INTRODUCTION

A technical description provides concrete details, precise words, and visuals to show readers what an object, mechanism, or product looks like, how it is put together, and/or how it works. Some technical descriptions detail processes instead of objects—for example, how a customer's credit card is processed online by a hotel's website. Composing technical descriptions, however, requires writers to recognize audience needs and expectations as well as pay careful attention to language use. In most cases audiences need to know answers to one or more of the following questions:

- What is it?
- What does it look like?
- What does it do?
- What is it made of?
- How does it work?
- How has it been put together?

Many professionals rely on technical descriptions to learn and perform their workplace tasks—making products, using products, fixing products, selling products, and sometimes simply understanding products.

It may seem at first glance that technical descriptions and specifications are used only for highly technical objects and processes and that technical descriptions and specifications are not particularly relevant to most everyday workplaces. It is true that not every workplace writer will compose technical descriptions and specifications on a regular basis; however, many will. In addition, it is important to note how descriptions and specifications surround so much that happens in all workplaces.

For example, in 1949 the U.S. government created the General Services Administration (GSA) as an agency to help manage and support the basic functioning of all other federal agencies. In particular, the GSA recommends and supplies products, vehicles, office space, and other services for federal agencies; and it attempts to do so in ways that minimize costs. The GSA deems itself "the federal government's premier acquisition agency" and oversees about $66 billion of spending each year. Interestingly, one of the tasks of the GSA is to develop standards for all products and services that can be purchased for use in federal agencies. Even for products such as furniture, the GSA provides detailed descriptions and specifications of all acceptable types. It is not difficult to realize that all federal agencies need things like filing cabinets; however, it is probably somewhat surprising to learn that the GSA provides a thirteen-page technical description and specification of the types of filing cabinets that are acceptable for use in federal agencies. Here is an excerpt from one section of the technical description, which focuses on two characteristics of approved filing cabinets:

> *2.5.1 Vertical dividers for drawers and shelves.* The material used in the dividers shall be of steel formed or reinforced so that the finished item will have stiffness at least equal to that of an uncoated flat sheet of steel. All exposed surfaces shall be smooth and free of burrs and rough edges. The dividers shall retain both legal and letter size documents adequately without excess overlap and shall be designed to snap securely in the drawers and shelves without the use of tools or attaching devices. When painted a color other than the color specified for the unit, they may be used provided color harmony is maintained. Each cabinet shall have two dividers per drawer or shelf.
>
> *2.5.2 Out stops and bumpers.* The cabinet drawers and shelves shall have two noise reducing out-stops (one on each side) that prevent drawers and shelves from falling out of the cabinet when they are fully extended. All stops and bumpers shall be installed in a manner to withstand a normal rebound without damage. The use of adhesive as the only method of securing the stops or the noise absorbing material is not permitted.*
>
> *Commercial item description, www.gsa.gov.

The GSA provides other technical descriptions and specifications of stools, chairs (folding style, rotary, and straight), desks, credenzas, and tables, among other types of furniture. However, this is not even the tip of the iceberg; the agency handles everything from paint to copy machines to fitness equipment to vehicles to buildings. In other words, just about anything that federal employees (hundreds of thousands of them) touch, use, work with, or work in has probably been described and specified by the GSA.

Although this may all seem a bit odd, most companies and organizations probably have similar technical documents that describe the characteristics and specifications of products and services that have been approved for use in the workplace. It is not by accident, for example, that hamburgers from McDonald's and Burger King taste pretty much the same regardless of where you buy them; these companies have developed descriptions and specifications that standardize their food in all locations.

Descriptions, then, are a normal part of workplaces. Even though many workers may not directly recognize how their work is affected by technical descriptions and specifications, there are instances when technical descriptions play a more obvious and crucial role in helping workers accomplish their jobs successfully. Consider the following workplace situations that require technical descriptions:

- *Manufacturing:* A lumber company provides customers (i.e., manufacturers of wood flooring) with technical descriptions of all its different woods for sale, including information about their properties, toxicities, and shrinkage rates. These technical descriptions help manufacturing companies efficiently, effectively, and safely make floors from the lumber.
- *Engineering:* A civil engineer samples and tests the soil where a new office building is going to be constructed. The technical details of the soil must be described so that engineers and builders know whether it is safe and feasible to construct a building on that specific site.
- *Computer science:* An electronics firm that develops fuel-cell-powered mobile phones must provide details and descriptions of how the phones work and how they use methanol for power in order to get government approval to produce them.
- *Medicine:* Pharmaceutical companies provide technical descriptions of drugs to both pharmacists and consumers, identifying chemical makeup, appearance, recommended dosage, proper usage, and side effects.
- *Environmental studies:* A research scientist who studies how traffic in large metropolitan cities contributes to global warming writes a technical description explaining the detailed processes by which this interaction takes place, including a visual diagram of the cause-and-effect relationships between traffic patterns and global warming.

In some respects technical descriptions are types of technical definitions, which are discussed in chapter 15. Like definitions, technical descriptions are not always stand-alone documents but are often parts or sections of other documents, such as memos, letters, instructions, manuals, proposals, reports, websites, and presentations. However, unlike many definitions, technical descriptions require writers to describe products, mechanisms, or processes with tremendous attention to physical details—parts, pieces, functions, and features, for example.

It is easy to mistakenly believe that definitions and descriptions are the same thing. For instance, the following might seem like a description of a spark plug:

> A device inserted in the head of an internal-combustion-engine cylinder that ignites the fuel mixture by means of an electric spark.

This tells us a good bit about spark plugs but would make a poor technical description because it discusses only what the spark plug does. It does not provide a description of the spark plug itself, what it looks like, what materials it is made of, what parts make it up, and so on. Such sharp attention to physical details and properties is the reason that technical descriptions are discussed on their own and are treated separately from technical definitions.

This attention to detail requires writers to think carefully about audience needs and the kinds of problems the technical description helps solve. Figure 16.1 is a technical description of a theater at Harvard University; the description derives from a more complex website about all the various theaters on the campus.

This technical description of the Loeb Theatre is for audiences considering the theater for a particular theatrical production. The technical information about capacity, lighting, and sound lets readers know whether this theater is the right place to hold their productions. It even includes a visual diagram of the theater's layout to help audiences visualize the space.

