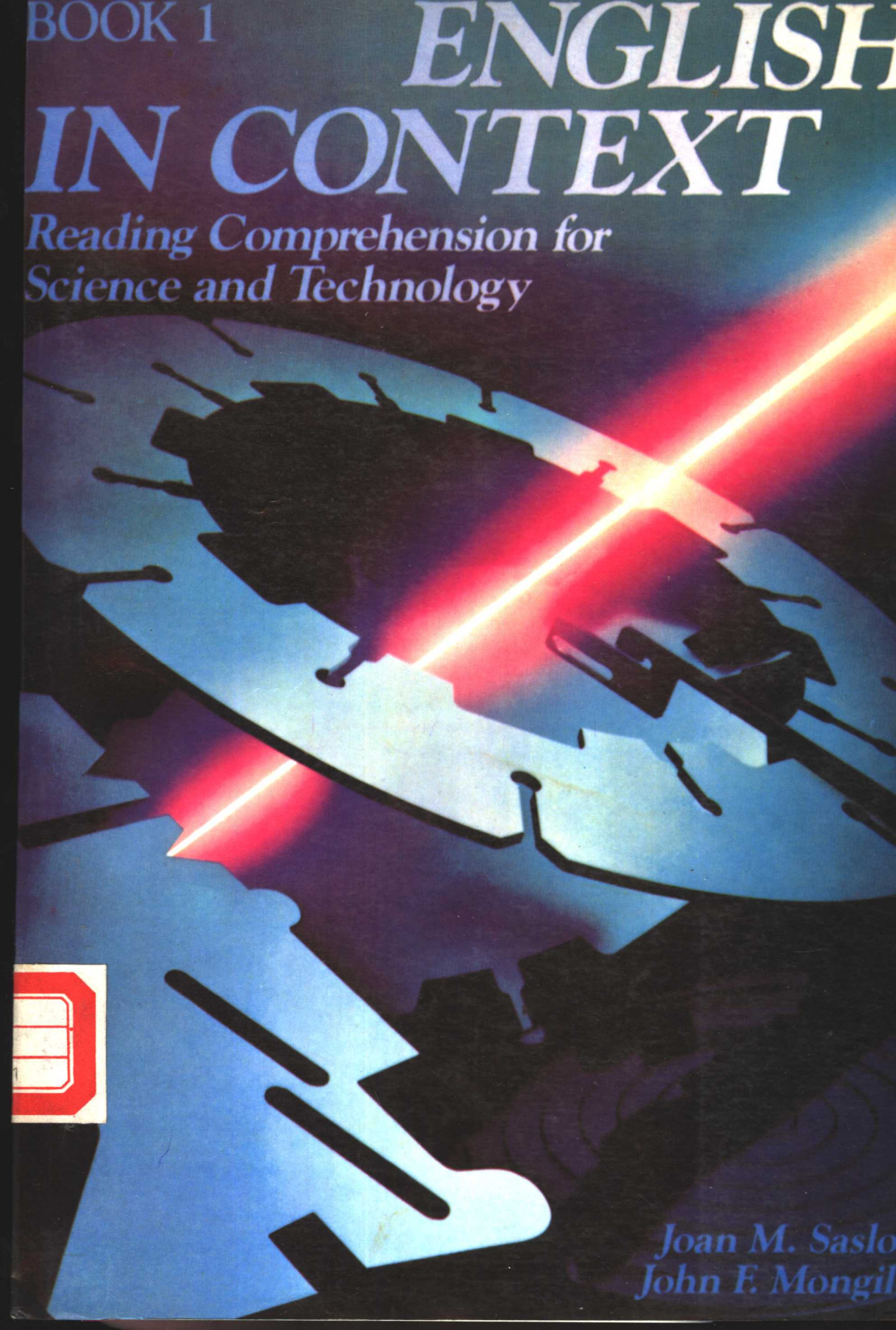
BOOK 1

ENGLISH IN CONTEXT

Reading Comprehension for Science and Technology



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Reading Comprehension for Science and Technology

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Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632
World Publishing Corporation, Beijing, China

Library of Congress Cataloging in Publication Data

Saslow, Joan M. (date)
English in context.

