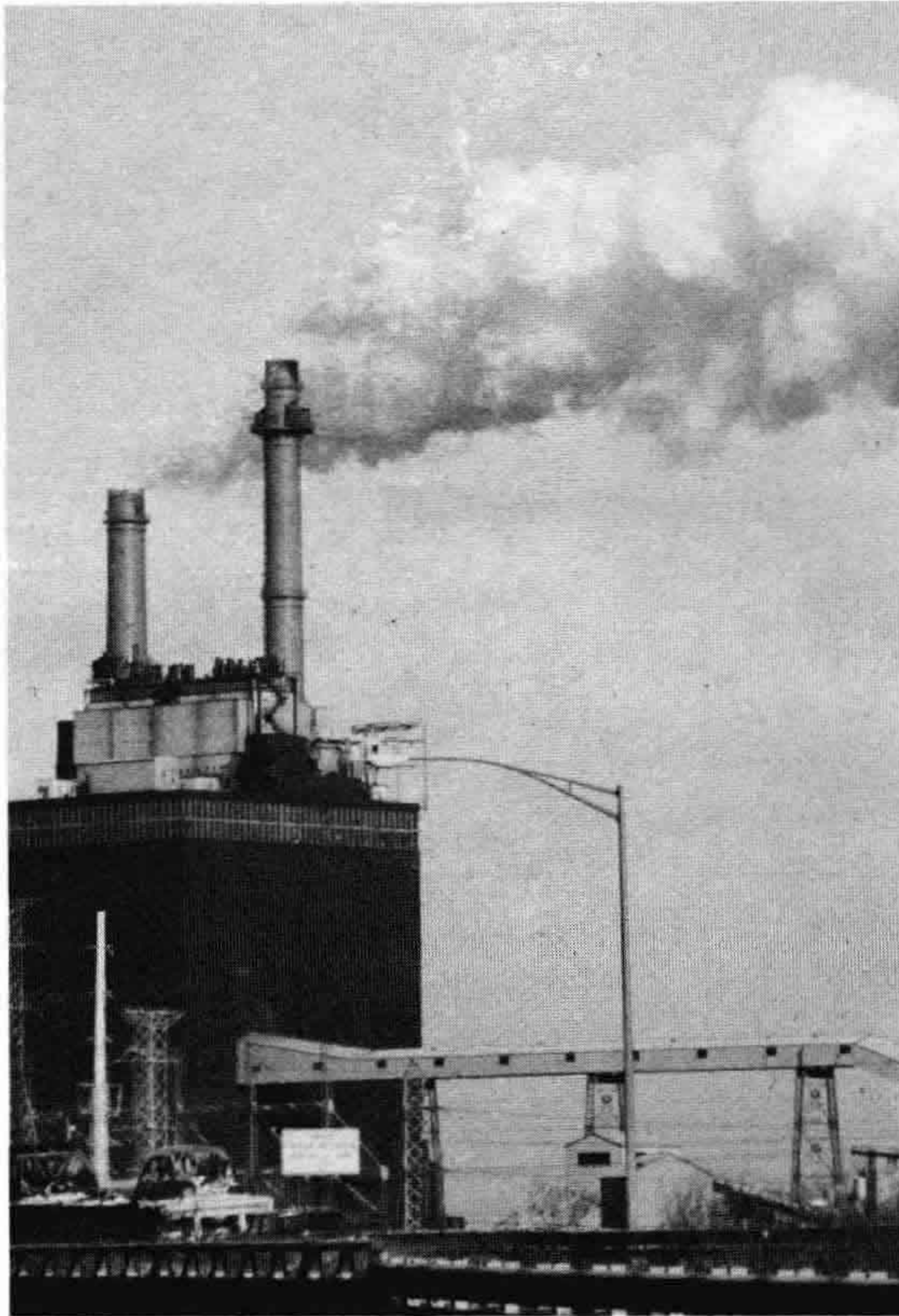
*ECOLOGY AND  
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## *Chapter 1*

# *WHAT IS POLLUTION?*

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It is a good reading practice to ask yourself specific questions while you are reading, and to have some ideas of what information you are looking for in a passage. When you do not do this, you read without the advantages of reading strategies, or techniques, that help you retain the main concepts, specific details, and sufficient information.

Before you read the passage, take a few minutes to think about the key word in the title “What Is Pollution?” What information does the key word give you about the subject? What do you already know about this topic from your own experience and previous reading?



PRE-READING

Discuss these questions before you read the passage.

- 1. If you have lived in an area where pollution was a problem, describe this condition.
- 2. What are the effects of pollution on the quality of human life?
- 3. What are some types of pollution? What are the causes?
- 4. What can be done to prevent pollution?

WHAT IS POLLUTION?

In 1965 the Environmental Pollution Panel of the President's Science Advisory Committee, U.S.A., produced this definition of pollution:

Environmental pollution is the unfavorable alteration of our surroundings, wholly or largely as a by-product of man's actions through direct or indirect effects of changes in energy patterns, radiation levels, chemical and physical constitution, and abundances of organisms. These changes may affect man directly, or through his supplies of water and of agricultural and other biological products, his physical objects or possessions, or his opportunities for recreation and appreciation of nature. 5

This definition implies that pollution is not a problem for scientists only. Since it affects human lives, it is a health problem. Since it affects property and health, it is an economic problem. Since it affects living organisms, it is a problem in conservation of natural resources. Since it affects the senses, it is an aesthetic problem. 10

Man, like other organisms, has always polluted his environment with the by-products of his actions. As an organism, he creates wastes from his digestive and metabolic processes. As a social creature, he removes things from the environment and adds residues to it as he seeks housing, clothing, food, and relaxation for his family unit. So long as population density is low in a particular area, the environment is able to accommodate these alterations. When population density gets too high, however, deterioration of the natural environment—air, water, and soil—begins. 15 20

High population density is not the sole cause of the marked increase in pollution problems within the past two or three decades. Not only are populations growing in size, but they are also demanding a higher standard of living. Ever-increasing demands are made upon the earth's natural resources 25

Taken from: Andrews, et al., *A Guide to the Study of Environmental Pollution* (Englewood Cliffs, N.J.: Prentice-Hall, Inc. 1972). © by William A. Andrews.