Loeb Experimental Theatre

General Information

- Space Contact(s): Loeb Technical Director, (xxx) 555-1212
- Overall Capacity (fire code): 120
- Recommended Seating Capacity: 80
- Overall Dimensions: 38′6″ by 51′0″(see plans)
- Loeb Technical Director maintains up-to-date space inventory and technical information at his own page.

Set/Props Information

- Largest Door Opening: airlock double doors 12′w × 8′h
- Ceiling: Full grid can support pretty much anything. Height is 16′.
- Floor: Replaceable black masonite. Can be screwed and painted.
- Walls: Black painted concrete/mesh panels. Solid walls can be painted; acoustical surfaces cannot.

Shows in the Loeb Ex have access to the Loeb shop for construction of their sets and props. The grid can be used to suspend set pieces and drops, and permanent movable flats are already in place (16′ × 4′). See plans for further details.

The space is a neutral black box with a narrow balcony and an overhead grid. The hanging hard flats allow you to break up the space or even create a wall across it. The 3′× 8′ audience seating risers in 8″, 16″, 24″, 32″ heights can be arranged in any desired fashion (while allowing for proper fire exits).

Lighting Information

- In-house Dimming: 12 × 2.4 kW
- In-house Circuits: One cable for each dimmer on 3 sides of the grid. Each cable is 50′, enough to reach most points in the grid and on the ground (see plans). All circuits have 3-pin twist-lock (L5-20) with nub in.
- In-house Control: ETC Express 48/96 board w/ color monitor. Houselights run off board, permanently wired to dimmers 91 through 96.
- In-house Instruments/Accessories: 25 × (4.5 × 6), 25 × (6 × 9), 3 × (6 × 12), 20 × (6″ Fresnel). 4 × (6′3 circuit PAR 38 striplights) (all twist-lock)
  2 × 30′cables, 6-20′cables, 6-15′cables, 12 two-fers, various SP-twist and Edison-twist adapters. 10 floor mount stands, various gel frames and gels from HRDC stock, templates and holders from Loeb Technical Director on request, other accessories from ART stock by permission of ART master electrician.
- Hanging Locations: The Ex has a full overhead grid consisting of steel mesh with lighting pipes spaced at 4′ intervals running E-W. In addition, there is a pipe on the S wall, and plugs can be made for the grid track to hang units below the grid. Floor mounts and booms are also possible.

The space itself is a very neutral black box; any set must be created essentially from scratch. Set designers tend to end up hanging lots of things from the grid, so it's worth checking with them to make sure there won't be any interference with lights.

The lightboard is on a custom table with the monitor. This is on a long cable and can be moved around on the balcony for running the show.

continued

FIGURE 16.1 Technical description of the Loeb Experimental Theatre

Sound Information

- Amplifier
- Speaker
- Sound board
- Sources: CD, Minidise
- Subwoofer and amp

The Ex has a full in-house sound installed in a rolling rack which can be placed anywhere in the balcony. Speakers can be installed anywhere in the space.

Plans

Ground plan, sections and grid plan available in Vector works, DW6, PDF, or printed hard copy from Loeb Techical Director and Loeb website.

