STRATEGIES FOR TECHNICAL COMMUNICATION IN THE WORKPLACE

FOURTH EDITION

LAURA J. GURAK &
JOHN M. LANNON

A Topical Guide to the Strategies Boxes

A Guide to the Checklists

Strategies for Technical Communication in the Workplace

FOURTH EDITION

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Preface

Overview

In today's workplace, professionals in all fields are expected to adapt to a variety of communication situations. Virtually everyone must be able to write routine workplace documents such as memos, emails, letters, and informal reports. In addition, employees must create more complex forms of communication such as formal reports and proposals, instructions, definitions and descriptions, Web pages, oral presentations, video presentations, and more. All the while, these professionals must also negotiate technological innovations, communicate in a global marketplace, work in teams, write persuasively, research effectively, and understand the ethical implications of the documents they produce.

We wrote *Strategies for Technical Communication in the Workplace* as a medium-length textbook that covers all the preceding topics thoroughly and concisely. Like the first three editions, this fourth edition of *Strategies* draws on the strengths of our other technical communication book, the best-selling *Technical Communication* (14th edition). We hope that students and faculty alike will appreciate the new edition of this distinctive textbook.

What's New in the 4th Edition

This fourth edition of *Strategies for Technical Communication in the Workplace* offers many new features, with an emphasis on updated discussions and examples of digital communication technologies and with a fresh new look and feel that students will appreciate. In addition, Learning Objectives at the outset of each chapter are now tied directly into the major sections of the chapter; model documents and pedagogical features have been revised or updated; and many new end-of-chapter Applications have been added. Another important update for this edition is the digital version of the text in an innovative platform called Revel that allows for interactivity, collaboration, and more. See page xix in this Preface for more information about Revel.

In detail, we have made the following chapter-by-chapter changes for this fourth edition of *Strategies*:

- **Chapter 1, "Technical Communication: Global, Collaborative, and Digital,"** features an updated introduction to the most common types of technical documents, as well as revised discussion of interpersonal and digital factors that can lead to team conflicts and a newly-written introduction to digital technical communication.
- **Chapter 2, "The Research Process in Technical Communication,"** has been thoroughly revised throughout to keep pace with the rapid changes in research technologies, placing less emphasis on the distinction between online and print sources and incorporating the latest information on locating secondary sources and using various types of secondary sources. A new figure provides an example of a cover email for an online survey.
- **Chapter 3, "Providing Audiences with Usable Information,"** includes revised discussion and examples to help students fully understand the process of analyzing an audience's technical background as well as expanded discussion of additional usability

factors beyond audience and purpose that technical communicators must consider, such as length, format, and budget.

- **Chapter 4, "Recognizing Ethical Issues in Technical Communication,"** has been updated throughout to incorporate the latest information on how technology affects ethical issues in the workplace.
- **Chapter 5, "Structuring Information for Your Readers,"** features a new email example demonstrating an introduction-body-conclusion structure but also foregrounding the importance of social media in the workplace, discussed in more detail later in the book.
- **Chapter 6, "Writing with a Readable Style,"** provides a thoroughly revised section on the importance of using unbiased language, which incorporates rather than separates the discussion of nonsexist language.
- **Chapter 7, "Using Audience-Centered Visuals,"** includes a new section on using visuals fairly and accurately.
- **Chapter 8, "Designing User-Friendly Documents,"** provides new information on using templates and other digital design tools.
- **Chapter 9, "Résumés and Other Employment Materials,"** has been revised throughout to keep pace with new developments in the job search process, including using LinkedIn effectively, what to now include in the contact information portion of your résumé, adapting your résumé to the specifications of various job-search sites, interviewing via Skype, and using email for follow-up communication after an interview or job offer. In addition, all sample résumés in the chapter have been revised and updated.
- **Chapter 10, "Memos and Letters,"** now speaks to the increasing use of email rather than hard copy to send workplace memos and letters and how writers can make informed decisions as to when and how to send them over email. In addition, the chapter presents expanded discussion on the three most common types of memos, and most of the sample memos and letters have been revised and updated.
- **Chapter 11, "Definitions,"** includes a thoroughly revised section on legal, safety, and societal implications of definitions as well as discussion as to when to use a glossary or hyperlinked definitions.
- **Chapter 12, "Descriptions,"** features a revised complex product description as well as new discussion of the safety implications of descriptions.
- **Chapter 13, "Instructions and Procedures,"** has been thoroughly revised to provide several new sample instructions, as well as updated information on online versus print instructions, expanded discussion of user manuals and safety and legal implications of instructions, and a new section on assembly guides.
- **Chapter 14, "Summaries,"** includes a detailed new section on summarizing information for social media.
- **Chapter 15, "Informal Reports,"** provides new information on choosing an appropriate format when delivering informal reports. In addition, all of the sample informal reports in the chapter have been carefully revised and updated.
- **Chapter 16, "Formal Reports,"** features expanded discussion of the format of various portions of a formal report, as well as a sample formal report that has been thoroughly revised to conform to the latest APA style guidelines.
- **Chapter 17, "Proposals,"** includes a sample formal proposal that has been reformatted to conform to the latest MLA style guidelines.
- **Chapter 18, "Email,"** has been thoroughly revised. In addition to all new email samples

throughout, the chapter now includes a new introductory discussion about the cautions of using email, a new section with examples on the three main types of workplace email, and a revised and expanded discussion of style and tone in email messages.

- **Chapter 19, "Blogs, Wikis, and Web Pages,"** now includes discussion of "universal design" of Web pages as well as a new section on fairness considerations in Web-based communication.
- **Chapter 20, "Social Media,"** has been thoroughly revised to include new discussions of personal versus workplace use of social media, using Instagram on the job, using other popular social media on the job (Reddit, Tumblr, Pinterest), and credibility and legal issues surrounding the use of social media on the job.
- **Chapter 21, "Oral Presentations and Video Conferencing,"** presents a thoroughly revised section on using presentation software, including new material on the individual benefits of using various presentation software programs such as PowerPoint, Apple Keynote, Prezi, and Google Slides.

Key Features

To help you get a better idea how *Strategies* works as a whole, following is a point-by-point discussion of the key features of this book.

Complete but Streamlined Coverage

Strategies includes all topics essential for an undergraduate technical communication course in a compact yet thorough format. The book covers everything technical communicators need to know—from writing basic letters and memos, to writing complex proposals and formal reports, to delivering oral presentations and writing for the Web—in roughly 500 pages. In addition, *Strategies* offers innovative coverage of emerging technologies used in the workplace, including text messages, social networks, and online videos.

Emphasis on Student Practice

This book is guided by the idea of providing students with practical, accessible concepts that are easy to follow and that get students writing and designing documents immediately. One key feature, as the title suggests, is the Strategies box, which provides step-by-step advice to follow in writing and discussing a given document. In addition, chapters in Parts 3 and 4 emphasize the importance of "doing" immediately via the Let's Get Started feature; students are asked to draft their best version of each chapter's document type or communication situation before they read the chapter. Then, as they work through the chapter content, students are encouraged to review and revise their original work. Finally, every chapter, including the foundational and "blueprints" chapters in Parts 1 and 2, includes Applications exercises, grouped into general, collaborative, global, digital, and social media categories.

Clear Explanations and Straightforward Organization

As we wrote and organized this book, we kept in mind five essential questions students most frequently ask: "What needs to be done?"; "What should it look like?"; "How do I do it?"; "What should be avoided?"; and "How well have I done it?". The features described previously focus on these questions. Also, marginal notes summarize and reinforce main points in each chapter.

The chapter sequence in *Strategies* proceeds from general foundational concepts and blueprints in Parts 1 and 2 to cumulatively more complex writing and communicating situations in Parts 3 and 4.

Practical Pedagogical Features

Strategies includes several practical, easy-to-access pedagogical tools. These features include:

- **Chapter Outlines and Learning Objectives.** On the opening page of each chapter, the outlines provide a quick orientation to the chapter topics and sequence, and they are tied into the learning objectives, which emphasize the practical skills students can expect to acquire.
- **Strategies boxes.** Featured in every chapter, the Strategies boxes summarize key strategies discussed in the text and provide additional pointers for approaching each communication situation.
- **Checklists.** End-of-chapter Checklists summarize each chapter, and more importantly, they emphasize "doing" by asking students to check off each item as they review their work.
- **Applications.** Called "applications" rather than "exercises" to emphasize applied learning, the end-of-chapter Applications fall into four categories: General Applications (for individual practice), Team Applications (for pair or group practice), Global Applications (for highlighting global issues in workplace communication), and Digital and Social Media Applications (for highlighting the use of technology in workplace communication).

Realistic and Accessible Annotated Model Documents

Model documents resemble the kinds of documents students will write in the workplace. Accessible, engaging, and easy to emulate, most of these documents are fully annotated.

Consistent Focus on Audience and Purpose

Technical communication in the workplace is more than a mere exercise in "information transfer"—it is also a social transaction involving individuals, teams, companies, and organizations that are national and international in scope. In the contemporary workplace, a one-size-fits-all approach to technical communication doesn't work. Effective communication must be tailored for different audiences and different purposes. Today's communicator must be smart about researching, summarizing, and customizing information to meet many different situations. *Strategies* has therefore been designed to provide much more than a "cookie cutter" approach to creating typical workplace documents and making presentations by focusing on key rhetorical principles of audience and purpose.

The Latest Technology and Global Issues Coverage

With the Internet and digital technology at our fingertips and with companies and teams spread across the world, communication reaches a wide audience and often is transmitted instantly. We receive or convey professional information in a variety of ways—handwritten, in word-processed documents, via email or text messaging; in video format; as a Web page; via blogs, wikis, or social networks; or as live presentations—and each medium and potential audience brings with it unique challenges about how to best present the information. *Strategies* incorporates relevant technology coverage and stresses the importance of thinking about global audiences wherever relevant.

Organization of the Book

Strategies begins with foundational concepts, then moves to "blueprints," and then applies the foundations and blueprints to increasingly complex documents and communication situations.