1. English language–Text-books for foreign speakers.
2. English language–Technical English. 3. College readers. 4. Readers–Science. 5. Readers–Technology.
I. Mongillo, John F. II. Title.
PE1128.S274 1985 428.6'4'0245 84-4800
ISBN 0-13-280025-X

Editorial/production supervision and
interior design: Barbara Alexander
Cover design: Whitman Studio, Inc.
Photo research: Teri Stratford
Manufacturing buyer: Harry P. Baisley

Cover photo credit: Courtesy Strippit-Houdaille, Akron, N.Y.
Lesson opening photo credits:

1: General Motors; 2: Courtesy Strippit-Houdaille, Akron, N.Y.; 3: U.S. Geological Survey, Department of the Interior; 4: USDA Photo by Doug Wilson; 5: Richard Ellis, Photo Researchers, Inc.; 6: Andre La Roche, Energy Conversion Devices, Inc.; 7: NASA; 8: United Nations; 9: NASA; 10: Japanese National Railways

ISBN 0-13-280025-X 01
ISBN 7-5062-0151-8

PRENTICE-HALL INTERNATIONAL, INC., *London*
PRENTICE-HALL OF AUSTRALIA PTY. LIMITED, *Sydney*
EDITORA PRENTICE-HALL DO BRASIL, LTDA., *Rio de Janeiro*
PRENTICE-HALL OF CANADA, LTD., *Toronto*
PRENTICE-HALL OF INDIA PRIVATE LIMITED, *New Delhi*
PRENTICE-HALL OF JAPAN, INC., *Tokyo*
PRENTICE-HALL OF SOUTHEAST ASIA PTE. LTD., *Singapore*
WHITEHALL BOOKS LIMITED, *Wellington, New Zealand*

Preface

Purpose

English in Context: Reading Comprehension for Science and Technology is an intermediate-level reading comprehension text series for students who want concentrated practice in reading scientific and technical English. The sole purpose of this three-level text series is to build the comprehension skill. Although it is unarguably true that listening, speaking, and writing practice enhance the reading skill, practice in reading itself is a more direct route to this goal. Thus, *English in Context: Reading Comprehension for Science and Technology* elicits no production of written or spoken English, and includes no listening comprehension activities. Students at the intermediate level may already have been exposed to years of classroom practice of "the four skills." What is provided here, then, is an alternate path focused entirely on reading.

Student Profile

English in Context: Reading Comprehension for Science and Technology is intended for students who have had beginning-level courses in English, either at the secondary-school level or at the university, the technical school, or the binational institute. These students typically have had two- to three-hundred hours of classroom instruction, often in large classes. They have been exposed, at one time or another (and with greater or lesser amounts of success), to the "basic structures" of the language, and they have a fair vocabulary covering everyday activities, work, school, play, and hobbies. They function conversationally at a low level and make many mistakes in grammar, lexicon, and pronunciation. They understand more difficult language than that which they can produce on their own. Their reading ability generally corresponds to what they can say, because

they have studied from texts that "strictly control" the reading narratives. These students approach all unfamiliar readings with a bilingual dictionary close at hand, since they are unskilled in deriving meaning from passages containing new words without translating every new word into their own language. They are particularly handicapped when facing a scientific or technical reading because their training has been in "everyday" English. It should be kept in mind that the students for whom these three texts in the *English in Context* series were created are not English majors, but rather are specialists (or specialists in training) in some area of science or technology.

Scope of the Series

English in Context: Reading Comprehension for Science and Technology Books 1 and 2 are similar in design and format (described below), while Book 3 differs significantly. Since the purpose of the series as a whole is to prepare students to read authentic published source materials in any area of science or technology, the first two books concentrate on reading selections especially written to ready students for this goal by illustrating the use of high-frequency science vocabulary and important concepts in grammar and syntax. Book 3, on the other hand, has been designed to bridge the gap between the "engineered" reading selections of Books 1 and 2 and free reading, in that it centers on real, unedited excerpts from published science textbooks and journals while maintaining a good deal of supporting exercise and explanatory material.