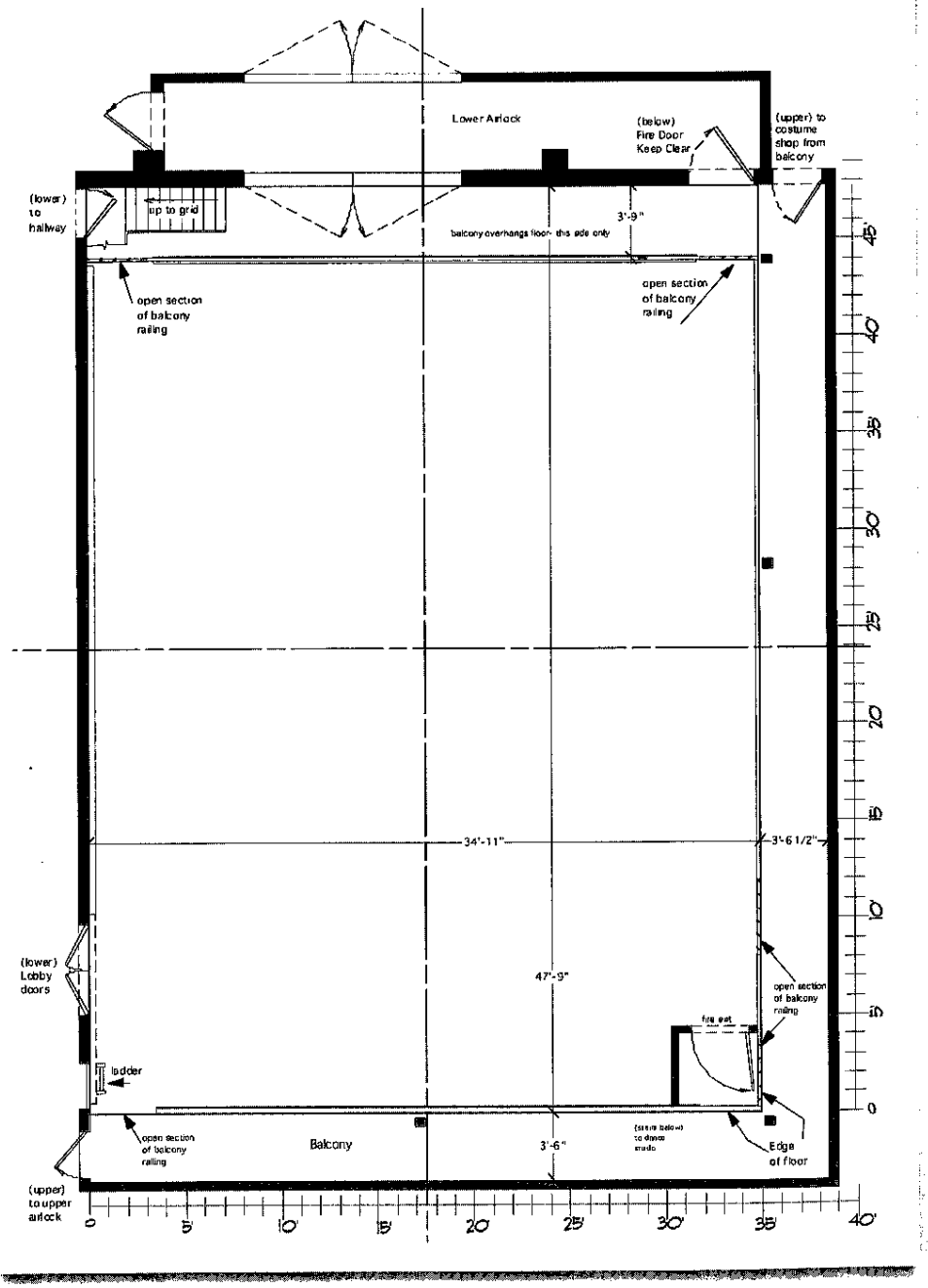


FIGURE 16.1 *Continued*

ANALYZE THIS

Look through Figure 16.1 again. If you were using this document to determine whether the Loeb Experimental Theatre would be appropriate for your theatrical production, which particular pieces of technical information would help you? Explain specifically how and why the information presented in this description would be beneficial. In what ways would it not be helpful?

Technical Specifications

Technical specifications are similar to technical descriptions in many ways, but they do have some distinct differences. Technical specifications typically do not use traditional forms of writing, such as complete sentences and paragraphs. Rather, technical specifications usually rely heavily on visuals—graphs, charts, tables, or illustrations—and include short phrases or words to describe parts or procedures. Like descriptions, however, technical specifications commonly serve as smaller sections of larger documents, such as instructions, manuals, and reports. Figure 16.2 shows technical specifications in the form of a table providing technical information about the characteristics of the Boeing 757 (200 series and 300 series). Notice how the table uses words, phrases, and numbers without relying on complete sentences, paragraphs, and other forms of traditional writing.

Technical specifications are relevant not only for those communicating in workplaces; many are written for audiences needing technical information about products they have purchased. These technical specifications are usually included in manuals and instruction booklets. Figure 16.3 shows the technical specifications of a remote control for a DVD player; it is part of the larger manual that came with the product.

See chapter 19 for more on manuals.

757 technical specification

	757-300 Technical Characteristics	757-200 Technical Characteristics
Passenger Seating Configurations		
Typical 2-class	243	200
Typical 1-class	280	228
Cargo	2,370 cu ft (67.1 cu m)	1,670 cu ft (43.3 cu m)
Engines	Rolls-Royce RB211-535E4B - 43,500 lb (193.5 kN)	Rolls-Royce RB211-535E4 - 40,200 lb (179 kN)
	Pratt & Whitney PW2037 - 36,600 lb (162.8 kN)	Rolls-Royce RB211-535E4B - 43,500 lb (193.5 kN)
	Pratt & Whitney PW2040 - 40,100 lb (178.4 kN)	Pratt & Whitney PW2037 - 36,600 lb (162.8 kN)
	Pratt & Whitney PW2043 - 42,600 lb (189.4 kN)	Pratt & Whitney PW2040 - 40,100 lb (178.4 kN)
Maximum Fuel Capacity	11,466 gal (43,400 l)	11,489 gal (43,490 l)
Maximum Takeoff Weight	272,500 lb (123,600 kg)	255,000 lb (115,680 kg)
Maximum Range	3,395 nautical miles (6,287 km)	3,900 nautical miles (7,222 km)
Typical Cruise Speed	Mach 0.80	Mach 0.80
Basic Dimensions		
Wing Span	124 ft 10 in (38.05 m)	124 ft 10 in (38.05 m)
Overall Length	178 ft 7 in (54.5 m)	155 ft 3 in (47.32 m)
Tail Height	44 ft 6 in (13.6 m)	44 ft 6 in (13.6 m)
Interior Cabin Width	11 ft 7 in (3.5 m)	11 ft 7 in (3.5 m)
Body Exterior Width	12 ft 4 in (3.7 m)	12 ft 4 in (3.7 m)

FIGURE 16.2 Technical specifications for the Boeing 757 in a table format

Name of Each Part

Remote Controller

• DVD Mode (Playback of DVD-Videos, Video CDs and Music CDs)