- **Part 1 ("Foundations")** introduces the underlying concepts for creating effective technical

communication. This section provides a definition of technical communication (Chapter 1); coverage of research as a pivotal part of technical communication (Chapter 2); an introduction to the analysis of audience, purpose, and other factors (Chapter 3); and in-depth coverage of workplace ethics (Chapter 4).

- **Part 2 ("Blueprints")** builds on Part 1 by discussing four basic considerations for approaching each type of workplace document or communication situation: understandable structure (Chapter 5), readable style (Chapter 6), audience-centered visuals (Chapter 7), and user-friendly design (Chapter 8).
- **Part 3 ("Documents")** applies the previous foundations and blueprints, presenting increasingly complex types of print documents. This section begins with the types of documents students need to get hired and concludes with the two most complex types of documents: formal reports and proposals. Specific documents covered in Part 3 include résumés and other employment materials (Chapter 9), memos and letters (Chapter 10), definitions (Chapter 11), descriptions and specifications (Chapter 12), instructions and procedures (Chapter 13), summaries (Chapter 14), informal reports (Chapter 15), formal reports (Chapter 16), and proposals (Chapter 17).
- **Part 4 ("Digital Media and Presentations")** provides guidance for creating documents for digital media and for giving oral presentations. Included are chapters on email (Chapter 18); blogs, wikis, and Web pages (Chapter 19); social media (Chapter 20); and oral presentations and video conferencing (Chapter 21).
- **Appendices A ("Documenting Sources") and B ("A Brief Handbook")** offer guidance on citations and grammar. Appendix A includes guidelines for avoiding plagiarism and documenting sources completely and accurately in both MLA and APA format. Appendix B provides a brief handbook of grammar, punctuation, mechanics, and usage. This appendix also includes useful advice on formatting lists and using transitions in written work.

REVEL™

Educational Technology Designed for the Way Today's Students Read, Think, and Learn

Revel is an interactive learning environment that deeply engages students and prepares them for class. Media and assessment integrated directly within the authors' narrative lets students read, explore interactive content, and practice in one continuous learning path. Thanks to the dynamic reading experience in Revel, students come to class prepared to discuss, apply, and learn from instructors and from each other.

The Revel features accompanying *Strategies* are as follows:

- **Journal Prompts** appear at the end of every major section in each chapter, encouraging hands-on practice through writing. Students are asked to perform brief writing activities that involve reflection, brainstorming, drafting a portion of a document, or analyzing a particular document.
- **Multiple-Choice Quizzes** help reinforce facts and concepts as students move through each major section in each chapter (the end of each major section quiz features three questions directly tied to that section) and then again at the end of the chapter (the end of chapter quiz provides five questions covering various sections of the chapter).
- **Table Drag-and Drop** activities help students remember information by matching terms with their descriptions or placing parts of complex documents in the right order.
- **Fill-in-the-Blank and True/False Quick Check** activities are directly tied to the

Strategies boxes that appear in every chapter and provide a quick means of remembering concepts presented in these important boxes.

- **Let's Get Started** activities, which appear at the beginning of each chapter in Parts 3 and 4, encourage students to begin "doing" immediately by producing the type of draft document or communication product discussed in the chapter based on their prior knowledge.
- **Shared Writing Activities** are tied to one or more of the chapter's Journal Prompts in Parts 1 and 2 and to the Let's Get Started activities in Parts 3 and 4, encouraging students to share, discuss, and critique each other's work.

Learn more about Revel
www.pearson.com/revel

Supplements

Make more time for your students with instructor resources that offer effective learning assessments and classroom engagement. Pearson's partnership with educators does not end with the delivery of course materials; Pearson is there with you on the first day of class and beyond. A dedicated team of local Pearson representatives will work with you to not only choose course materials but also integrate them into your class and assess their effectiveness. Our goal is your goal—to improve instruction with each semester.

Pearson is pleased to offer the following resources to qualified adopters of *Strategies*. Several of these supplements are available to instantly download from Revel or on the Instructor Resource Center (IRC); please visit the IRC at www.pearsonhighered.com/irc to register for access.

- **TEST BANK** Evaluate learning at every level. Reviewed for clarity and accuracy, the Test Bank measures this material's learning objectives with multiple-choice, true/false, fill-in-the-blank, short-answer, and essay questions. You can easily customize the assessment to work in any major learning management system and to match what is covered in your course. Word, Black-Board, and WebCT versions are available on the IRC, and Respondus versions are available on request from www.respondus.com.
- **PEARSON MYTEST** This powerful assessment generation program includes all of the questions in the Test Bank. Quizzes and exams can be easily authored and saved online and then printed for classroom use, giving you ultimate flexibility to manage assessments anytime and anywhere. To learn more, visit www.pearsonhighered.com/mytest.
- **INSTRUCTOR'S RESOURCE MANUAL** Create a comprehensive roadmap for teaching classroom, online, or hybrid courses. Designed for new and experienced instructors, the Instructor's Resource Manual includes overall teaching strategies (including general teaching ideas, advice on how to use the Revel features accompanying *Strategies*, and sample syllabi) and chapter-specific resources (including chapter overviews, Learning Objectives, teaching tips, additional exercises, and quizzes). Available within Revel and in the IRC.
- **POWERPOINT PRESENTATION** Make lectures more enriching for students. The PowerPoint Presentation includes a full lecture outline and figures from the textbook and Revel edition. Available in the IRC.

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—Laura J. Gurak and John M. Lannon

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Part 1
Foundations

Chapter 1

Technical Communication: Global, Collaborative, and Digital

Learning Objectives

1.1 Define technical communication.

1.2 Describe the key characteristics of effective technical communication.

1.3 List the three main purposes of technical documents.

1.4 Recognize typical technical documents.

1.5 Understand the global, collaborative, and digital nature of technical communication.

Chapter Outline

What is Technical Communication?

1.1 Define technical communication.

Technical communication is the exchange of information that helps people interact with technology, advance workplace goals, and solve complex problems.

Technical communication helps us interact with technology in our daily lives

We live in a world where many of our everyday actions depend on complex but usable information. For example, when you purchase or install a new device, such as a DVD player or wireless speakers, you need clear, easy-to-use instructions. From banking systems to online courses to business negotiations, countless aspects of daily life are affected by technology, and we rely on usable technical information to answer questions such as these:

- How do I access my online bank statement?
- How do I connect my tablet with a conference room's projection system?
- How do I paste a digital photo into a document and resize the image?

Technical communication helps specialists solve complex problems

Technical information is also used in more specialized settings. For example, a physician performing heart surgery must have clear information about how to install

a pacemaker. A government research scientist must have accurate instructions about how to write a grant or how to perform a particular experiment. An engineer must have access to the correct specifications for designing a bridge or configuring a new app. In specialized settings, technical communication answers questions such as these:

Specialized questions

- Do the benefits of the Lyme disease vaccine outweigh its risks?
- What are the technical limits to wind energy?
- How effectively will the new heating system circulate in the top floors of the new office complex?

Technical communication helps advance workplace goals

In the workplace, we are not only consumers of technical communication but also producers. Virtually all professionals, at some point, function as technical communicators. Experts are often required to present their knowledge to nonexpert audiences. For instance, a nuclear engineer testifying before Congress would need to write a report explaining climate change data in nonscientific language to policy makers and the general public. Nurses and other medical professionals are often required to explain complex medical concepts to patients and families. Writers of instructions for uploading new software need to be sure that a wide range of readers can perform the task without having to call customer service.

Technical communication is global, collaborative, and digital

Technical communication is global, collaborative, and digital. Technical documents, including user manuals, instructions and procedures, online help, and other such materials, are accessible by people around the globe, created by teams from different countries and time zones, and available online in formats suitable for reading on a variety of devices from laptops to tablets to smartphones to print.

Main Features of Technical Communication

1.2 Describe the key characteristics of effective technical communication.

Technical communication differs from most academic writing

Technical communication differs from other communication and writing courses you take in college. In first-year writing (freshman composition) or expository writing, the emphasis typically is on one type of document: the traditional college essay. As you work on the assignments for this course, the skills you learned in previous writing classes will remain important, but the writing will often be different. Technical documents typically exhibit the following characteristics.

Focus is on the Reader, Not the Writer

Produce user-centered documents

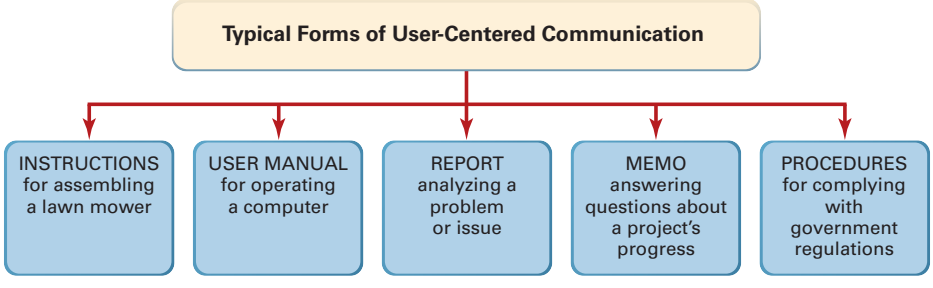
Unlike poetry, fiction, or essays, technical documents rarely focus on the author's personal thoughts and feelings. This doesn't mean that technical documents should have no personality (or voice), but it does mean that the needs of your readers must

come first. Users of technical communication are only interested in you, the communicator, to the extent that they want to know what you have done, what you recommend, or how you speak for your company or organization. This type of communication is called "user-centered communication" (see Figure 1.1). User-centered communication requires a focus on the people who will be *reading and using* the document. What do your readers need to know? What tasks are they trying to perform?

Learn to put yourself in the reader's place

Placing the reader's needs and interests first takes practice because many of us are taught to write from our own perspectives. For instance, assume you've been asked to create a set of instructions that explain how people in the community can bring household hazardous waste (gasoline, paint) for recycling. Assume also that you live in the neighborhood near the recycling center and often visit that location. In this instance, you could easily forget to include a map and directions to the center, unless you focus consistently on your actual readers—people who are new in town, people who don't live close to the facility, and so on.

