Technical Writing

Unit: Science, Technology, Engineering, and Mathematics (STEM) Skills

Problem Area: Communication Skills: Writing

Lesson: Technical Writing

Student Learning Objective.

Instruction in this lesson should result in students achieving the following objective:

Identify the proper techniques for technical writing.

Resources.

The following resources may be useful in teaching this lesson:

E-units corresponding to this lesson plan. CAERT, Inc. http://www.mycaert.com.

"Ambiguous Sentences," *Byrdseed.* Accessed Oct. 22, 2015. http://www.byrdseed.com/ambiguous-sentences/.

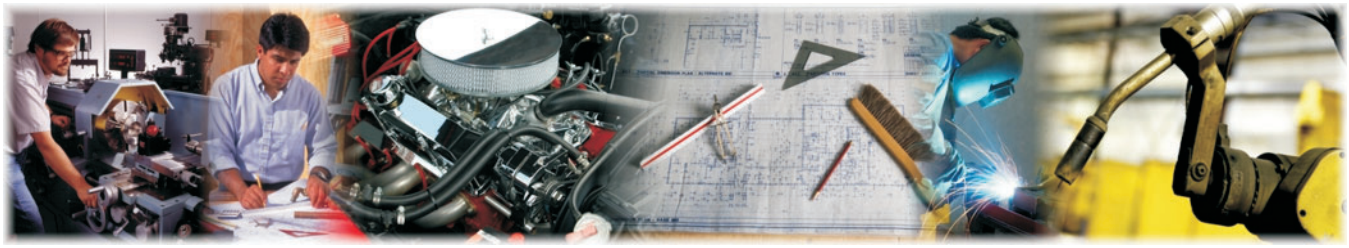
Brockway, Laura Hale. "24 Complex Words—and Their Simpler Alternatives," *Ragan's PR Daily*. Accessed Oct. 22, 2015. http://www.prdaily.com/Main/Articles/ 24_complex_wordsand_their_ simpler_ alternatives_8750.aspx.

Kelley, Nicole. "Sentence Structure of Technical Writing," *MIT: Program in Writing and Humanistic Studies.* Accessed Oct. 22, 2015. http://web.mit.edu/me-ugoffice/communication/technical-writing.pdf.

"Professional, Technical Writing," *OWL: Purdue Online Writing Lab.* Accessed Oct. 22, 2015. https://owl.english.purdue.edu/owl/section/4/16/.

"Technical Writing—Required Education and Qualifications," *Technical Writing Zone.com*. Accessed Oct. 22, 2015. http://www.technicalwritingzone.com/technical_writing_required_education_and_qualifications.htm.

"What Is Technical Writing?" *TECH Whirl.* Accessed Oct. 22, 2015. http://techwhirl.com/what-is-technical-writing/.



Equipment, Tools, Supplies, and Facilities

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

Key Terms.

The following terms are presented in this lesson (shown in bold italics):

- active voice
- ambiguity
- brevity
- clarity
- jargon
- planning stage
- simplicity
- technical writing

Interest Approach.

Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

> *Ask students to research topics such as technical writing techniques, technical writing certificates, technical writing degrees, or technical writing jobs. Then have them develop presentations or essays on these topics to share with the class.*

CONTENT SUMMARY AND TEACHING STRATEGIES

Objective 1: Identify the proper techniques for technical writing.

Anticipated Problem: What are the proper techniques for technical writing?

I. ***Technical writing*** is the process of simplifying complex ideas into documents or texts. Technical writers create many types of writings, ranging from an instruction manual on how to operate a toaster to a technical document for launching the space shuttle. Technical writers work in almost every industry. They create manuals,

documents, books, and instructions. In addition, technical writers may create illustrations and graphs to accompany documents.

A. Technical writers have excellent writing and communication skills. They are good problem solvers and have an interest in science and technology. Technical writing jobs exist in areas such as science, healthcare, pharmaceuticals, engineering, computer science, the gaming industry, accounting, farming, research, aerospace, and the military. These jobs range from full-time employees to part-time contract employees.
    1. Recently, the U.S. Bureau of Labor Statistics reported that the United States has more than 49,000 technical writing jobs, with an expected growth rate of 15 percent by 2022. This is a higher than average growth rate and would add more than 7,000 jobs by 2022. These jobs are expected to be available in the science, technology, information, and manufacturing industries.
    2. Most professions (e.g., doctors and lawyers) require specific education and training. Technical writers are an exception to the rule. They may not have a degree in technical writing. More than likely, they have a degree in another field, such as computer science, English, communications, or business. One suggestion is to take elective classes that would complement a technical writing career. Some colleges and universities offer technical writing certifications and/or degrees in technical writing.