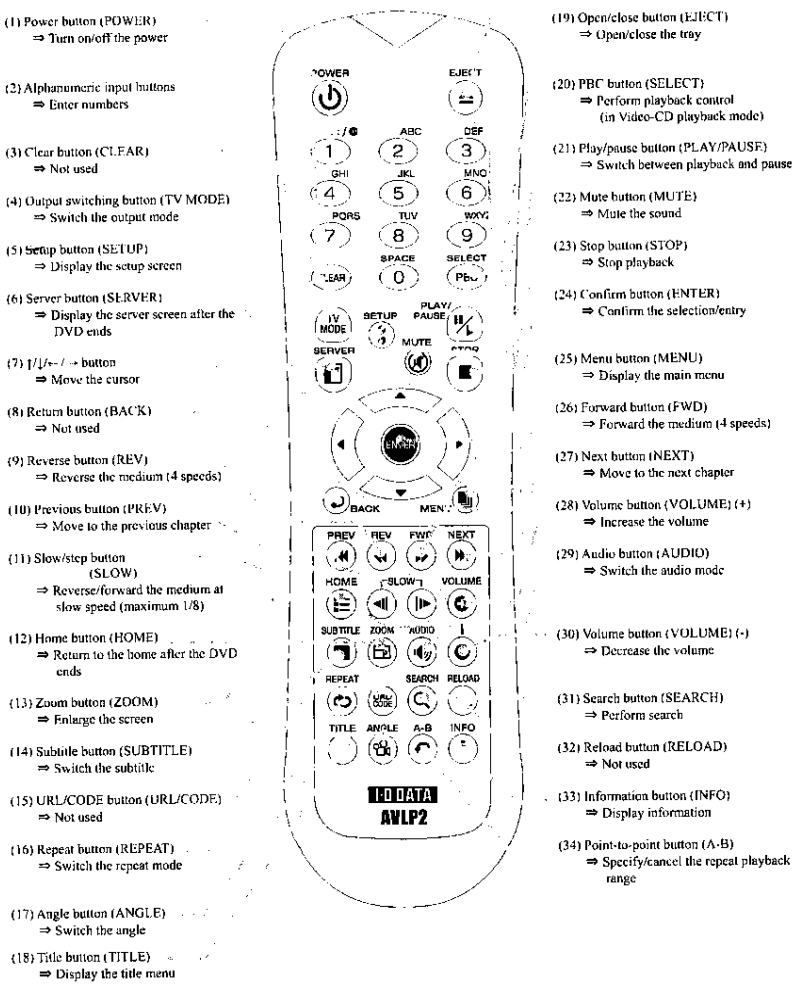


FIGURE 16.3 Technical specifications for a remote control

The technical specifications for the Boeing 757 and the JVC remote control are similar in that they provide a great deal of technical information in a small amount of space. This is one benefit of technical specifications: short phrases and visuals give readers information quickly and efficiently. However, because technical specifications do not use complete sentences and paragraphs, writers must pay close attention to the layout and design of these documents—the key to the documents' success. Word choice is important, but the visual aspects must render the information clearly to readers.

See chapter 9 for more on layout and design.

EXPLORE

Find the technical specifications online for a product that you use regularly, such as a car, computer, phone, or MP3 player. Remember that the specifications might be a section of a longer document such as a manual. After locating the technical specifications, note the way they are put together visually. Is there a table, chart, graph, or illustration? Given the document and its purpose, why do you believe the writer(s) chose to present the information in this visual form? Write your responses down, and be prepared to share them in class.

PSA

COMPONENTS OF TECHNICAL DESCRIPTIONS

The main components found in technical descriptions are not all found in every description, nor are they always found in the order presented here. Workplace writers must know their audiences and their purposes in writing to determine which sections are necessary and which are not. This determination this should take place in the Plan phase of writing.

Introduction

The purpose of the introduction to a technical description is to do one or more of the following:

- Identify the object, product, mechanism, or process to be described
- Discuss what background information the audience needs to know
- Give a general, brief description of the object, product, mechanism, or process
- Provide an overview of the rest of the technical description (if the description is longer than ten pages and has multiple sections, writers should use a table of contents)

In all cases the introduction should be short and to the point.

The Congressional Research Service sent a report to Congress that discusses ricin and functions in large part as a technical description. The introduction to that document (see Figure 16.4) is succinct but lets readers know what is described, provides background information, and forecasts the rest of the document all in just a few sentences.

Introduction

On February 2, 2004, the deadly toxin ricin was detected in the Dirksen Senate Office Building. As of this writing, early indications suggest that the toxin may have been mailed to Senator Frist's offices. All mail sent to government offices on Capitol Hill is sterilized by irradiation. However, this procedure was designed to kill bacteria, such as anthrax, not to inactivate preformed toxins such as ricin. Ricin is often mentioned as a potential bioterror weapon. This report describes what ricin is, how it is made, it's effects, a brief history of it's use, it's potential for use as a bioterror weapon, and how it is currently regulated.

FIGURE 16.4 Introduction to a technical description

Background

Sometimes the thing writers describe is not entirely familiar to audiences, or there might be contextual information that readers need to know to fully understand the description. In such cases writers provide detailed background sections for their audiences. In the article "Knee Brace Use in the Young Athlete," Thomas J. Martin, MD, composes a document that serves as a

> revision of a previous statement on prophylactic knee bracing and provides information for pediatricians regarding the use of various types of knee braces, indications for the use of knee braces, and the background knowledge necessary to prescribe the use of knee braces for children.[1]

[1] Thomas.J. Martin, "Technical Report: Knee Brace Use in the Young Athlete," *Pediatrics* 108, no. 2 (2001).

That document has a distinct purpose: to help pediatricians prescribe the correct kind of knee brace for young athletes. To accomplish this task, Martin includes a variety of technical descriptions of knee braces. In addition, even though his audience is highly educated, Martin provides background information (see Figure 16.5) to help his readers make sense of the descriptions and to ensure that the document serves its purpose. A reading of the excerpt in the figure makes it clear that Dr. Martin's document is written for medical experts, yet even experts may still need background information. Don't assume that background information is only for nonexperts.

Background

Pediatricians are appropriately becoming more involved in the care of young athletes. The knee is one of the most commonly injured joints in athletes. The correct care of knee injuries is an important part of any sports medicine or general pediatrics practice and may include the use of braces. Therefore, the pediatrician should be knowledgeable about knee bracing. This statement is an update of a previous statement on prophylactic knee bracing and includes information for pediatricians regarding the use of various types of knee braces, indications for the use of knee braces, and the background knowledge necessary to prescribe the use of knee braces for children. Acute and over use injuries to the knee are seen as a result of participation in virtually all athletic activities. Injuries to the ligamentous structures of the knee in the young athlete are becoming more common. The medial collateral and anterior cruciate ligaments are prime stabilizers of the knee and can be injured when direct or indirect forces are applied to the knee. In a growing child, the distal femoral physis is subject to these same forces and may also be injured. In the skeletally immature child, acute trauma to the knee is most likely to cause injury to these 2 ligaments and/or to the distal femoral physis. Patella subluxation, dislocation, or tracking abnormalities can occur as a result of mechanical predisposition as well as direct or indirect stress to the knee. Cumulative microtrauma or over use can lead to patellofemoral disorders or apophysitis of the tibial tuberosity (Osgood-Schlatter disease), which are common in adolescents.

FIGURE 16.5 Background section of a technical description

Parts and Characteristics

The main section of a technical description is the discussion of parts and characteristics. *Parts* refers to the physical, tangible portions of the thing itself. For example, a desktop computer has the following parts: a monitor, a CPU, a keyboard, a mouse, and a printer. *Characteristics*, on the other hand, refer to describable qualities that are not parts. For example, a computer monitor might be 17 inches wide, and the CPU might weigh 8.7 pounds. Inches and pounds are not physical parts of the object but are characteristics of those parts.