Figure 1.1 User-centered communication



Document Design is Efficient and Accessible

Produce documents that are easy for readers to use and navigate

Unlike college essays, which take essentially one shape (paragraphs of text), technical documents may take the form of a brochure, a memo, a report with different sections, a numbered set of instructions, a Web site, online help, a blog, a wiki, or an email with a PDF attachment. Regardless of format and media, the design must be efficient and accessible, making it easy for readers to find what they are looking for and use the content to perform a task or answer a question.

Writing Style is Clear and Relevant

Write clearly

Technical communication uses clear language. For example, the instructions for using a fire extinguisher (Figure 1.4, page 9) are written for a wide range of readers. Likewise, the letter from the company's general manager to a potential client (Figure 1.5, pages 10–11) is another example of clear communication.

Provide only relevant information

Information is relevant if the audience can apply it to the task at hand. For instance, if someone needs to operate a fire extinguisher, that person needs clear, brief sentences listed numerically without a lot of unnecessary explanation. As shown in Figure 1.4, some limited background information may be required (by law or by code), but even that information must be clear, relevant, and to the point.

Information is Persuasive, Truthful, and Based on Research

Persuasion means trying to influence someone's actions, opinions, or decisions. In the workplace, we rely on persuasion daily: to win coworker support, to attract clients and customers, or to request funding. But changing someone's mind is never easy, and sometimes it is impossible. Your success will depend on who you are trying to persuade, what you are requesting, and how entrenched they are in their own views.

All documents are at least in part persuasive

All technical documents are persuasive, in some sense. Some documents, such as the letter in Figure 1.5, are explicitly persuasive, in that the writer is trying to convince the reader that the proposed project is the right choice. Other documents, such as the instructions in Figure 1.4, are mainly informative, but they are also implicitly persuasive: The writer is also trying to show readers that the fire extinguisher is easy to use and safe.

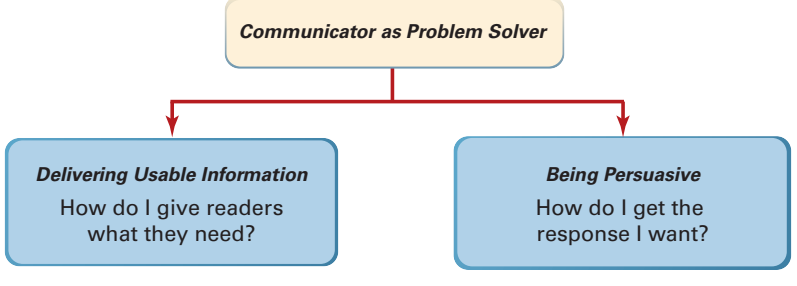
Balance information and persuasion

In short, a technical communicator is a problem solver and, as such, must be aware of the best balance between providing readers with the information they need and persuading them to respond as desired, as illustrated in Figure 1.2.

Technical documents should be truthful

Even when you need to be overtly persuasive, as in a sales proposal, honesty is essential. A document that is highly persuasive but in some way dishonest may influence readers in the short term but will lead to long-term problems. You will lose credibility with the client or your boss and could potentially damage a working relationship for life.

Figure 1.2 Balancing information and persuasion



Even routine technical documents produced on the job are based to some extent on research. For example, a routine email to employees about a new performance review system may not require extensive research, but the information must be accurate. Accuracy in this case may only involve double-checking meeting notes or asking a colleague in the human resources department for clarification on some point, but double-checking your facts is still research. With more complex documents, the research component of technical communication becomes more obvious. For more on research, see Chapter 2.

Base your documents on careful research

Three Primary Purposes of Technical Communication

1.3 List the three main purposes of technical documents.

Most technical communication seeks to address one of three primary purposes: to anticipate and answer questions (inform), to enable people to perform a task (instruct), or to influence people's thinking (persuade). Keep in mind that these purposes often overlap (as in the following sample documents). However, most documents have one *primary* purpose: to inform, to instruct, or to persuade.

Three purposes of technical documents: inform, instruct, and persuade

Informational Purpose

Figure 1.3 displays an *informational* document created by the U.S. Environmental Protection Agency. It is designed for a wide audience of readers who may know little about the topic (bioremediation), but the writer has kept audience diversity in mind by anticipating and answering likely questions.

Informational documents anticipate and answer questions

Instructional Purpose

Figure 1.4 is an *instructional* document. As we have all experienced, effective instructions can be a pleasure to work with because they help people do what they want to do. But poor instructions can create frustration, often causing people to return the product and to have second thoughts about purchasing that brand in the future.

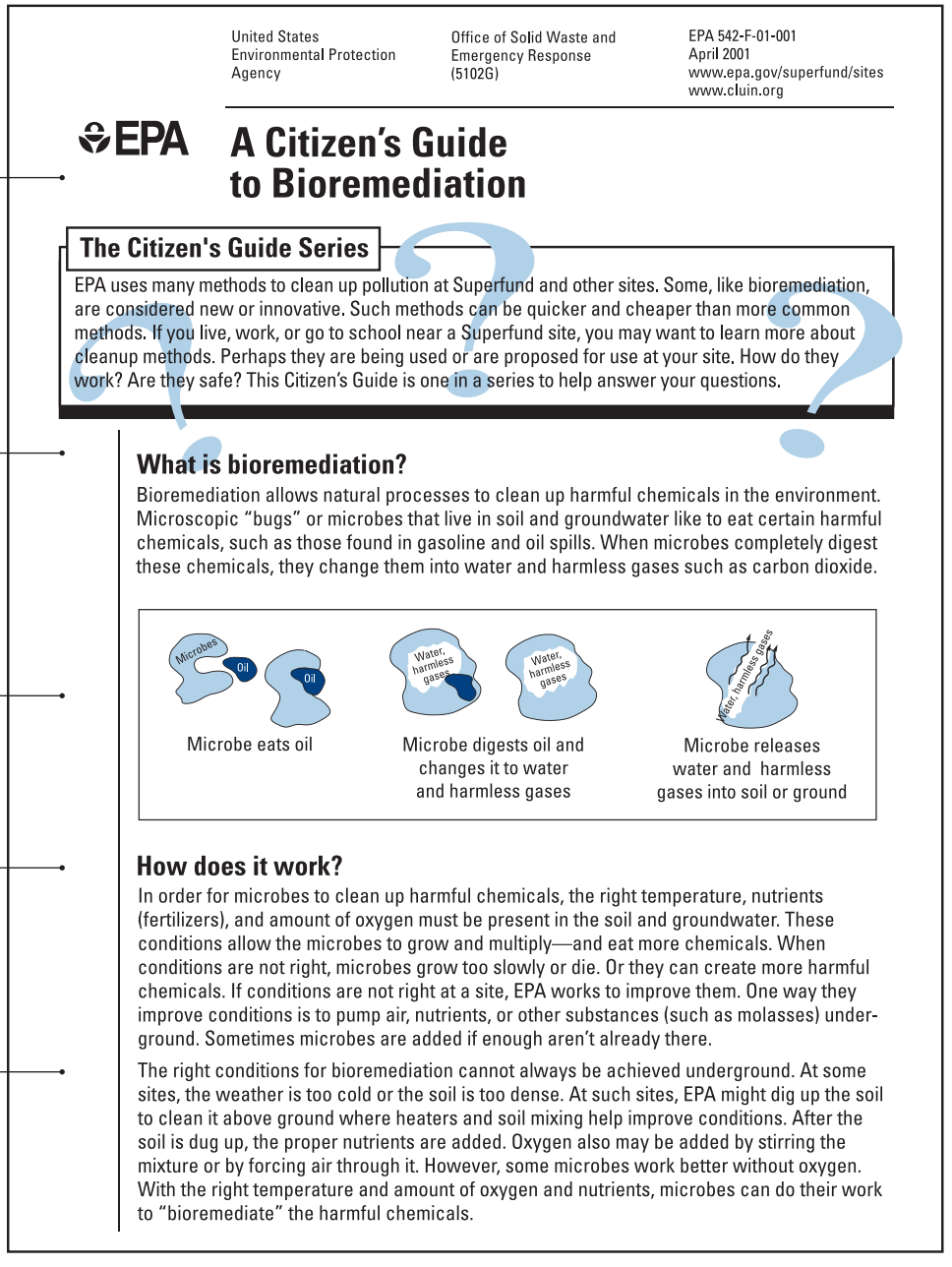
Instructional documents help people perform a task

Persuasive Purpose

Figure 1.5 shows a *persuasive* document in the form of a letter from a company that distributes systems for generating electrical power from recycled steam. General Manager William Bullock writes a persuasive answer to a customer's question: "Why should I invest in the system you are proposing for my plant?" As you read the letter, note how the writer focuses on reasons that are important to the reader.

Persuasive documents encourage readers to take a desired action

Figure 1.3 An informational document



United States Environmental Protection Agency | Office of Solid Waste and Emergency Response (5102G) | EPA 542-F-01-001, April 2001, www.epa.gov/superfund/sites, www.cluin.org

EPA

A Citizen's Guide to Bioremediation

The title is clear and easy to understand

The Citizen's Guide Series

EPA uses many methods to clean up pollution at Superfund and other sites. Some, like bioremediation, are considered new or innovative. Such methods can be quicker and cheaper than more common methods. If you live, work, or go to school near a Superfund site, you may want to learn more about cleanup methods. Perhaps they are being used or are proposed for use at your site. How do they work? Are they safe? This Citizen's Guide is one in a series to help answer your questions.

User-centered headings are phrased as questions that readers would need answered

What is bioremediation?

Bioremediation allows natural processes to clean up harmful chemicals in the environment. Microscopic "bugs" or microbes that live in soil and groundwater like to eat certain harmful chemicals, such as those found in gasoline and oil spills. When microbes completely digest these chemicals, they change them into water and harmless gases such as carbon dioxide.

Illustrations combine text and visuals

Microbe eats oil

Microbe digests oil and changes it to water and harmless gases

Microbe releases water and harmless gases into soil or ground

Headings and a clean layout make this document easy for readers to navigate

How does it work?

