The shoot slowly grows longer and turns green while the root grows downwards. Side roots begin to appear on the most important and largest root.

The shoot (8) gradually (9) lengthens and turns green while the root grows downwards. Side roots begin to appear on the (10) main root.
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Preface

Understanding and using scientific English presents many stumbling blocks to those who have achieved a reasonable proficiency in conversational or literary language through the usual course books. The present volume is designed, therefore, to help bridge the gap between such a course book and the science text-book.

Presenting its elementary science material in 40 short, graded texts, 1–22 in Book 1 and the remainder in Book 2, together with Exercises on vocabulary and language items which take a prominent place in technical writing, this book will, I hope, help students of English to overcome the bewildering problems of unfamiliar subject matter, new vocabulary and structures, and the new concept of English language used, not to relate personal experiences or to tell stories, but as an informative, impersonal account of principles and phenomena.

This book may be used by either the English language teacher or by the Science-in-English teacher, who often justifiably complains that the teaching of his subject is greatly hampered by the students' inability to cope with language difficulties.

Work which can be dealt with only in small groups of students, or which requires equipment beyond the means of the ordinary classroom, has been avoided. It also seems essential, in accordance with the principles of learning through meaningful association, that work on language should remain within the limits imposed by the Texts themselves. Therefore, the Exercises do not contain any vocabulary or structural items extraneous to the Texts.

The layout in each Unit is as follows:
1 At the head of each Unit, vocabulary which can most efficiently be taught through mother-tongue equivalents.
2 Text A, which presents the subject matter in simple, everyday language and structure.
3 Text B, which contains exactly the same subject matter, but is re-worded in more scientific terms and structures. Each numbered word or phrase corresponds with a word or phrase italicised in Text A, and these are set out for easy reference in Exercise 1 of each Unit.
4 Exercises, with brief explanations, pinpointing important language items introduced in Text B. Special emphasis is given to passive structures, since these are particularly common in scientific language.
5 Comprehension questions designed to check that content and vocabulary have been mastered, and to give practice in handling them.

6 Questions for further discussion, designed to stimulate thought and interest, to develop powers of deduction and application of the principles dealt with in the Texts, and to provide opportunities for the student to achieve greater fluency in free discussion along the lines suggested in the Notes for the Guidance of Teachers given at the end of the book.

Some of these questions require the student to do a little research or enquiry outside class, and can be developed into project work, but most need him only to draw on his general knowledge and observation of everyday life.

7 Where possible, suggestions for further activities are included at the end of the Unit, in order to stimulate interest and reinforce learning. They may be carried out in class, where time and space permit, or allocated to be done outside class by a student or a group of students. They have purposely been kept simple and safe, and require a minimum of equipment, such as can be found in the home, or acquired with little difficulty.

8 Revision Exercises are provided at intervals, and may be used for reviewing work done, or for testing purposes. In either case students should not refer to the Units while doing them.

9 Finally, two word lists are given at the end of the book. The first, Vocabulary, alphabetically lists the vocabulary given at the head of each Text A, together with the words given after Questions for further discussion, and space is provided for the mother-tongue equivalents. The second is an English-to-English Glossary of the numbered terms and phrases of Text B, together with their explanations. A word or phrase occurring in the Vocabulary List of Book 1 is not repeated in that of Book 2, but a language item is included in the Glossary of Book 2 irrespective of whether it has already appeared in Book 1.

How to Use this Book

To the teacher
It is advisable to work through the Texts and Exercises in the order in which they are presented, since the subject matter is graded and grouped in a logical sequence, and vocabulary is built up progressively from one Unit to the next.

Discretion may be used as to how much reading aloud is done, and which Exercises are done in class and which as homework. But it is recommended that your students should hear a Text before attempting to read it themselves, and that the Exercises should be at least started in class before the
student is left to his own devices with them.

Notes for the Guidance of Teachers will obviously need to be simplified and enlarged upon when explained to the student.

If answering comprehension questions as oral classwork, quick, short answers are time savers, but as written work, answers in complete sentences should be encouraged.