Writers identify and discuss parts and characteristics according to audience needs. A manual that serves as an introduction for new automobile mechanics, for example, might divide an engine into its basic parts: engine block, cylinders, pistons, radiator, spark plugs, and so one. A manual written for advanced mechanics might go into much greater detail, perhaps dividing the radiator itself into its many constituent parts. Writers also describe those parts and characteristics at a level of detail appropriate for audience needs.

In addition, technical descriptions sometimes describe the functions of those parts and characteristics—how they work and/or how they are put together. Audiences sometimes can make better sense of the description if writers explain what the part does as well as what it looks like. Technical descriptions commonly describe physical characteristics, explain functions, define terms, and discuss relationships among the parts, all within a single description. These discussions of parts and

characteristics use phrases, sentences, and/or paragraphs to describe the subject in as much detail as the audience needs. Visuals such as tables, charts, graphs, and illustrations are usually included to help readers.

In "Knee Brace Use in the Young Athlete," Dr. Martin describes the parts and characteristics of many different kinds of knee braces, including one in particular called a knee sleeve. Figure 16.6 gives the parts and characteristics section that describes the knee sleeve. Notice that the document includes descriptions of the possible parts of the knee sleeve: its nylon cover, movable straps, lateral hinge, infrapatellar band. And the passage describes some characteristics of a knee sleeve, such as being expandable, made of neoprene, and perhaps having a buttress of varied shapes. In addition, this section discusses the purpose and function of a knee sleeve—increasing warmth, providing compression, and so on. The description tells the audience what the knee sleeve does and why it is used.

Knee Sleeves

Knee sleeves are expandable, slip-on devices usually made of neoprene with a nylon cover. They increase warmth, provide even compression, and may enhance proprioception. Knee sleeves may provide a feeling of support to the knee. Plain knee sleeves may be used to treat postoperative knee effusions and patellofemoral syndrome. Used in this capacity, the purpose of a knee sleeve is to decrease knee pain. When a knee pad is added, it provides protective cushioning to the patella and anterior knee.

The knee sleeve may be modified to include an opening for the patella, or more movable straps, or a buttress. The buttress may be circular, C-shaped, J-shaped, or H-shaped. With these modifications, the knee sleeve is often referred to as an extensor mechanism counterforce brace and is used to treat patellofemoral joint disorders, including patella subluxation, patella dislocation, and patellofemoral syndrome, all of which are very common in athletes. The pathophysiology of patellofemoral syndrome is unclear, but it has been postulated to occur as a result of abnormal tracking of the patella on the femoral trochlear groove. The knee sleeve helps compress the tissue and limits patella movement. The extensor mechanism braces are designed to apply a medially directed force to the lateral patella, thereby improving patellofemoral tracking and decreasing the likelihood of lateral patella subluxation or dislocation. Used in this capacity, they may be of benefit in the athlete with an unstable patella. These braces may also contain a lateral hinge that incorporates an extension stop.

When a strap is placed inferior to the patella, it may be used to treat Osgood-Schlatter disease and patellar tendonitis. This infrapatellar band is used to decrease the traction forces at the tibia tuberosity for patients with Osgood-Schlatter disease and on the patellar tendon for patients with patellar tendonitis.

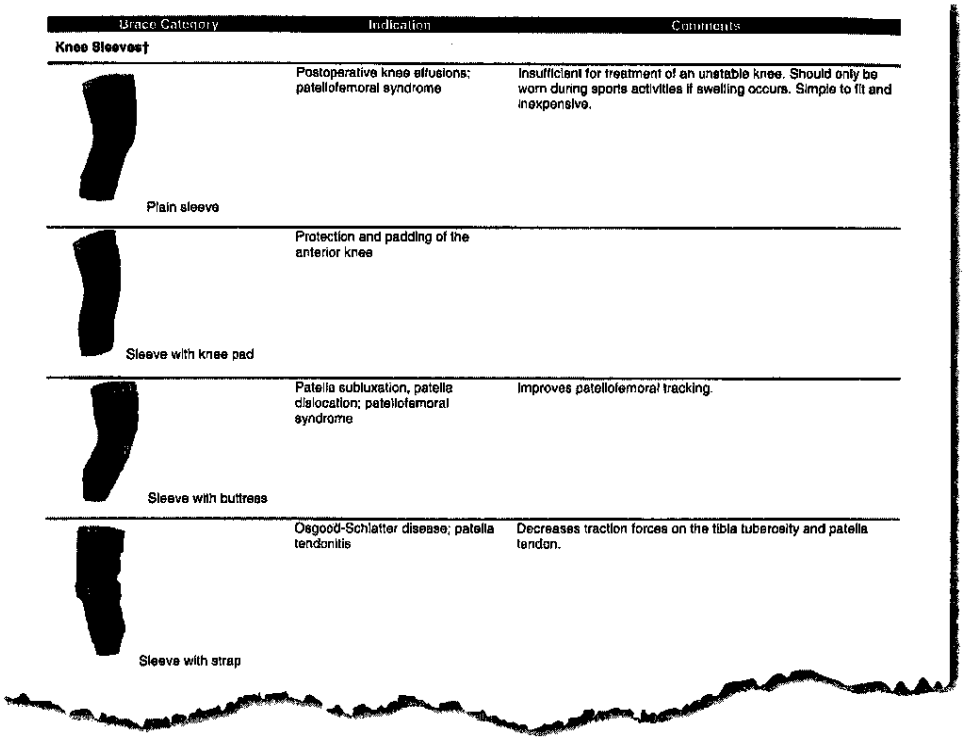
FIGURE 16.6 A portion of a parts and characteristics section of technical description

Visuals

Despite all that a good description can do for its intended audience, it may also need visuals to help readers understand more fully and clearly. Technical descriptions, like other workplace documents, incorporate visuals for many reasons, as discussed fully in chapter 8.

In the case of the knee sleeve description, the writer is providing readers with information about an object that might be hard to envision, as evidenced in the passage in Figure 16.6. Providing an illustration of knee sleeves not only provides an example of written information but also clarifies a difficult description and helps the audience retain an understanding of it. Figure 16.7 shows a table with illustrations that let readers see the different kinds of knee sleeves.

Most technical descriptions, and all technical specifications, require visuals of one kind or another, even if it is simply a chart, table, or graph to organize information. The kind of visuals, their complexity, and the number included depend on audience needs and the purpose of the document itself.