In order for microbes to clean up harmful chemicals, the right temperature, nutrients (fertilizers), and amount of oxygen must be present in the soil and groundwater. These conditions allow the microbes to grow and multiply—and eat more chemicals. When conditions are not right, microbes grow too slowly or die. Or they can create more harmful chemicals. If conditions are not right at a site, EPA works to improve them. One way they improve conditions is to pump air, nutrients, or other substances (such as molasses) underground. Sometimes microbes are added if enough aren't already there.

Text provides the most relevant information without being too detailed

The right conditions for bioremediation cannot always be achieved underground. At some sites, the weather is too cold or the soil is too dense. At such sites, EPA might dig up the soil to clean it above ground where heaters and soil mixing help improve conditions. After the soil is dug up, the proper nutrients are added. Oxygen also may be added by stirring the mixture or by forcing air through it. However, some microbes work better without oxygen. With the right temperature and amount of oxygen and nutrients, microbes can do their work to "bioremediate" the harmful chemicals.

SOURCE: U.S. Environmental Protection Agency Web site <www.epa.gov>.

Figure 1.4 An Instructional Document

How to Operate a Portable Fire Extinguisher

The Occupational Health and Safety Administration (OSHA) requires employers to provide portable fire extinguishers in the workplace. This document illustrates the parts of a fire extinguisher and provides instructions for operating the extinguisher safely and effectively using the P.A.S.S. method: Pull, Aim, Squeeze, and Sweep.

WARNING: At the first sign of fire, sound the alarm and call the fire department. Before approaching the fire, identify a safe evacuation path. **Never** allow the fire, heat, or smoke to come between you and your evacuation path. **If you have the slightest doubt about your ability to fight a fire...** EVACUATE **IMMEDIATELY!**

Parts of a Fire Extinguisher

Figure 1 illustrates the parts of a portable fire extinguisher. When the extinguisher handle is compressed, an inner canister of high-pressure gas forces the extinguishing agent from the main cylinder through a siphon and out the nozzle.

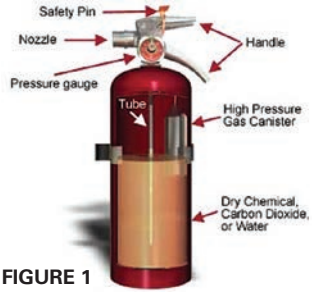


FIGURE 1

Using a Fire Extinguisher with the P.A.S.S. Method

1. **PULL** Pull the pin. This will also break the tamper seal.
2. **AIM** Aim low, pointing the extinguisher nozzle (or its horn or hose) at the base of the fire.
3. **SQUEEZE** Squeeze the handle to release the extinguishing agent.
4. **SWEEP** Sweep from side to side at the base of the fire until it appears to be out. Watch the area. If the fire reignites, repeat steps 2–4.

FIGURE 2

Introduction provides appropriate level of detail for first-time users

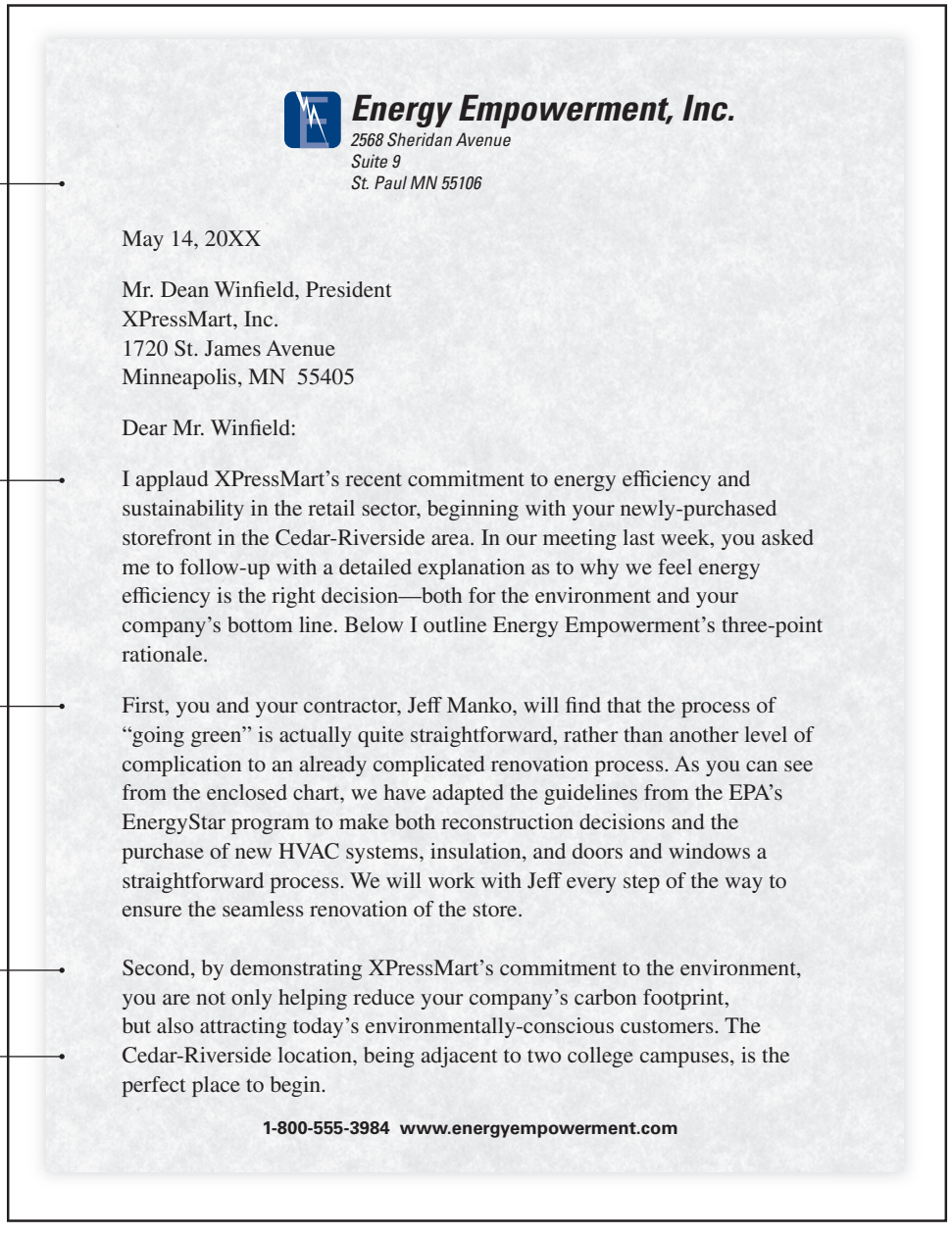
A prominent warning box alerts users before they take action

Clearly labeled illustration helps readers understand the product

Numbered steps and a complementary illustration make the instructions easy to navigate and use

SOURCE: Text and figures from the U.S. Occupational Safety and Health Administration <www.osha.gov>.

Figure 1.5 A persuasive document



Energy Empowerment, Inc.
2568 Sheridan Avenue
Suite 9
St. Paul MN 55106

May 14, 20XX

Mr. Dean Winfield, President
XPressMart, Inc.
1720 St. James Avenue
Minneapolis, MN 55405

Dear Mr. Winfield:

I applaud XPressMart's recent commitment to energy efficiency and sustainability in the retail sector, beginning with your newly-purchased storefront in the Cedar-Riverside area. In our meeting last week, you asked me to follow-up with a detailed explanation as to why we feel energy efficiency is the right decision—both for the environment and your company's bottom line. Below I outline Energy Empowerment's three-point rationale.

First, you and your contractor, Jeff Manko, will find that the process of "going green" is actually quite straightforward, rather than another level of complication to an already complicated renovation process. As you can see from the enclosed chart, we have adapted the guidelines from the EPA's EnergyStar program to make both reconstruction decisions and the purchase of new HVAC systems, insulation, and doors and windows a straightforward process. We will work with Jeff every step of the way to ensure the seamless renovation of the store.

Second, by demonstrating XPressMart's commitment to the environment, you are not only helping reduce your company's carbon footprint, but also attracting today's environmentally-conscious customers. The Cedar-Riverside location, being adjacent to two college campuses, is the perfect place to begin.

1-800-555-3984 www.energyempowerment.com

A nicely designed letterhead creates an effective, professional visual appeal

The opening paragraph is written clearly and in a direct but polite manner

Each item in the writer's list of reasons starts out with "first," "second," and "third," making the document easy to navigate

The writer backs up the first reason with evidence

The writer backs up the second reason with an appeal to shared values and goals

Figure 1.5 (Continued)

Dean Winfield, May 14, 20XX, page 2

Currently the storefront rates only a 42 on EnergyStar's performance scale. By improving that rating to 75 or above, this location will qualify for an EnergyStar display sticker, which, according to the EPA's Annual Report last year, increases retails sales in urban areas. Between the EnergyStar rating and your focus on sustainable products, expect to attract the interest of all residents of this forward-thinking community.

Finally, and perhaps most importantly, rest assured that the costs you put into reconstruction, systems, and other materials will pay for themselves in less than two years. Jeff and I have assembled a preliminary proposal itemizing costs, to which I will add my estimates regarding cost recuperation. However, know that in Energy Empowerment's 12-year history, every store and office renovation project has paid for itself remarkably quickly. As a recent example, consider our recent small office renovation in Columbia Heights, which recouped its costs in only
14 months.

If I can answer any further questions, please do not hesitate to email me at rgarrido@esi.com or call me (extension 646). Again, we applaud your commitment to the environment and look forward to working with you and Jeff.

Best regards,

Rosemary Garrido

Rosemary Garrido
Executive Manager

cc: Jeff Manko, Manko Construction
Encl. Energy Star's performance chart

The writer provides statistics to reinforce her point

The writer closes with the most important reason and backs it up with an appeal to a common financial goal

The writer closes in a friendly manner but retains a persuasive tone

Common Types of Technical Documents

1.4 Recognize typical technical documents.

The variety of typical technical documents

Many of you probably encounter the following types of documents routinely, either through work or school. You may also be asked to produce such documents for a class, an internship, or your job.