When the student is familiar with the presentation of Text B as a rewording of Text A, he will find it useful to try to ‘read’ Text B while looking only at Text A. This is a good way of testing himself, and pinpoints weaknesses or gaps in his performance. Although this should never be attempted until the whole Unit has been completed, it brings a real sense of achievement when done fluently.

The student may be encouraged to keep a Science Notebook, in which to record new vocabulary and useful diagrams and illustrations, to work the Exercises and to make notes on class discussions and on any research or enquiry he may pursue on his own, particularly on the work involved in the suggestions for further activities.

Suggestions for working

1. Give mother-tongue equivalents for the vocabulary listed at the head of each Unit. (As a learning reinforcement, these can be filled in later in the space provided in the Vocabulary list at the end of the book.)
2. Read Text A while students follow.
3. Read aloud each numbered word or phrase in Text B, while students find its equivalent italicised in Text A.
4. Have the student (or group) repeat each numbered phrase in Text B, before it is read in its entirety.
5. Work through the Exercises, or use them as homework, leaving time to deal orally with the Questions for further discussion.
Unit 9 Evaporation and Condensation of Water

Vocabulary

to give off heat surface tiny

A
When you boil a kettle of water, you can see steam coming out of the spout. This is because the boiling water gives off water vapour, which we can see only as steam. The water in the kettle gets less and less, because it is changing into vapour. Or we can say that it is vaporizing or evaporating.

It cannot evaporate without heat.

If you hold a cold surface in the steam, you can see tiny drops of water being made on it. This is because the water-vapour gets cool when it touches the cold surface. Then it changes back into liquid water. This process is known as condensation.

Water vapour makes clouds. With the help of the sun’s heat, water is changed to vapour from the earth’s surface, and when it meets a body of cold air, this water vapour changes to water in the form of millions and millions of tiny drops of water. These may join together until they are so heavy that they can fall down.
B

When a kettle of water is boiled, steam can be seen coming out of the spout. This is because water vapour is given off by the boiling water, and (1) is visible only as steam. The water in the kettle (2) decreases because it is (3) being converted into vapour. (4) In other words, it is vaporizing or evaporating. It cannot evaporate (5) in the absence of heat.

If a cold surface is held in the steam, (6) droplets of water can be seen (7) forming on it. This is because the water vapour (8) is cooled on touching the cold surface, and is (3) converted into liquid water. This process is known as condensation.

Clouds are made by water vapour. (9) By the aid of the sun’s heat, water (10) evaporates from the earth’s surface, and, (11) on meeting a body of cold air, this water vapour (12) condenses in the form of millions and millions of (6) droplets of water. These may (13) combine until they are (14) heavy enough to (15) be precipitated.

Exercise 1 Find the way in which the words and phrases italicised in Text A are expressed in Text B:

1 which we can see
2 gets less and less
3 changing
4 Or we can say that
5 without
6 tiny drops
7 being made
8 gets cool when it touches
9 With the help
10 is changed into vapour
11 when it meets
12 changes to water
13 join together
14 so heavy that they can
15 fall down
Exercise 2  Draw a labelled diagram and under it write this account using passive forms. (The subjects of passive sentences are italicised.) Should the agents be expressed or omitted? (Write this as a paragraph and do not number your passive sentences):

1. First we filled a kettle with water and marked the level of the water.
2. Next we boiled the kettle of water for 15 minutes.
3. We could see steam coming out of the spout.
4. We held a cold dry plate in the steam.
5. We observed droplets of water forming on the plate.
6. We again marked the level of water in the kettle.
7. We found that the level was lower, because some of the water had evaporated as the kettle boiled.