Brace Category	Indication	Comments
Knee Sleeves†		
Plain sleeve	Postoperative knee effusions; patellofemoral syndrome	Insufficient for treatment of an unstable knee. Should only be worn during sports activities if swelling occurs. Simple to fit and inexpensive.
Sleeve with knee pad	Protection and padding of the anterior knee	
Sleeve with buttress	Patella subluxation, patella dislocation; patellofemoral syndrome	Improves patellofemoral tracking.
Sleeve with strap	Osgood-Schlatter disease; patella tendonitis	Decreases traction forces on the tibia tuberosity and patella tendon.

FIGURE 16.7 Visuals used to clarify a technical description

ANALYZE THIS

Return to Figures 16.5, 16.6, and 16.7. Compare your understanding of the knee braces in the textual descriptions with your understanding of them when visuals were provided. In what ways did the visuals enhance your understanding? Do you think the intended audience for the document could have gotten the necessary meaning from just the text? In what ways are the visuals unhelpful, or in what ways might the visuals be rendered in more effective ways? Explain your answers in as much detail as possible.

COMPOSING TECHNICAL DESCRIPTIONS

Workers and consumers rely on technical descriptions to learn and perform tasks, but the purpose of technical descriptions typically is not to instruct someone to do a task. Technical descriptions can help readers by describing the parts and characteristics of a product, for example, but that is not the same thing as explaining to readers how they themselves can assemble or use the product.

Composing technical descriptions requires writers to recognize that these documents help audiences solve problems, thus making the problem-solving approach quite relevant. Writers must plan to meet the needs of the audiences who will read their technical descriptions; in particular, writers must know the level of technical sophistication the audiences hold. For example, general readers of a technical description of a small lawn mower require easy-to-read and uncomplicated data, quite different from the technical description of a large dam written by one engineer for another. Writers must also remember the purpose of the description and the ways audiences will use it. Some descriptions that are part of owner's

manuals, for example, are used by readers to understand products such as DVDs and computers. Other descriptions that are part of a technical report may be used by audiences to simply understand a process, such as how and why earthquakes happen in California.

PSA

In addition, writers of technical descriptions often must conduct research to complete their documents. For instance, a physician writing technical descriptions of different knee braces for young athletes might offer his expert opinions on the subject matter, but he must also show how these opinions correlate with beliefs and ideas in the wider medical community. Thus, his technical descriptions and specifications will result in part from research about knee braces. And like other workplace writing, technical descriptions benefit from the same PSA focus on drafting, reviewing, and distributing. Some specific suggestions for writing technical descriptions follow.

Audience Analysis

This chapter and others in the book have continually asked you to consider audience needs when writing any workplace document; we tell you to always know your audience and, in the case of technical descriptions, provide the descriptive detail that the audience requires. Nonetheless, some writers mistakenly think that complex objects or processes necessarily require more detailed description than simple ones require. In fact, a seemingly simple product might require a tremendous amount of description, whereas an extremely complex mechanism might require only a short, general description. It all depends on what the audience needs.

For example, a governmental agency like the Food and Drug Administration (FDA), which inspects and approves new food products, might require lengthy and complex descriptions (e.g., hundreds of pages) of a restaurant chain's new line of organic menu choices; consumers, on the other hand, might want only short paragraph-long descriptions. The amount of detail a writer uses in technical descriptions is not determined by the complexity of the object or process; it is determined by what the audience needs.

Descriptive Detail

Writers of technical descriptions must determine the specific descriptive detail to provide for readers. Appealing to their five senses usually means describing according to characteristics. The following is a list of characteristics to consider when writing technical descriptions:

color	shape	age
height	texture	finish
width	location	temperature
length	pattern	moisture content
depth	ingredients	smell
weight	materials	sound

This list is certainly not exhaustive, nor is it arranged in any order of importance. And of course, few descriptions would use all of these characteristics. Instead, writers choose characteristics based on what they are describing and which categories best help readers understand. In most instances readers need descriptions that appeal to their sense of sight and touch, although there are times when taste, smell, and hearing are important. For example, technical descriptions of chemicals might include information about smell.

Well-written technical descriptions provide sensory detail for audiences but also include visuals to help audiences further understand the information. No matter how much descriptive detail a writer uses, visuals can always help ensure clarity. Figure 16.8 is a

passage from a field guide about requiem sharks, and Figure 16.9 is a visual from the same field guide. Notice that the passage is full of details about this shark species, yet the inclusion of the visual helps readers better understand the information by letting them see illustrations of the shark and its parts.

Members of Carcharhinidae [a species of shark] are variously distinguished by the presence of precaudal pits; lack of spiracles (present on tiger sharks and occurring rarely on lemon sharks; Compagno, 1988); bladelike teeth with single cusps; first dorsal fin origin usually above pectoral fin or slightly posterior to pectoral fin inner corner (except on the blue shark with the dorsal fin base midpoint closer to pelvic fin origin than pectoral fin axil); second dorsal fin smaller than first dorsal fin and above anal fin (second dorsal fin and first dorsal fin almost equal size on lemon sharks); fifth gill slit over or posterior to pectoral fin origin; no fleshy keels along sides of caudal peduncle (except on tiger sharks and blue sharks); well-developed nictitating membrane along eye socket lower margin.

Freshly caught carcharhinids have a variety of body colors that are often muted color mixed with gray tones dorsally, and pale yellow or white laterally or ventrally; the exception is the blue shark which is counter shaded brilliant blue above and white below. Juvenile tiger sharks have distinct mottling and vertical bars that often fade with age; Atlantic sharpnose sharks (*Rhizoprinodon terraenovae*) often have light spots along the body. Juveniles for most species have fins tipped dusky or black. Adults generally have dusky fin tips; however, in the western North Atlantic Ocean blacktip sharks (*Carcharhinus limbatus*) greater than 80.0 cm TL have black fin tips except for a pale or white anal fin (Branstetter, 1982); all fin tips are black on spinner sharks (*Carcharhinus brevipinna*) greater than 80 cm TL (Branstetter, 1982) ; oceanic whitetip sharks have white fin tips on the first dorsal fin, pectoral fin, and caudal fin.