- **Memos.** Organizations use memos as the primary means of internal written communication. Unlike a conversation, a memo leaves a record for future reference. An employee might write a memo to a manager requesting a pay raise; a team of students might write a memo to an instructor explaining their progress on a term project; or an office manager might write a memo to company employees to outline the new vacation policy. Most memos are sent out via email (either as an attachment or as a stand-alone email message).
- **Email.** Email is the main way people communicate in today's workplace. Email is used widely to communicate with clients, customers, suppliers, and associates worldwide. Email messages are sometimes written more informally than paper memos or letters, but in the workplace, most writers recognize that email must maintain a similar level of professionalism to other formats.
- **Letters.** Letters, especially on company letterhead, offer a more formal way to communicate than email or memos. As a student, you might write a letter to request research data or to apply for a summer internship. At work, you might use a letter format to persuade a client to invest in a new technology or to explain the delay in a construction project.
- **Instructions.** Instructions explain the steps or course of action for completing a specific task such as how to use a fire extinguisher. Instructions come in various formats: online instructions may be accessible from the help menu of an app; brief instructions may be written on single-page reference cards; longer instructions may be part of a more comprehensive user manual.
- **Procedures.** Procedures are similar to instructions in that they explain how to perform a task step by step; however, procedures are different in that they usually deal with matters of company or organizational policy. Many companies maintain standard operating procedures (SOPs) for tasks such as how to test soil samples or how to access corporate databases.
- **Manuals.** Almost every technology product or service comes with a manual. Manuals may include instructions on how to assemble, set up, and use a product, but they also include background information, such as technical specifications or lists of materials. Most people have used manuals to perform tasks such as connecting the components of your sound system or setting up the voice mail on your office phone system. Most manuals are available in hard copy and for digital download.

- **Brochures.** To market goods or services, companies produce brochures. Brochures from professional organizations such as the American Medical Association may define various medical conditions, explain the causes, and describe available treatments. Many government agencies create brochures to help with issues such as how to obtain student loans or how to start a small business.
- **Proposals.** Proposals offer solutions to problems and make specific recommendations for how to implement those solutions. A proposal's purpose is usually to persuade readers to improve conditions, accept a service or product, or otherwise support a plan of action. Proposals are often written in response to calls for proposals (CFPs) or requests for proposals (RFPs). For example, a nonprofit child-care facility may seek safer playground equipment, or a pharmaceutical company may wish to develop a new online education program for its employees. These organizations would issue RFPs, and each interested vendor would prepare a proposal that examines the problem, presents a solution, and defines the process and associated fees.
- **Reports.** Reports, both short and long, are generally based on the study of a specific problem or issue. Some reports are strictly informative ("Why Smartphone Batteries Can Explode"); other reports recommend solutions to urgent problems ("Recommended Security Measures for Airline Safety"); and still others have an overtly persuasive goal, advocating a particular course of action ("Why Voters Should Reject the Nuclear Waste Storage Facility Proposed for Our County").

Technical Communication is Global, Collaborative, and Digital

1.5 Understand the global, collaborative, and digital nature of technical communication.

In the workplace, the documents we create have global implications, are typically written not by one individual but in teams, and are created using digital technologies and distributed electronically. These concepts are described here and apply across all chapters and assignments in this book.

Technical Communication is Global

Why global issues are important in today's workplace

Employees who work across different continents, countries, and cultures must pay special attention to various customs and values. Key to this practice is the idea of "face saving." No one wants to be embarrassed in public, have his or her traditions or values criticized, or be treated with disrespect. (All these situations represent what is sometimes called a loss of "face.") But people in different cultures have different views about what is embarrassing or insulting. For example, in some cultures a "tell it like it is" approach is considered rude, while in others body language such as leaning back in your chair and crossing your arms signals disrespect.

Do your research on international business culture

If you are working on a team project and the team spans different countries and cultures, do some research to learn about your team members, to appreciate their frame of reference, and to establish common ground. You may find, for example, that your team members in another country value a slower, more patient approach or put a value on oral communication (by phone or video conference) rather than written communication at certain stages of the project.

Remember that any document may be transmitted globally

Any document can reach across the globe. For example, the instructions you write for a new cell phone may well end up on a Web site, where they will be used by customers worldwide. Some international readers of your instructions may be offended by commands in strongly worded imperative forms, such as "STOP: Do not insert the storage card until you reach Step 3." Or they may be baffled by icons and other visuals that have no meaning in their culture.

Documents may originate in English but then be translated into many other languages. In these cases, writers must be careful to use English that is easy to translate. Idioms, humor, and analogies are often difficult for automated as well as human translators, and so these items should as a rule be avoided when writing technical documents

For more advice on global communication, see the following Strategies.

Strategies

for Global Technical Communication

- **Learn as much as possible about the culture and background of your team members or customers.** Search online for information from credible sources that can help you understand the communication norms for the countries or cultures with which you will be working.
- **Be respectful and considerate.** Do nothing that will cause anyone to feel embarrassed in front of the group.
- **Avoid the use of humor, slang, and idioms.** These items are culturally specific, do not translate well, and could be misunderstood by nonnative audiences.
- **Avoid stereotyping.** Violating a person's cultural frame of reference is offensive, but so is reducing individual complexity to a laundry list of cultural stereotypes. Any generalization about a culture is just that—a generalization. People are still individuals and should be respected as such.

Technical Communication is Collaborative

Teamwork is a frequent part of technical communication

Complex technical documents (especially long reports, proposals, and manuals) are rarely created by one person working alone. In the workplace, such documents are typically produced by teams of writers, engineers, scientists, graphic artists, editors, reviewers, marketing personnel, lawyers, and other professionals.

Characteristics of effective in-person and virtual teams

Teams can work in person or virtually. Usually, though, teamwork involves a combination of face-to-face meetings and technology-facilitated exchanges, such as those via the phone, email, or the Web. Whether the team shares information in person

or virtually, members have to find ways of openly sharing their ideas, expressing their views persuasively, giving and accepting constructive criticism, and reaching agreement with others who hold different views. Teamwork is successful only when there is strong cooperation, a recognized team structure, and clear communication. The following Strategies explain how to work on a team project systematically.

Strategies

for Organizing a Team Project

- **Appoint a group manager.** The manager assigns tasks, enforces deadlines, conducts meetings, consults with supervisors, and "runs the show."
- **Define a clear and definite goal.** Compose a purpose statement that spells out the project's goal and the plan for achieving the goal. Be sure each team member understands the goal.
- **Identify the type of document required.** Is this a report, a proposal, a manual, or a brochure? Are visuals and supplements (abstract, appendices, and so on) needed? Will the document be made available online, in print, or both?
- **Divide the tasks.** Who will be responsible for which parts of the document or which phases of the project? Who is best at doing what (writing, editing, layout and graphics, oral presentation)? Which tasks will be done individually and which collectively? Spell out—in writing—clear expectations for each team member. Also keep in mind that the final version should display a consistent style throughout, as if written by one person only.
- **Establish a timetable.** A timetable will help the team visualize the whole project, each part of the project, and completion dates for each phase.
- **Decide on a meeting schedule.** How often, where, and for how long will the group meet?
- **Establish a procedure for responding to each other's work.** Will reviewing and editing be done in writing, face to face, as a group, one on one, or online?
- **Develop a file-naming system for various drafts.** Be careful about saving documents. It's too easy to save over a previous version and lose something important. Consider using a document sharing system such as Google drive or Dropbox.
- **Establish procedures for dealing with interpersonal problems.** How will disputes be discussed and resolved (by vote, by the manager, or by other means)? How will irrelevant discussion be curtailed?
- **Select a group decision-making style.** Will decisions be made by the group manager alone, by group input, or by majority vote?
- **Decide how to evaluate each member's contribution.** Will the manager assess each member's performance and in turn be evaluated by each member? Will members evaluate each other? What are the criteria?
- **Prepare a project planning form.** Figure 1.6 shows a sample form you can adapt for your team.
- **Submit regular progress reports.** These reports (see page 265) track activities, problems, and rate of progress.

Running Successful Meetings

Face-to-face meetings are either informational or decision based

Despite the many digital tools available for collaboration (see pages 20–21), if possible you should start your project with an in-person meeting for the entire team. Meetings are usually scheduled for one of two purposes: (1) to convey or exchange

Figure 1.6 Project planning form

Project Planning Form

Project title:
Audience:
Project manager:
Team members:
Purpose of the project:
Type of document required:

Specific Assignments	**Due Dates**
Research:	Research due:
Planning:	Plan and outline due:
Drafting:	First draft due:
Revising:	Reviews due:
Preparing final document:	Revision due:
Presenting oral briefing:	Progress report(s) due:
	Final document due:

Work Schedule

Team meetings:	*Date*	*Place*	*Time*	*Note-taker*
#1				
#2				
#3				
etc.				
Mtgs. w/instructor				
#1				
#2				
etc.				

Miscellaneous

How will disputes and grievances be resolved?
How will performances be evaluated?
Other matters (online searches, email routing, online conferences, etc.)?

information or (2) to make decisions. Informational meetings tend to run smoothly because there is less cause for disagreement. But decision-based meetings often fail to reach clear resolution because the meeting leader fails to take charge. Running a meeting doesn't mean imposing one's views or stifling opposing views, but it does mean keeping the discussion moving and centered on the issue, as explained in the following Strategies.

Strategies

for Running a Meeting

- **Set an agenda.** Distribute copies of the agenda to participants beforehand: "Our 10 A.M. Monday meeting will cover the following items: . . ." Spell out each item, set a strict time limit for discussion of each item, and stick to this plan. Use Google drive or a similar document sharing app so everyone has access to the latest version of the agenda.
- **Ask each person to prepare as needed.** A meeting works best when each participant makes a specific contribution. Appoint someone to take notes or minutes, and appoint others to other roles, such as doing background research on a particular topic that will be discussed.
- **Appoint a different "observer" for each meeting.** This person's job is to take notes on what aspects of the meeting did or did not work well.
- **Begin by summarizing the minutes of the last meeting.** This process will ensure that the conversation in this meeting moves beyond what was concluded previously. (For preparing meeting minutes, see pages 272–273.)
- **Give all members a chance to speak.** Don't allow anyone to monopolize. At the same time, encourage quiet members to contribute. If someone is connecting via video or phone, reach out to that person to be sure they are still connected to the meeting.
- **Stick to the issue.** When the conversation strays, politely nudge members back on track.
- **Keep things moving.** Don't get hung up on a single issue. Work toward a consensus by highlighting points of agreement and pushing for a resolution.
- **Observe, guide, and listen.** As the meeting leader, don't lecture or dictate. Instead, take charge by steering the group discussion.
- **Summarize major points before calling for a vote.** Paraphrase what has been discussed to be sure everyone understands the major points and so that clarifications or corrections can be made before the vote.
- **End the meeting on schedule.** This is not a hard-and-fast rule. If you feel the issue is about to be resolved at the meeting's end time, continue. Understand, however, that some participants may need to leave for other appointments.