Exercise 3  Rewrite these sentences, using on...ing in place of the when clauses:

1. When it is heated, water evaporates.
2. When it is cooled, water vapour condenses.
3. Air rises when it is heated.
4. When it meets a body of cold air, the water vapour in the atmosphere condenses.
5. When water vapour condenses, it forms droplets of water.
6. When these droplets combine, they may become heavy enough to fall as rain.
7. When it boils, water readily gives off water vapour.
Exercise 4  Rewrite this passage, using ONE word in place of each phrase italicised:
Water changes to vapour and the amount of water gets less as it is boiled. Water vapour is unable to be seen unless it is beginning to change from vapour to liquid as it gets colder.
Clouds are made of millions of tiny drops which may join together until they become heavy enough to fall down.

Exercise 5  Answer these questions without referring to the Texts:
1  What is given off by boiling water?
2  Is water vapour visible or invisible?
3  Why does the water in the kettle decrease on boiling?
4  Why do droplets of water form on a cold surface?
5  How are clouds made and how is rain formed?
6  When does it rain?

Exercise 6  Compare these two pairs of sentences:
In everyday speech or writing: (active)
(1a)  You could see steam coming out.
(2a)  You could see steam come out.
In science: (passive)
(1b)  Steam could be seen coming out.
(2b)  Steam could be seen to come out.

Rewrite these sentences in the passive as in examples (1b) or (2b). (The subjects of the passive sentences are italicised):
1  You can observe the water decreasing as it boils.
2  You could notice droplets forming on the cold surface.
3  You could see the vapour returning to liquid.
4  When a cube of lead is placed in water, you can see it sink.
5  We can observe clouds floating in the sky.
6  When the bulb is held in steam, we can see the mercury rise.
7  When the bulb is held in melting ice, you can see the mercury fall in the tube.
8  When a cork is placed in water, we can see it float.
9  You can see water decreasing as it boils.
10  You can sometimes see condensation taking place on a mirror.
Exercise 7 Adjective + enough + infinitive: Compare these two ways of expressing the same idea:
In everyday speech or writing:
(a) A cube of lead is so heavy that it sinks.
In science:
(b) A cube of lead is heavy enough to sink.
Rewrite these sentences in the way shown in example (b):
1 A cube of wood is so light that it floats.
2 When steam touches a mirror, it becomes so cold that it condenses.
3 When the tiny droplets in a cloud combine, they may become so large and heavy that they fall.
4 These droplets may become so large and heavy that they are precipitated as rain.
5 The last filters are so fine that they can remove even the smallest particles from the water.
6 Bacteria, however, are so tiny that they can pass through even the finest filter.
7 The amount of chlorine added to the water is so small that it is harmless to humans.
8 The amount of added chlorine is not so large that it can affect the taste very much.
9 Steam is so hot that it expands the mercury rapidly.
10 The expansion of air inside the bottle was so rapid that it could blow the water out of the tube.
11 The expansion of water inside the bottle was so great that it overflowed the tube.
12 The world's supply of natural rubber is not so large that it can satisfy the needs of industry.

Exercise 8 Questions for further discussion:
1 Why do the windows of your classroom become misty on a cold day?
2 Where else do you see examples of condensation?
3 When a bottle of cold milk is taken out of the fridge into a warm room, why do drops of water form on the outside of the bottle?
4 How is rain formed? Where does it come from?
5 What other examples of the process of evaporation have you observed in everyday life?
6 Why does it feel cool when you pour eau-de-cologne on your hand?
7 How does sweating make you feel cooler?
8 What is distilled water, and what is one simple way of making it?
Vocabulary
distilled water  eau-de-cologne  misty  sweating

Exercise 9  Suggestions for further activities:
1  Get a small mirror or piece of glass, and breathe on it. What happens? Why? Is the mirror wet or dry?
2  Get two ordinary mercury thermometers, marked A and B, and leave them in the room close together for a while. (They should both show the same temperature.) Record the temperature reading of each. Cover the bulb of thermometer A with cotton wool soaked in water, and cover the bulb of thermometer B with cotton wool soaked in methylated spirits. After 4–5 minutes, record the temperature readings of each, and notice any difference. Can you explain the cause?
3  Boil a kettle of water and hold a large, cold, dry plate in the steam. (Be careful not to burn yourself.) Why does water form on the plate?