Sharks that may possibly be misidentified as belonging to Carcharhinidae include species of Odontaspididae (sand tiger sharks), and Lamnidae (mackerel sharks). Members of these families have all five gill slits anterior to the pectoral fin origin; sand tiger sharks have short pectoral fins and large pelvic fins; mackerel sharks have lunate caudal fins (upper and lower caudal fin lobes of almost equal length) and well-developed caudal keels that extend past the caudal fin origin.

FIGURE 16.8 A technical description of requiem sharks

ANALYZE THIS

Choose an object that is located near you at the moment: a pencil, a cell phone, a book, or a piece of electronic equipment. Using sensory detail, write a complete description of this object. Focus only on its parts and its characteristics, rather than on what the thing does or is used for. You might consult the list of characteristics in this section to help you decide which aspects are most important.

Organization

Like other workplace documents, technical descriptions use an organizational pattern suitable for the subject matter and audience needs. Chapter 7 covers many organizational patterns in detail, but technical descriptions all tend to use versions of the division strategy. As you may recall, this strategy is based on the idea that some things can best be understood as a series of smaller parts; the division strategy allows a writer to divide and even subdivide an object into its various parts. There are three variations of division patterns that workplace writers use for technical descriptions.

See chapter 7 for more about organizational strategies.

General to Specific

This organizational strategy can be used in two ways: the first provides descriptions that progress from general to specific information; the second moves from specific to more general. Purpose and audience help determine which is more appropriate. A technical

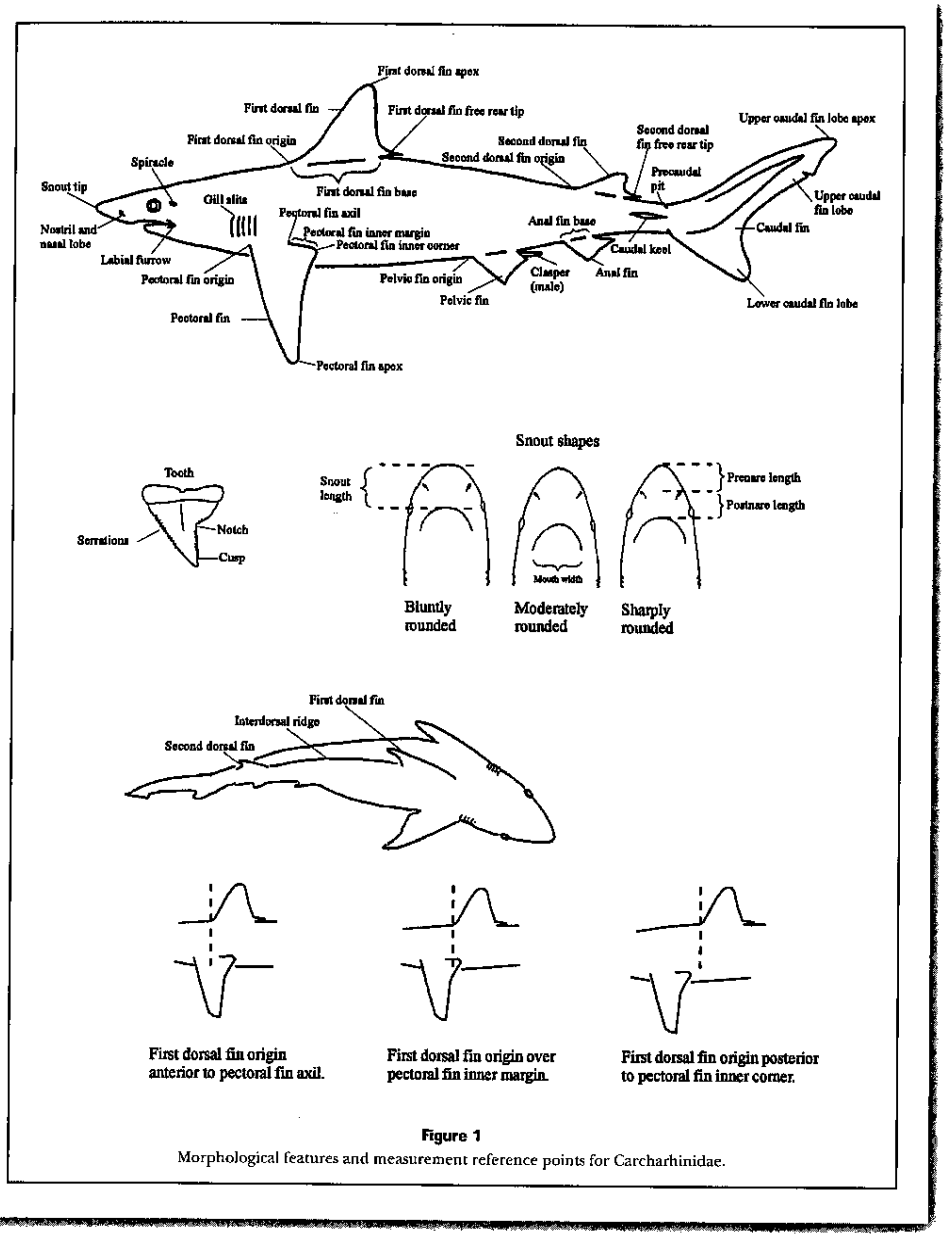


Figure 1
Morphological features and measurement reference points for Carcharhinidae.

FIGURE 16.9 An illustration of a requiem shark and its parts

description of a complex telescope, for example, might first provide a general overview of the object, then move into detailed descriptions of its specific parts, and finally provide descriptions of smaller pieces that make up those parts, all the way down to individual screws. On the other hand, a technical description can work in the opposite order. For example, a proposal to build a new shopping center might begin by describing the immediate site the shopping center would occupy. Writers might then describe outlying areas and finally the region in general to further explain their reasons for the site selection.

Spatial

The spatial strategy helps readers navigate information pertaining to physical objects or places; it is useful in technical descriptions that detail relatively large objects or places. For example, a technical description of an airplane might detail the different parts by moving the reader from the front of the plane to the back, or from the bottom

to the top. Or a technical description of a building might detail the different rooms or areas by moving from the front of the building to the back, the bottom to the top, or the left to the right. In short, spatial organization is appropriate when writers must discuss parts and pieces as they relate to each other in space. The diagram of the requiem shark in Figure 16.9 relies mainly on spatial organization.