Identifying and Managing Group Conflicts

Even when all team members have good working relationships and positive attitudes, conflicts still can arise, usually because of the following factors:

Differences that may lead to group conflict

- **Interpersonal styles.** People who work on teams often clash because of differences in a range of areas, including personality, working style, cultural norms (see page 18), or ability to take criticism. Some might disagree about exactly what or how much the group should accomplish, who should do what, or who should have the final say. Some might feel intimidated or hesitant to speak out. Certain people may be comfortable with a "just the facts" approach, while others on the team may interpret this style for rudeness.
- **Digital communication.** When we communicate via text or email, ideas can be easily misunderstood. The lack of vocal inflection and facial features (such as a smile or frown) can turn what you thought was a humorous comment into a

serious insult. Also, because we write more quickly in digital settings, we may not proofread carefully and thus might leave out important information, causing the team to become confused and concerned.

- **Cultural differences.** According to one expert, some cultures value intuition and ambiguity more than hard evidence or data, or they prioritize politeness and personal relationships more than business relationships. Cultures also differ in their perceptions of time. Some are "all business" and like to get directly to the point; others take as long as they feel is needed to weigh the issues and come to carefully considered conclusions (Victor, 233). Finally, cultures differ in their accepted methods of communication, varying in their willingness to express disagreement, question or be questioned, leave things unstated, or use nonverbal language (Victor, 206).

When group conflicts do arise, deal with them directly and openly by using the following Strategies.

Strategies

for Managing Team Conflicts

- **Listen actively.** Perhaps the most constructive way to manage team conflict is to avoid it by *really* listening to others. Listening actively means focusing your attention when people speak, keeping your mind open to what they say, letting them finish before you interject, using direct eye contact and body language that communicates interest, and asking for clarification when genuinely needed. In short, observe the 90/10 rule: listen 90 percent of the time, and speak only 10 percent of the time. As President Calvin Coolidge once said, "Nobody ever listened himself out of a job."
- **Avoid gender and cultural bias.** Respect the fact that men and women must be treated equally as team members, and understand that assertiveness and reserve are qualities of both genders. Also, do not assume that one culture's approach to business, time, or communication is better than that of another.
- **Use technology wisely.** Email is the worst way to resolve a conflict. Find a time for the team to meet in person, or use a video chat or a group phone call.
- **Give everyone a chance to be heard.** Encourage quieter members to speak up, and curtail dominating members from speaking excessively.
- **Take everyone's feelings and opinions seriously.** Don't play favorites. Every team member has something valid to contribute.
- **Don't be afraid to disagree.** Politely let other team members know if you don't agree with their ideas or opinions. Your point of view is as important as anyone else's.
- **Offer and accept constructive criticism.** Criticism focused on helping reach the team's goal, as opposed to seeming like a personal attack, creates an atmosphere of open communication.
- **Find points of agreement with others who hold different views.** Although you might not agree with everyone in the group, find those points on which you do agree.
- **When the group makes a decision, support it fully.** At some point, decisions must be made. If you are outvoted, accept the fact that a vote is binding and that you represent the group as a whole, even if you disagree with the final decision.

Reviewing and Editing the Work of Others

The process of reviewing a document

Documents produced in teams must be reviewed and edited extensively. *Reviewing* means evaluating how well a document connects with its audience and meets its purpose. When reviewing, you explain to the writer how you respond as a reader; you point out what works or doesn't work. This commentary helps the writer think about ways of revising. Reviewers typically examine a document to make sure it includes these features:

Qualities reviewers look for

- accurate, appropriate, useful, and legal content
- material organized for the reader's understanding
- clear, easy-to-read, and engaging style
- effective visuals and page design

The process of editing a document

Editing means polishing a document by making it more precise and readable at the sentence and word level. Editing may happen simultaneously with reviewing, but usually it comes after a document has been reviewed and revised—when the more global considerations of content, organization, style, and design have already been resolved and the editor can focus on more particular details. Editors typically suggest improvements such as these:

Types of "fixing" that editors do

- rephrasing or reorganizing sentences
- clarifying a topic sentence
- choosing a better word or phrase
- correcting spelling, usage, punctuation, and so on

For a team project, at work or at school, you can each take turns reviewing and editing drafts of the document by using the following Strategies.

Strategies

for Peer Review and Editing

- **Read the entire piece at least twice before you comment.** Develop a clear sense of the document's purpose and audience. Try to visualize the document as a whole before you evaluate specific parts.
- **Focus first on the big picture.** Begin with the document's content and organization. Is the document appropriate for its audience and purpose? Is the supporting material relevant and convincing? Is the discussion easy to follow? Does each paragraph do its job? Do all the visuals serve a distinct and appropriate purpose? Is the design appropriate for this document?
- **Be honest but diplomatic.** Say what you think, but don't merely offer negative comments. Begin with something positive before moving to suggested improvements. Maintain a supportive tone.

- **Explain why something doesn't work.** Instead of "this paragraph is confusing," say "because this paragraph lacks a clear topic sentence, I had trouble discovering the main idea." Instead of "I don't like this visual," say "this visual doesn't work, not only because it is a little blurry, but also because it doesn't add to the discussion."
- **Make specific recommendations for improvements.** Write out suggestions in enough detail for the writer to know what to do. Don't just say "I think you should add a chart here." Instead offer "I think you should add a new chart here to show all the numerical information you've provided in an easy-to-understand visual way."
- **Don't expect everyone to agree with your suggestions.** Even professional editors can disagree. Offer your best advice but don't dictate—others may have better suggestions. If different readers offer conflicting opinions of what needs to be revised, seek your team leader's opinion or take it to a vote.
- **Understand the acceptable limits of editing.** Don't simply rewrite an entire document in your own words. Although changes can range from making a few suggestions and additions to closely editing every paragraph, always preserve the author's original vision and style.
- **Focus next on the particulars.** Once the document has been reviewed and revised for content, organization, style, and design, refine the sentences and word choice—and proofread several times.

Technical Communication is Digital

Digital technology helps teams collaborate

In today's workplace, teams are distributed across different locations, working hours, time zones, and countries. Even within the same local team, some people may work from home while others work mainly from the office. For a school project, you and other team members will probably have very different schedules. For these reasons, technical communication is heavily dependent on digital collaboration. For instance, a draft document might be created in Word and circulated via email. Or, team members may collaborate using a shared drive, such as Google Drive or Microsoft OneDrive. Some organizations use email to send attachments, but others prefer to make the document available on the company's internal server (intranet).

Digital technology combines text, visuals, and sound

Along with the use of digital technologies for collaboration, technical communication also involves the use of digital apps that combine words, images, and sounds effectively. Some documents, such as formal letters, rely heavily or solely on words; other documents, such as instructions, blend words with pictures or diagrams. Technical training documents, such as certain types of procedures, may contain embedded video links.

The following technologies are used regularly in technical communication:

Virtual collaboration technologies

- **Teleconferencing.** The oldest form of virtual collaboration—still very much in use—occurs when multiple callers hold a conference via the telephone.
- **Email.** The most popular app for workplace communication, email is used for sending attachments and keeping track of ideas and discussions among team members and individuals.
- **Instant messaging (IM).** IM is a fast and easy way to hold a real-time conversation among multiple people, as long as they are all logged in.
- **Project management software.** Most large organizations use dedicated software, such as Microsoft Project, to manage complex team projects.

- **Editing software.** Editing tools allow multiple users to see each other's edits (which are tagged by the user's initials) and to accept or reject those changes. An example is Microsoft Word's "track changes" feature.
- **Digital whiteboards.** These tools provide a large screen that allows participants to write, sketch, and erase from their own computers in real time.
- **Web conferencing.** A password-protected Web site provides the medium for this more contemporary version of teleconferencing.
- **Blogs.** Blogs allow people to create postings or add comments to previous postings as a way for teams to share and refine ideas.
- **Intranets.** Intranets are sites set up for internal company use only. Readers can access files, documents, and other content.
- **Wikis.** Wikis can be set up to allow access only to those directly involved in the project. When a team member edits a document, a new version is created and old versions saved.

For more on digital communication, see Chapters 18–21.

Checklist

for Effective Technical Communication

- ❑ Does my document focus on the reader, not the writer?
- ❑ Is the document efficient and accessible?
- ❑ Is the document clear and easy to understand?
- ❑ Does the document give readers what they need?
- ❑ Have I used the appropriate media to convey my message?
- ❑ Have I created the document to address a global audience as needed?
- ❑ Am I able to work as part of a team?
- ❑ Is the document sufficiently persuasive to get the response I want?
- ❑ Is the document based on careful research?
- ❑ Does the document achieve its primary purpose (i.e., inform, instruct, persuade)—or a combination of purposes?

Global Considerations

- ❑ Do I understand the communication customs of the international audience for my document?
- ❑ Is my writing clear and direct so that it is easy to translate?
- ❑ Have I avoided idioms, humor, and slang?
- ❑ Have I avoided stereotyping different cultures and groups of people?
- ❑ Is the communication about this project respectful to everyone?

Collaborative Considerations

- ❑ Has our team appointed a team manager?
- ❑ Does the team agree on the type of document required?

- ❑ Do we have a plan for how to divide the tasks?
- ❑ Have we established a timetable and decided on a meeting schedule?
- ❑ Do we have an agenda for our first meeting?
- ❑ Are we using the project planning form (page 16) to help us get organized?

Digital Considerations

- ❑ Have we decided which apps we will use for our collaboration (Google Drive; Microsoft OneDrive; other)?
- ❑ Do we know which digital features our document requires (text only; text plus images; video) and how it will be distributed (online as a downloadable PDF; as a Word file stored on the company Intranet)?