Working Assumptions

Underlying the development of these materials are several assumptions. The first is that scientific and technical English are English. The characteristic features of this type of writing are all found in all other forms of English. Colin R. Elliot has remarked that [except for technical terms and some more complex structures] "there is little to distinguish it from any other form of writing which seeks to explain and exemplify general theories or describe processes" (ELT Journal, October 1976). J. D. Corbluth (ELT Journal, July 1975) even disagrees that there is such a thing as scientific English at all. Although other possible grammatical frameworks exist (notably Ewer's Microacts, for example), we have chosen to base these materials on the assumption that the similarities between scientific/technical English and ordinary English are greater than the differences between them, always recognizing, however, that students predictably will have difficulty with certain syntactical and grammatical features which occur frequently. Some well-recognized examples of these are passive voice, noun compounds, *if*-clauses, long preposed modifying clusters, and reduced adjective clauses. These have been given particular emphasis.

In addition to the choice of the syntactical and grammatical features in each lesson, certain words were chosen for inclusion in the vocabulary sections at the beginning of each lesson. It is our working assumption that most of these words are probably not known by the student who has had the two- to three-hundred hours of English described above. These words are found over and over in scientific and technical prose. Most of

them are of a type we call "subtechnical," that is, they are not highly specialized for one narrow field of interest but rather are found in writings in all areas of science and technology. It is our belief that knowing these words will greatly increase comprehension of scientific and technical narrative. These words are further and more specifically described below under Vocabulary.

"Vocabulary of ideas" is another category of words included in the Vocabulary section at the beginning of each lesson. These words are not really "science" or "technology" words at all but rather are used frequently to express concepts and ideas in the type of writing students will be reading. It must be admitted, however, that the inclusion of some words under one or the other rubric is sometimes debatable and concededly made on a subjective, and sometimes almost arbitrary, basis. The major value of having the vocabulary divided into two parts is to "lighten the load" of words to be learned at one time. We chose to distinguish these two gross categories of words in the belief that some of the vocabulary, though not at all "scientific" or "technical" (such as *predominantly*), are used with extremely high frequency in scientific and technical prose. Furthermore, we felt that these words differ in a general way from more strictly "scientific" or "technical" words, such as, for example, *buoyancy*. Although this distinction is very clear for these two examples, we must recognize that the choice of placement for all words is not always that evident.

Organization and Lesson Format

Each lesson in *English in Context: Reading Comprehension for Science and Technology* is built around a reading selection on a timely scientific or technical topic. *All other sections of the lesson are tightly connected to the reading, either as a preparation for it or an extension of it.* In this way, *every* word and *every* exercise deals with comprehension of the central reading selection of the lesson.

VOCABULARY*

The vocabulary section that appears at the beginning of each lesson is made up of Subtechnical Vocabulary, Vocabulary of Ideas, and, occasionally, Thought Connectors. Each lesson presents twenty to thirty important new words.

Subtechnical Vocabulary. Some examples are *retractable, fuel, deposit, devise, stress, yield, trait, field, breakthrough, dwindle, resource, equip, standardize,* and *retrieval.* Almost all these words will be found sooner or later in students' independent reading, regardless of their specialized interests. Each word is defined in the limited sense in which it is used in the reading selection to follow. The word is then presented in a simple contextual sentence which further conveys and fixes its meaning. Where necessary or helpful, an illustration is also provided as a meaning conveyor.

*Note: *All* vocabulary in these sections is used in the reading selection to come.

Vocabulary of Ideas. These words and expressions are also taken from the reading selection to follow and are less technical *per se* than the words described previously. (For the rationale for the division between "subtechnical vocabulary" and "vocabulary of ideas," see Working Assumptions, page viii.) Some examples of such words are *overcome, involve, account for, subject to, supply, buildup, level, marginal, feasibility, alternate, outlook, depend on,* and *potential.* As with the Subtechnical Vocabulary, each word is defined and used in a contextual sentence.

Thought Connectors. When included, these rhetorical items are essential connectors of ideas in scientific and technical writing. Some examples are *therefore, consequently, furthermore, in spite of,* and *nevertheless.* As with the Subtechnical Vocabulary and the Vocabulary of Ideas, the goal is comprehension–not production–of these words.

