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ENGLISH

for Science and Technology (C1)

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Böhner / Chojnacki-Herbers / Michaels / Nixon

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Preface

This book draws on the collective experience and expertise of four English instructors from the University of Stuttgart's Language Center, who have each taught various courses in the areas of English for Specific Purposes (ESP) and academic English for well over a decade. Each instructor has specialized over the years in a particular area of technical English, such as English for Civil Engineering, English for Chemistry or English for Space Engineering. The idea behind the book was to bring together the ample material that we have developed over the length of our careers to create an ESP textbook for technical English courses at a solid C1 level, given that much of the published material already on the market fell short of this advanced level or was not particularly relevant to or appropriate for university students.

The texts contained in this book have either been drawn from authentic material in the respective scientific or engineering fields or been written using scientific and technical information from reputable sources. The goal was to bring together textual material from a variety of fields that was both challenging and accessible to non-experts.

While this book is intended as a textbook to accompany technical English courses at post-secondary institutions across the German-speaking world, if one disregards the occasional contrastive language exercises (English vs. German), it could easily be used for ESP classes anywhere. Students are not expected to have in-depth knowledge of each topic, and it is unlikely that all of the chapters in the book could be covered in one technical English course. Therefore, this book can easily be implemented in different English-language programs requiring technical English by selecting the relevant chapters or individual academic English exercises from throughout the book. Furthermore, this textbook can be used by engineers and scientists who have already begun their careers as part of a structured course or as a means of self-study.

Users of this book should a have a firm grasp of general English. The book is geared towards a C1 level of English as outlined by the Common European Framework of Reference for Languages or UNIcert Level III. Not only are technical English topics

covered, but also elements of academic writing, such as discourse markers and register, are explored throughout. In this way, the book goes beyond simply providing technical jargon by pointing out vocabulary and expressions typical of academic English. As is often the case in ESP classes, the line between technical and academic English cannot be clearly delineated.

The referencing standard in academic writing can vary from field to field and even within one field. For this book, the Chicago and IEEE citation styles were chosen as they can be found in a number of scientific and engineering publications. They are also similar to several other citation styles found in technical texts. Both the author-date system and bracketed number referencing system are used to expose students to these two common practices.

As the material has been taken from a number of sources in its original context or written by instructors of diverse backgrounds, the variety of English differs from chapter to chapter. Consequently, British English spelling co-exists alongside American and Canadian spelling. This should not be viewed as inconsistent, but rather as representative of the global varieties of English that students will encounter in their studies and careers.

This book is a combination of reader and workbook. Space has generally been provided so that students can enter their answers into the book as they work through the exercises under the guidance of an instructor or on their own.

Although there is emphasis on reading comprehension, vocabulary and writing skills, there are exercises throughout the textbook that provide practice for listening comprehension, speaking and mediation. A few task-oriented exercises have also been provided to allow the students to employ all of their English-language resources in authentic, real-life situations.

We would like to thank all of the individuals who provided help and advice along the way and in particular the companies and governmental organizations that granted us permission to use their material as a basis for our exercises. We are also indebted to our students, whose enthusiasm for English and thirst for knowledge have spurred us to research new fields over the years and to compile some of our material in this book. Finally, we would like to express our gratitude to Hanser Publishing for supporting us on this project and publishing this manuscript.

Stuttgart, December 2023

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1 Water Purification

1.1 Drinking Clean Water

1.1.1 Introduction

The natural water cycle includes processes that help to filter the natural water to make it potable (Figure 1.1). Nevertheless, not all water that has gone through the natural process is fit to be drunk by humans.

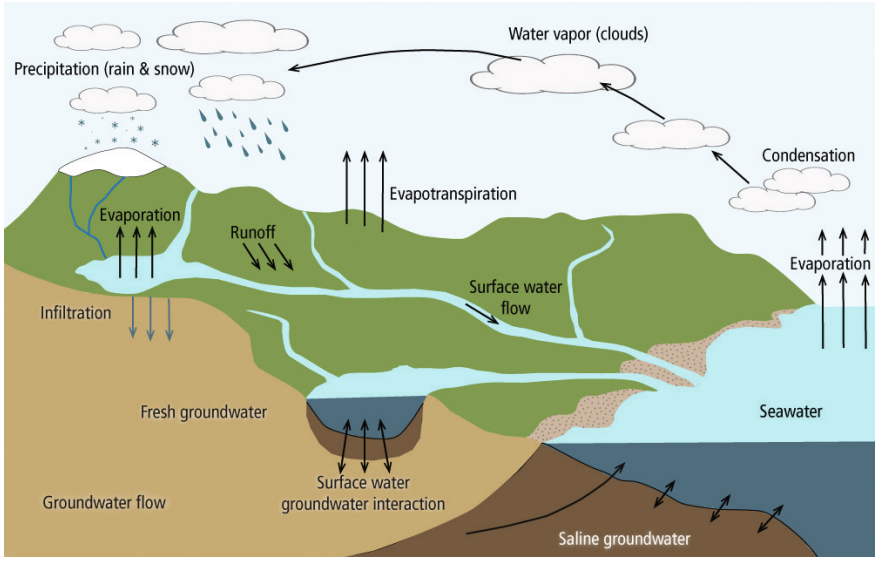

Figure 1.1 The water cycle (source: Cabibbo 2022)

1.1.2 Exercise

1. What technical challenges must be overcome to ensure that all people have access to clean water?

_____

_____

_____

_____

2. What types of systems are in place to maintain the water supply?

_____

_____

_____

_____

Later in this chapter, you will find a process description of a water treatment plant (Section 1.3.2), but first we will discuss the importance of giving clear instructions.

■ 1.2 Giving Instructions

1.2.1 Introduction

Giving clear, concise and appropriate instructions is a necessary skill when working in a lab or in a team. When thinking about what information is required, one must keep the audience and purpose in mind.

Audience: Who is being addressed? Do you know the audience? What previous information (if any) does the audience have about the topic? What type of experience does the audience have regarding the topic? Knowing whom you are addressing will help you when considering what information needs to be included and in what register the information should be written. Register refers to the level of formality in language. A formal register is directed to a professional contact, a person in a high position or a person of authority, such as a judge. An informal register is directed to someone with whom one is familiar, a friend or friendly acquaintance or a person of a lower position.

Purpose: Why are you writing? Are you imparting information? Are you telling someone what to do? Are you expressing your opinion? Are you trying to convince

someone of your point of view? The audience you are addressing as well as the purpose will influence the language you use (vocabulary, grammar, detail), as well as the level of formality.

1.2.2 Exercise

Think about a situation when you were responsible for telling someone what to do. What were some factors that you needed to consider?

_____

_____

_____

_____

1.3 Process Description

1.3.1 Introduction

A process description is a useful way of describing an experiment, explaining how a machine works, or telling a colleague how a task is completed (Focus 2017). There is a simple structure which should be utilized so that the reader is able to follow the description of the task without much difficulty.

Introductory Statement

As in most essay-style texts, it is useful to include an introductory statement, which explains what the process is. This gives the reader an overview of what is happening, why the process is useful and what the outcome should be. The introduction should also incorporate limitations of the process. Information about the number of steps in the process may also be included in this statement.

Useful phrases for an introductory statement:

- This process describes …
- The process of … is useful for …
- An (experiment) is done in order to …
- A (machine) is used to …
- The diagram illustrates …