Applications

General Applications

1. Write an email to your boss, requesting that the company pay your tuition for this class. Explain how the class will help you be more effective on the job. Proofread your email: Is it too long or too short? Is the tone professional or demanding? Did you write from your perspective or the reader's (your boss)?
2. Find an example of an informational document or a set of instructions or a persuasive letter. Identify in your document the features of effective technical writing discussed in this chapter. Discuss your findings in class.

Team Applications

1. Class members will work together often this semester. So that everyone becomes acquainted, your task is to introduce to the class the person seated next to you. (That person, in turn, will introduce you.) Follow this procedure:
   - **a.** Exchange with your neighbor whatever personal information you think the class needs: background, major, career plans, communication needs of your intended profession, and so on. Each person gets five minutes to tell her or his story.
   - **b.** Take careful notes; ask questions if you need to.
   - **c.** Take your notes home and select only what you think the class will find useful.
   - **d.** Prepare a one-page memo telling your classmates who this person is. (See page 172 for memo elements and format.)
   - **e.** Ask your neighbor to review the memo for accuracy; revise as needed.
   - **f.** Present the class with a two-minute oral paraphrase of your memo and submit a copy of the memo to your instructor.
2. Write a short memo to your instructor describing the role of teams in a company, organization, or campus group where you have worked or volunteered. Your memo should address questions such as what type of projects your team worked on, how the teams were organized, what worked, and what did not work.

Global Application

Technical documents are often read by international audiences. Some companies handle this issue by translating their documentation into multiple languages; other companies use a combination of words and pictures or just

pictures. Find an example of technical communication written for an international audience. You might look at the instructions that came with your computer, cell phone, unassembled bookshelves, or other products (or look online for similar instructions). Write a short memo explaining what techniques the writer used to make the information useful for people who may not speak English or who speak English as a second language.

Digital and Social Media Application

Use the Internet to research examples of technical communication that are common in your profession or major. For example, if you are studying electrical engineering, what are the typical types of reports you might need to write when you get a job? See if you can find a sample report or other document that relates to your major. Using the Checklist for Effective Technical Communication on pages 21–22, evaluate whether this document appears to be effective. Write a memo to your instructor explaining your findings. Include the Web address or other information about how to locate the document online.

Chapter 2

The Research Process in Technical Communication

Learning Objectives

2.1 Apply critical thinking to every stage of the research process.

2.2 Understand the difference between primary and secondary research.

2.3 Locate, identify, and assess the reliability and credibility of secondary sources.

2.4 Consult primary sources via unsolicited inquiries, informational interviews, surveys, and observations.

Chapter Outline

All technical communication requires some degree of research, even if that research merely entails checking a fact or consulting a colleague before writing a memo, letter, or email. This chapter explains how to conduct more complex research for such technical documents as long reports and proposals. As you read, consider how research in technical communication often differs from research conducted in an academic setting.

Thinking Critically About Research

2.1 Apply critical thinking to every stage of the research process.

Research is a vital part of technical communication

Most major decisions in the workplace are based on careful research, often with the findings recorded in a written report, in a long memo, in some combination of documents typically available online (as a Web site or as a PDF document), in hard copy, or both. The types of research you will perform as a technical communicator depend largely on your workplace assignment.

Not all findings will be of equal value. For instance, if you really want to know how well the latest invention in robotic surgery works, you need to check with sources other than the inventor (from whom you could expect an overly optimistic or insufficiently critical assessment). Likewise, if you only consult material published more than 10 years ago and don't consult any updated sources, you are not likely to get a current and balanced view. Further, if you interpret your findings inaccurately—say, by ignoring a study that contradicts your viewpoint or claim—your research will be invalid.

Why critical thinking is essential in research

Whether you work with your own findings or the findings of other researchers, you need to decide if the information is reliable. Then you need to decide what your information means. *Critical thinking* means that you test the quality of your information and the accuracy of your interpretations. Instead of accepting information at face value, you examine, evaluate, verify, analyze, and weigh alternatives during every stage of your research. You use critical thinking to examine your evidence and your reasoning to discover new connections and new possibilities and to test the soundness of your conclusions. Critical thinking is especially important when evaluating content from online sources (to be discussed later in this chapter). The following Strategies provide specific guidelines.

Strategies

for Thinking Critically about Research

- **Ask the right questions.** To get the right answers, start by asking the right questions. Instead of researching an overly general topic that will lead to an enormous variety of information, such as "genetically modified foods," ask a specific, narrowed question, such as "Are all genetically modified foods harmful to human health?"
- **Explore a balance of views.** Consider your research topic from a variety of angles. Don't just consult one expert because experts may disagree. Instead, find out what multiple experts say, and examine the points on which the experts agree and disagree.
- **Explore your topic in sufficient depth.** Different sources of information represent different levels of detail and dependability. At the surface layer is information that is widely available and designed for everyday readers, such as newspapers and news programming (on TV and online), most Twitter feeds, Facebook pages, and many Web sites. This surface information may be useful and valid, but you should also go further and explore deeper levels, such as trade and business publications, online resources intended for experts, and specialized literature (peer-reviewed journals as well as credible Web sites from professional associations and government sources).
- **Evaluate your sources.** The information you find may be incomplete or misleading. While you can't always verify that a source is trustworthy, you can weed out unreliable sources by looking for common ground among sources, by determining if any of these sources are driven by an agenda, and by checking the source's credentials. Increasingly, most online content will at first glance look and sound credible, but be sure to do more digging on the background of the organization that sponsors the content, the date of publication, and any reviews or commentary on this source and its underlying approach to facts and information.
- **Interpret your findings objectively.** Examine what you've uncovered from multiple angles. Do your findings support only one viewpoint, or are there several ways to interpret these findings? Remember that although our social media feeds often make it appear that there are only two sides to any issue ("us and them," for example), most topics, especially technical ones, can be viewed from more than two perspectives. If your research yields indefinite findings, don't try to force a definite conclusion. A wrong conclusion is worse than an indefinite one.

Primary Versus Secondary Sources

2.2 Understand the difference between primary and secondary research.

How primary and secondary research differ

Primary research means getting information directly from the source by conducting interviews and surveys and by observing people, events, or processes in action. *Secondary research* means getting information secondhand by reading what other researchers have compiled in books and articles (in print or online or both). Most online information would be considered a secondary source. Online information requires increased scrutiny on the researcher's part; because almost anyone can create a Web page or online document that looks credible, researchers need to evaluate the source carefully. For instance, a Web site created by a high school student might be interesting but not overly reliable, whereas a site that is the equivalent of a traditional secondary source (research index, well-established news source, peer-reviewed journal, scientific or technical database or wiki) will be more reliable for your research.

Why you should combine primary and secondary research

Whenever possible, combine primary and secondary research. Typically, you would start by using secondary sources because they are readily available and can help you get a full background understanding of your topic. However, don't neglect to add your own findings to existing ones by doing primary research. Working with primary sources can help you expand on what other people have already learned and add considerable credibility to your work. For instance, assume your boss asks you to write a report about how successfully your company's new product is being received in the marketplace: you might consult sales reports and social media (Yelp, Facebook) reviews of the product (secondary research), but you might also survey actual product users and interview some of them individually (primary research).

Exploring Secondary Sources

2.3 Locate, identify, and assess the reliability and credibility of secondary sources.

Types of secondary sources

Research assignments begin more effectively when you first uncover and sort through what is already known about your topic before attempting to add to that knowledge yourself. To locate existing research and information on your topic, start with secondary sources such as books; journal, magazine and news media articles; government publications and other public records; professionally conducted surveys and interviews; blogs and wikis; and Web sites. These sources may be available online, in print, or both. Make sure the sources are credible and reliable (see the Strategies box on pages 32–33).

How to Locate Secondary Sources

Secondary sources such as the ones described above can be located by using various search tools. The two most common ways of locating secondary sources are searches done through a library and searches done using Google.

Locate secondary sources by using the library

- **Library searches.** Public libraries as well as college and university libraries offer a range of search tools you can use to find secondary sources related to your topic. It can be helpful to start by meeting with a librarian to get an overview of how to use the library's online public access catalog (OPAC) and to get some help in narrowing your search. Library searches will yield books, articles, and other materials available in that library as well as from other libraries via interlibrary loan. You can access the library's OPAC from a computer located at the library or, if the library is set up for remote access, via the Web.

Locate secondary sources by using Google

- **Google searches.** Google searches through millions of pages of content, including Web pages, government documents, online news sites, blogs, wikis, Twitter feeds, social media pages, and more. Google also has a large collection of digitized books (Google Books) and a specialized search for academic articles (Google Scholar). Google is a good way to start your search, but be careful to narrow your findings to credible, reliable sources and then to use these sources as a basis for more focused research (such as library research for books and peer reviewed reports or articles).

Types of Secondary Sources

GENERAL COMMERCIAL, ORGANIZATIONAL, AND ACADEMIC WEB SITES. Google and other search engines locate a wide range of material, most of which will be commercial (.com), organizational (.org), and academic (.edu) Web sites. If the content within a commercial site looks directly relevant to your search, consider using it, but think critically about the information presented. Does the fact that the company is likely trying to sell you something affect the content? Be careful also of organizational Web sites that may be well researched but have a particular social or political agenda. Are the opinions expressed by the organization designed to sway you to their agenda? Academic Web sites tend to be credible. However, some academics may also have biases, so never stop thinking critically about what you find on the Web.

GOVERNMENT WEB SITES. Most government organizations (local, state, and federal) have a Web site and online access to research and reports. Examples include the Food and Drug Administration's Web site, which offers information on food recalls, clinical drug trials, and countless related items. State and local sites provide information on auto licenses, state tax laws, and local property and land issues. From some of these sites you can link to specific government-sponsored research projects. Be sure to check the dates of reports or data you locate on a government Web site, and find out how often the site is updated.