Vocabulary Exercises. It is every language teacher's experience that in order to make vocabulary "active," rigorous practice is necessary. All too often at the intermediate level, students' vocabularies stop growing because it is assumed that practice is only appropriate for beginners. A series of exercises in each of these lessons provides students with yet another opportunity to see each of the vocabulary words from that lesson in a relevant contextual sentence. These exercises are not a test. They are meant to help commit meaning to memory. Not only will each word be elicited as an answer to a question, but it also will be used several other times in items eliciting other vocabulary words as answers.

COMPREHENSION SKILL INDEX (Skills and Syntactical-Grammatical Concepts)

Before and after the reading selection in each lesson, facsimiles of index cards signal the names of comprehension skills or important grammatical or syntactical concepts presented in that lesson. These skills and topics comprise the comprehension index. Some of the skills are skimming, scanning, reading comprehension, confirming content, understanding vocabulary from context, understanding vocabulary from word parts, and drawing conclusions. Syntactical and grammatical topics include noun compounds, passive voice, *if*-clauses, preposed modifying clusters, and gerunds. Throughout, great care has been taken to select the teaching approach best suited to building *comprehension rather than production* of the various syntactical and grammatical concepts. A brief example is the treatment of *if*-clauses in Lesson Eight. Texts concerned with production of this structure give practice in the sequence of tenses to use in both clauses of sentences expressing contrary-to-fact ideas as well as in sentences that express real conditions. Here, on the other hand, the explanatory copy points out that *if*-clause sentences in the present tense express facts and beliefs; those using *will* express predictions; those using *would* express probable outcomes of conditions not presently existing; and those using *would have, could have, might have,* and *should have* express what could have happened in the past under conditions that did not exist. *English in Context: Reading Comprehension for Science and Technology* provides no practice in usage of these structures, but only in deriving meaning from sentences that use them. Consequently, the exercises ask the students to choose explanations for sentences in the reading using *if*-clauses. In addition, students do intensive work with the reading selection in that lesson, making sure they can

comprehend the grammatical or syntactical concept at hand. The reading selection has, in fact, been written specifically to use the targeted syntax or grammar concept numerous times. In Lesson One, for example, noun compounds are presented. The reading selection in that lesson contains no fewer than twenty-six of these noun compounds.

Comprehension Skill Index Exercises. In each section of the comprehension index, exercises are provided. It is important to note that no production of the targeted concepts is necessary in these exercises. Rather, students receive practice in deriving meaning from sentences containing the targeted concepts. All sentences used in these exercises come from the reading selection, providing cross reinforcement of each concept.

READING SELECTION

The reading selection is the core of each lesson and the source of all the vocabulary, comprehension index skills, and syntax and grammar topics presented in that lesson. Each reading concerns an exciting subject designed to be of interest to any modern reader who has a basic knowledge of science and who lives in today's world. A glance at the titles of these selections in the Table of Contents will make this apparent. Care has also been taken in ensuring that the instructor with a humanities rather than a science background will be comfortable teaching these selections.

The readings get linguistically more complex, conceptually denser, and rhetorically more sophisticated as each book develops. As previously pointed out, each reading uses numerous examples of the syntactical and grammatical concepts targeted in that lesson. In addition, each of the vocabulary words that appeared in the vocabulary section at the beginning of the lesson appears at least once in the reading selection. These vocabulary words can be easily spotted, as they are set in boldface type, reminding the student to notice these important words once more in the context of the reading selection.

The side notes that appear alongside the reading define words that most students probably do not know. These words are less essential for a student's active vocabulary because of their lower frequency in scientific and technical writing. However, some of these words should be considered active vocabulary by specialists in the particular field dealt with in the reading. An example of such a word is *birthmark*, in Lesson Two. Any student whose main interest is medicine—or particularly dermatology—will find this to be an important word. Most other students will not; for this reason birthmark was not included in the Subtechnical Vocabulary at the beginning of the lesson but instead is side noted alongside its occurrence in the reading.

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Contents

LESSON ONE

Aerodynamics in Car Design

An engineer checks drag coefficient numbers in the test section control room of the wind tunnel.