Chronological

A chronological pattern guides readers through a sequence in time, moving from start to finish. Some technical descriptions describe processes—why events happen and/or how things work over time. For example, technical descriptions using a chronological pattern might detail how a complex mechanism like a dam or a motor works or how and why a natural process like photosynthesis or a thunderstorm happens. Figure 16.10 is a technical description of how electricity is produced. Notice how the description takes readers through a step-by-step chronological organization.

How Electricity Is Produced

It's hard to imagine our homes without electricity. There would be no TV, computer, or video games. You'd have to do your homework by candlelight or oil lamps. You wouldn't be able to listen to your favourite bands on the radio or CD player—instead you'd have to make your own music!

But what is electricity?

Electricity is a form of energy that starts with atoms. You can't see atoms because they're too small, but they make up everything around us. There are three parts to an atom: protons, neutrons and electrons. Electricity is created when electrons move from atom to atom. There are a number of ways to make electrons move, but most electricity is produced at power plants.

How do power plants work?

It all starts with a source of power. At Yukon Energy, we use water to create most of our electricity. That's why most of our plants are called hydroelectric facilities: hydro means water. Power plants that use water to make electricity are built near rivers. Our Whitehorse plant, for instance, is on the Yukon River. Dams are built across rivers to hold back the water. The water is then directed through big pipes and it falls against the blades of giant turbines. The turbines have blades on them that turn when the water hits them, just like the blades of a pinwheel turn when you blow on them. Once the water hits the blades, it returns to the river. The turbine blades are attached to a big metal rod, and at the end of that rod are large magnets. When the blades turn, they make the rod and the magnets spin very fast. The magnet end is surrounded by heavy coils of copper wire, and the spinning magnets cause electrons in the wire to begin to move, creating electricity.

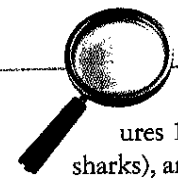
What happens to the electricity after that?

It moves through wires into what's called a power transformer. The electrical voltage (the strength at which electricity flows) is fairly high, and the transformer makes it even higher to help it flow through wires called transmission lines. Those wires are attached to wooden or metal poles that you see along roads and throughout communities. All the wires are made of metal—usually aluminum or copper. That's because metal is a good conductor—electricity travels through it easily. By the way, water is also a good conductor, and because our bodies are mostly made of water, electricity can travel through us easily. That's not something we want to happen though, because if we have electricity going through us we'll likely be seriously hurt or even killed. That's why grown-ups warn you to stay away from high voltage sites and not to stick your fingers in a wall plug. Electricity travels fast—about 310,000 kilometers per second! If you moved that fast, you could probably make several trips around the world in the time it takes to turn on a light! Sometimes, when electricity has to travel a long way, it gets a little weaker as it moves along the lines. It needs a boost (like you need food to replace the energy you've burned after playing outside all day). That's where substations help. Substations are large box-like power transformers that sit in fenced-in areas. You'll see signs on the fences that say high voltage—stay away, and it's really important that you obey those signs (remember what you read about electricity being able to travel easily through your body).

How does electricity get into my house?

When wires reach your house, another transformer on the power pole makes the electricity just the right voltage so you can use it safely. The wire is connected to a meter box that keeps track of how much electricity is being used. There are wires in your house connected to plugs, also called outlets. These outlets let you plug in your boom box, television set, or anything else electrical. What an amazing journey electricity takes to get to your home!

FIGURE 16.10 A technical description using chronological organization



ANALYZE THIS

Compare the styles and language used in Figures 16.6 (about knee sleeves), 16.8 (about requiem sharks), and 16.10 (about electricity). Who are the audiences for each of these three documents? From what you can tell, what is the purpose of each? How does the writing style of each of these three contribute to your understanding of the audience and the purpose of each? Discuss your answers to these questions with a small group of classmates.

Headings

Technical descriptions often use headings and subheadings to designate individual sections; for example, introductions, background sections, and body paragraphs might require headings. In many cases technical descriptions themselves are sections in longer documents, such as reports or proposals, which may have sections in their bodies titled, for instance, "Description of Building Site" or "Technical Description of X-578A Laser Printer." No matter where writers place their technical descriptions, they usually describe each part or piece of the object, product, mechanism, or process in a separate paragraph or section, and those paragraphs or sections are usually marked with a descriptive heading.

Parts Lists

Parts lists are sometimes used in technical descriptions to itemize the parts of an object, product, mechanism, or process. Writers whose technical descriptions detail many different parts (ten or more) may want to include a list in their introduction to let readers know what lies ahead. Readers probably would like to know ahead of time if the description they are reading is going to take them through the details of many parts.

ETHICS AND TECHNICAL DESCRIPTIONS

Even though technical descriptions are usually smaller segments of larger documents, writing technical descriptions entails a particular set of ethical obligations and responsibilities.

Objectivity

Ethical technical descriptions require objectivity. Those who write technical descriptions should not try to persuade audiences that the object, product, mechanism, or process being described is amazing, indispensable, or intimidating. In short, writers should not make value judgments about the thing being described. Don't try to sell it, and don't try to degrade it. Describe it in as much detail as the audience needs, but do so in objective, unbiased ways. For example, in describing a suspension bridge, you should not say that it is a dramatic and inspirational architectural achievement, but you might mention that the bridge spans a 200-foot-long gorge by utilizing two 77-foot-high arches that connect cardinal red cables to the roadway. Let readers decide whether the bridge is dramatic and inspirational.

Alerts

As mentioned earlier, technical descriptions simply describe and should not provide readers with any kind of instructions or procedures to follow. Consequently, audiences should not be at risk of damaging anything, including themselves. In some cases, however, writers may decide to include special notices about the things they are describing if those things are potentially dangerous. Such alerts could be either words and phrases or visuals, such as warning signs. Alerts in technical descriptions are not nearly as crucial as they are in instruction booklets and manuals, but extremely hazardous objects or processes may warrant special notices, at the writer's discretion.