ONLINE NEWS OUTLETS AND MAGAZINES. Most major news organizations offer online versions of their broadcast and print publications. Examples include online versions of newspapers such as the *New York Times* and the *Wall Street Journal*, CNN, and National Public Radio. Major magazines, such as *Time, Newsweek, Forbes*, and other more specialized magazines also offer Web versions. Some news is available online only, as in the online magazines *Slate* and *Salon*. To locate these publications, do a Google search on the publication name.

Make sure you understand how the publication obtains and reviews information. Is it a major news site with careful editorial scrutiny and wide respect, or is it a less reputable site that looks great on the surface but is run by a special-interest group that takes wide liberty with the facts?

BLOGS. *Blogs* are used by journalists, commentators, and others to post ideas and opinions about a wide range of topics. Postings and replies are displayed in reverse chronological order, with the newest topic first. Older posts can usually be viewed via an index or link. Links chosen by the owner also supply ways to connect to other blogs on the same or similar topics. Blogs are great for finding current information from individuals, companies, and nonprofit organizations that are knowledgeable about particular topics. You will find more blogs than you can use, so you need to evaluate the information on individual blogs carefully and decide which ones are most relevant and reliable.

Keep in mind that blogs nearly always represent the particular views of the blog author (whether an individual, company, organization, or academic institution) and of those who reply to the blog postings. Check any information you find on a blog against a professionally edited or peer-reviewed source.

WIKIS. *Wikis* are sites that are used to collect information and keep this information updated. Most wikis allow readers to add to or edit content. The most popular wiki is *Wikipedia*; the theory behind Wikipedia is that if the information from one posting is wrong, someone else will correct it, and over time the site will reach a high level of accuracy and reliability. Keep in mind, however, that many wikis have no oversight. Aside from a few people who determine whether to delete articles based on requests from readers, wiki content may not be checked by editors for accuracy. Always confirm information you find on a wiki against several other peer-reviewed or traditional sources. See Chapter 19 for more on blogs and wikis.

ONLINE FORUMS AND EMAIL LISTS. For almost any topic imaginable, you will find a forum or discussion group, either on the Web site for the company or organization or on sites such as Reddit, Google groups, Yahoo groups, or even some Facebook pages. Large technology companies such as Apple and Microsoft offer Web-based discussion forums to help customers solve technical problems; health-related sites such as WebMD offer forums on specific illnesses and conditions. Email lists allow you to subscribe to a discussion related to a specific topic and receive regular emails in your inbox. As with blogs, you will find more forums and email lists than you could ever possibly use, so choose with care, especially when reviewing forums that are not moderated or subject to other editorial scrutiny.

DIGITAL LIBRARIES AND COLLECTIONS. Entirely searchable online, digital libraries and collections can be excellent research tools. Aside from the online sites sponsored by most public libraries, one notable digital library is the Internet Public Library, a partnership between seven major research universities. HathiTrust, also a partnership between several major research libraries, offers millions of digitized books and other documents. The Internet Archive is another site offering digitized and archived materials, including its "WayBackMachine," which searches through all current

and past versions of Web pages and other online materials. Balance your use of digital libraries with your own college or university or public library to be sure your search is yielding all possible findings related to your topic.

PERIODICAL DATABASES. Almost all libraries have their own Web site where, if you are a library cardholder or a student, you can access a wide variety of periodical databases. Periodical databases are electronic collections of articles from newspapers, magazines, journals, and other publications. You can search these databases by title, author, keyword, and so on.

When searching a periodical database, narrow your search when you get too many hits or expand your search if you don't find enough relevant material. Once you have typed in your keyword(s), you will be presented with a citation page that includes some or all of the following information: author(s), title, source, subject area, abstract (a brief summary of the article), ISSN (International Standard Serial Number—an identifier for the article much like a book's ISBN), and DOI (or Digital Object Identifier—where the article can be found in digital format).

Some of the most popular general periodical databases include *InfoTrac, NewsBank, ProQuest*, and *EBSCOHost*, but there are also many specialized periodical databases in a variety of subject areas to which your library may also subscribe.

Before initiating a periodical database search, try to meet with your local reference librarian for a tour of the various databases and the instructions for searching them effectively. Also, be aware that some databases may not be accessible from school or home—you may need to visit your library in person.

HARD COPY BOOKS AND PERIODICALS. Any library will be well stocked with books as well as numerous print copy magazines, journals, and newspapers. The smaller and more general the library you visit, the less likely you are to find highly specialized print sources; the larger or more specialized the library, the more likely you are to find books by specialist publishers and periodicals that delve into more specific subject areas. Some older publications may be available on CD-ROMs and microfiche, but as time goes on, these publications continue to be digitized.

When consulting books and periodicals, be sure to check the copyright date and supplement the source with additional information from more recent sources, if necessary.

REFERENCE WORKS. Reference works are general information sources that provide background and can lead to more specific information. Reference works may be available in hard copy but increasingly these publications are also (or only) available online. Because most of these secondary sources are available only by subscription, you'll most likely need to access these at the library (although a number of the reference works mentioned here are accessible for free via the Internet Public Library or other sites, so be sure to check). Always look for the copyright date to make sure you are accessing the most current information available. The following items represent typical reference works you might access.

- **Bibliographies.** Bibliographies are lists of books or articles by subject field. To locate bibliographies in your field, begin by consulting the *Bibliographic Index Plus*, a list (by subject) of major bibliographies, which indexes more than 500,000 bibliographies worldwide. You can also consult such general bibliographies as *Books in Print* or the *Reader's Guide to Periodical Literature*. Once you have narrowed your topic, you can consult specific subject area bibliographies topics ranging from engineering to medicine to history (and more).
- **Indexes.** Book and article bibliographies may also be referred to as indexes. However, other types of indexes collect information not likely to be found in standard bibliographies, such as indexes to conference proceedings (e.g., the *Index to Scientific and Technical Proceedings*), which collect the most current information in various fields not yet published in book or periodical form; patent indexes (e.g., the *Index of Patents Issued from the United States Patent and Trademark Office* and the *World Patents Index*), which collect cutting-edge technological descriptions not yet widely available to the public; and technical report indexes (e.g., *Scientific and Technical Aerospace Reports*), which also collect current information unavailable elsewhere.
- **Encyclopedias.** Encyclopedias are alphabetically arranged collections of brief articles. Wikipedia, discussed previously, is the most popular online encyclopedia; its entries are edited by a wide range of readers, both expert and nonexpert. Other encyclopedias, such as *Encyclopedia Britannica* or the *Columbia Electronic Encyclopedia*, are subject to a more traditional editorial process and are not always available online except with a subscription. Once you've narrowed your idea, you can consult more specific subject-focused encyclopedias, such as *Encyclopedia of Nutritional Supplements* or the *Encyclopedia of Business and Finance*.
- **Dictionaries.** Dictionaries are alphabetically arranged lists of words, including definitions, pronunciations, and word origins. If you can't locate a particular word in a general dictionary (e.g., a highly specialized term or jargon specific to a certain field), consult a specialized dictionary, such as *Dictionary of Engineering* or the *Dictionary of Media and Communication Studies*. Online dictionaries vary widely in their currency and detail; most researchers prefer the *Merriam-Webster* version.
- **Handbooks.** Handbooks offer condensed facts (formulas, tables, advice, examples) about particular fields. Examples include the *Civil Engineering Handbook* and *The Electrical Engineering Handbook*.
- **Almanacs.** Almanacs are collections of factual and statistical data, usually arranged by subject area and published annually. Examples include general almanacs such as the *World Almanac and Book of Facts* or subject-specific almanacs such as *Baer's Agricultural Almanac*.
- **Directories.** Directories provide updated information about organizations, companies, people, products, services, or careers, often listing addresses and phone numbers. Examples include *The Career Guide: Dun's Employment Opportunities Directory; Hoover's Company Capsules* (for basic information); and *Hoover's Company Profiles* (for detailed information).

- **Abstracts.** Abstracts are collections of summaries of books or articles, as you might find when searching a periodical database, but collected in one place. Abstracts can save you from having to track down a journal before deciding whether to read or skip the article. Abstracts usually are titled by discipline: *Biological Abstracts*, *Computer Abstracts*, and so on. For current research, you might consult abstracts of doctoral dissertations in *Dissertation Abstracts International*.

GRAY LITERATURE. Some useful printed information may not be available at any library. This content is known as "gray literature"—content that is not formally published and not usually catalogued in the library. Examples include pamphlets and brochures (e.g., medical pamphlets or company marketing materials); unpublished government documents (available under the Freedom of Information Act, with the exception of classified documents); papers presented at professional conferences; and self-published works. You can track down gray literature by looking at the Web sites for various organizations to see if brochures or the like are accessible and downloadable. You can also contact organizations to ask if they have anything available in your subject area. For instance, you might email a professional organization asking for papers on your topic delivered at its recent annual conference. Before doing so, know your research topic well and know specifically whom to contact and what you are looking for. Keep in mind that similar to some Web sites, gray literature is often not carefully scrutinized for content by editors. Therefore, the material may not be reliable and should be backed up by information from other sources.

Strategies

for Finding Credible, Reliable Secondary Sources

- **Use more than one approach when searching.** Google is a good starting point, but as you search, continue to narrow your topic and refine your search terms. Try Google Scholar, Google Books, and Google Images. Balance these searches with focused searches using the library's tools and apps, and be sure to work with a reference or research librarian: These highly skilled professionals can help you understand what you are finding and teach you a thing or two about searching through the many, many sources you will find and determining what's credible and reliable versus what is not.
- **When searching, select keywords or search phrases that are varied and technical rather than general.** Some search terms generate more useful hits than others. In addition to "electromagnetic radiation," for example, try "electromagnetic fields," "power lines and health," or "electrical fields." Specialized terms (say, "vertigo" versus "dizziness") offer the best access to reliable sites. Still, check the source of the site and look for peer-reviewed or edited content (journal articles; reporting from credible news sites) to corroborate your findings.
- **Consider the domain type (where the site originates).** Standard domain types in the United States include .com (commercial organization), .edu (educational institution), .gov or .mil (government or military organization), .net (general usage), and .org (organization). A commercial site may be biased and thus not as credible as, say, an educational or research site. By finding and comparing information across different domains, you can begin to determine where the information is in conflict and where the information tends to agree.