Subtechnical Vocabulary

full-size (adjective)

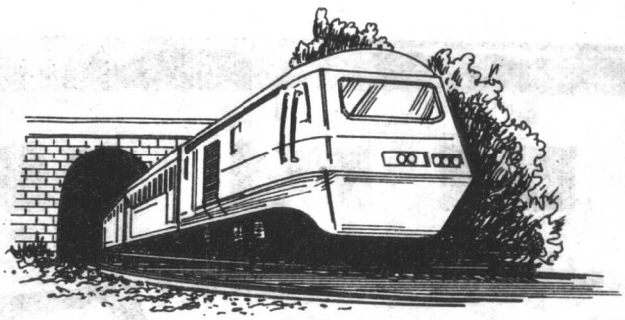
standard-size; normally big

Full-size cars use more gas than smaller cars.

streamlined (adjective)

designed for speed and easy movement

The new trains are all **streamlined** and much faster than the older trains.

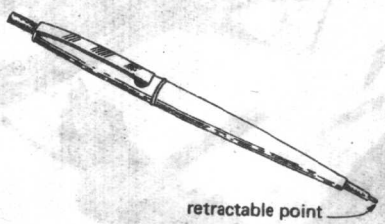


streamlined

retractable (adjective)

capable of being pulled in so that it cannot be seen

Many pens have **rectractable** points.



retractable point

force (noun)

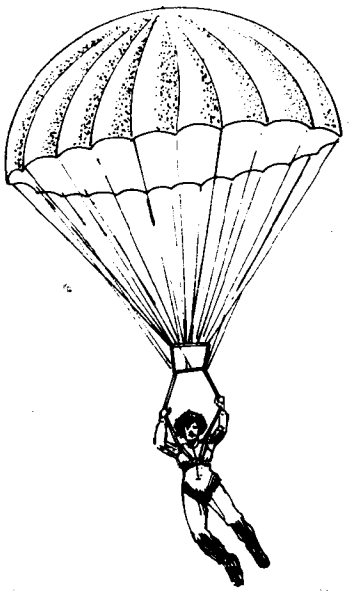
physical power, energy, strength

Gravity is the **force** that holds us close to the earth.

resistance (noun)

opposition of one thing to another

A parachute offers **resistance** to the wind.



fuel (noun)

material that is burned to provide power or heat

Wood, oil, coal, and gas are **fuels.**

ratio (noun)

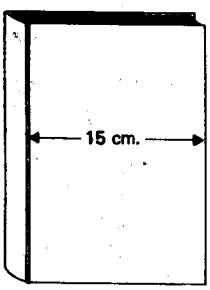
numerical relation between two related things

The **ratio** of cars to trucks on this road is three to one.

width (noun)

distance from one side to the other side of an object

This book has a **width** of 15 centimeters.



vacuum (noun)

the empty space that occurs when all air is taken away; a completely empty space

When all the air is taken from a container a **vacuum** occurs.

model (noun)

a smaller representation of a full-size object

Architects make **models** of the buildings they design.

to check (verb)

to look at; to investigate; to test; to measure

The man **checked** the thermometer to see what the temperature was.

to reduce (verb)

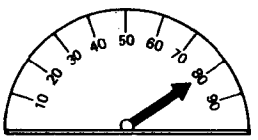
to make smaller, to lessen

Cold **reduces** the volume of gases.

to indicate (verb)

to show

The speedometer **indicates** how fast the car is traveling.



speedometer

to install (verb)

to put in a position for use

An electrician **installs** new electrical wiring.

Vocabulary of Ideas

to overcome (verb)

to win against

Antibodies help us **to overcome** infection.

to encounter (verb)

to find

We **encounter** new ideas whenever we travel to new places.

to involve (verb)

to require; to include

Science **involves** the study of physics, chemistry, and biology.

to account for (phrasal verb)

to explain; to cause

Good care **accounts for** the larger size of this plant.

to cut down on (phrasal verb)

to reduce

It is necessary **to cut down on** calories in order to lose weight.

in comparison

when measured against, when contrasted with

Mary is very tall **in comparison** to the typical Polynesian woman.

subject to

able to be affected by; vulnerable to

His weakness made him **subject to** many diseases.

Vocabulary Exercises

A. Complete the following sentences with words from the list.

install	reduces	involves
retractable	resistance	ratio
indicate	fuel	streamlined

1. Many newer cars have _____ head lamps.
2. Cooking oil is not a good _____.