B. Good technical writers are able to convey ideas so the majority of the readers understand the information. This is achieved by first understanding the audience, identifying the purpose, knowing the material, organizing thoughts, and allowing adequate time to write, review, and edit the material. All of these aspects are considered the ***planning stage***, which is a time when the writers gather, outline, and make a draft of the writing.
    1. After the initial planning process, writers must focus on ***clarity*** or clearness, as it makes the material easier to understand. Clarity is achieved by defining unfamiliar words, not using slang, and avoiding abbreviations. When unfamiliar words are used, they should be defined the first time they appear in the document and should be italicized. If abbreviations are necessary, the entire term should be written out with the abbreviation in parentheses the first time it is used.
    2. ***Jargon*** (a term or expression used by a particular profession) should be used carefully. Jargon can be used, depending on the intended audience and their familiarity of the topic. For example, if a person is writing a document for the medical profession, it may be full of words or phrases that only medical professionals fully understand. Some examples are nasal congestion, alpha blockers, antidepressants, and antihistamines. The legal field is full of examples (e.g., lawsuit, plaintiff, defendant, and injunction). Slang is not the same as jargon. It is more informal and should be avoided when possible.
    3. Writers must next focus on ***brevity*** (briefness; expressing thoughts in as few words as possible). They should never use two words when one word is more efficient. Technical writers understand that less is more and focus on giving a

clear, concise message. The most important information should always be placed first in a sentence. For instance, The Blue Devils won the game, despite missing 10 free throws. This is the correct way to present the information. You should not say, "Despite missing 10 free throws, the Blue Devils won the game."

4. It is important to avoid redundancy. For example, writers should combine sentences with the same interests. For instance: The Board of Education needed to raise money to build a new high school. The high school had become old, outdated, and too small for all the students. The Board of Education put a tax referendum on the ballot in hopes of raising the money needed to build a new high school. In turn, the voters saw the need for a new high school and voted yes to the referendum. This allowed enough tax dollars to build and construct a new high school. To make these sentences less redundant, writers could say: The school had become old, outdated, and too small for all the students. As a result, the Board of Education proposed a tax referendum that the voters passed to allow a new high school to be built.
5. ***Simplicity*** (plainness) keeps the message specific and clear, so it is best. The audience should not be overwhelmed with too many details. An overuse of details loses audience understanding. This is especially true with scientific and engineering information. When using numbers, if appropriate, they should be rounded. For example, instead of using the number 1,230,456,562, writers should say "more than 1 billion." If specific numbers are needed, charts and graphs should be added to make the information easier to read and understand.
6. Less complex words should be used to make the text easy to understand.

Complex Words	Less Complex
cognizant	aware
commence	begin
consolidate	combine
facilitate	help, ease
expedite	fast
optimize	perfect
aforementioned	mentioned
individualize	individual
proficiencies	skills
proximity	near
regarding	about

7. Unnecessary words should be removed. The following are examples.

Unnecessary Words	Unnecessary Words Removed
in order to	to
at the present time	presently
basic fundamentals	fundamentals
completely eliminate	eliminate
never before	never
every single day	daily

8. The words in a sentence should be ordered carefully to avoid ***ambiguity*** (uncertainty of meaning). The following are examples that can be interrupted in different ways.
   a. **I saw her fish.**
      (1) I looked at her fish in the aquarium.
      (2) I saw her fishing in the pond.
   b. **She hit the kid with the car.**
      (1) She hit the kid with her car.
      (2) She ran her car into another car that belonged to a kid.
      (3) She physically attacked the kid with a car.
9. It is necessary to get to the point when using verbs. For instance:
   a. made plans for (**planned**)
   b. took measurements of (**measured**)
10. Technical writers should write in ***active voice*** (a sentence structure in which the subject performs the action). This creates a stronger and more straightforward sentence. Here are some examples:
    a. **Hallie won the race. (active voice)**
    b. The race was won by Hallie. (passive voice)
    c. **The instructor teaches the students. (active voice)**
    d. The students were taught by the instructor. (passive voice)

C. Technical writing is a work in progress. Good writing skills require time, planning, rough drafts, revisions, rereading, and editing.
   1. It is important to review multiple times. Also, sources should be gathered before beginning. The project should be planned and should include sources from subject matter experts.
   2. Developing good technical writing skills takes time and experience.

Teaching Strategy: *Use VM–A to review. Have the students make flash cards and quiz each other over the definitions. Assign LS–A.*

Review/Summary. Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. If a textbook is being used, questions at the ends of chapters may be included in the Review/Summary.

Application. Use the included visual master(s) and lab sheet(s) to apply the information presented in the lesson.

Evaluation. Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

Answers to Sample Test:

Part One: Matching

1. d
2. a
3. c
4. h
5. b
6. g
7. f
8. e

Part Two: True/False

1. T
2. T
3. F
4. F
5. T
6. T
7. F
8. T

Part Three: Short Answer

1. Answers will vary. Good technical writers understand the audience, identify the purpose, understand the material, organize their thoughts, allow adequate time to write, review, and edit the material. Students could be more specific by including simplifying, brevity, clarifying, and avoiding the use of jargon.
2. Answers will vary. One example is “I saw her fish.” It could mean “I looked at her fish in the aquarium” or “I saw her fishing in the pond.”

Sample Test

Name _____

Technical Writing

Part One: Matching

Instructions: **Match the term with the correct definition.**

a. active voice
b. ambiguity
c. brevity
d. clarity
e. jargon
f. planning stage
g. simplicity
h. technical writing

_____1. Clearness

_____2. A sentence structure in which the subject performs the action

_____3. Briefness; expressing thoughts in as few words as possible

_____4. The process of simplifying complex ideas into documents or texts

_____5. Uncertainty of meaning

_____6. Plainness

_____7. A time when the writers gather, outline, and make a draft of the writing

_____8. A term or expression used by a particular profession

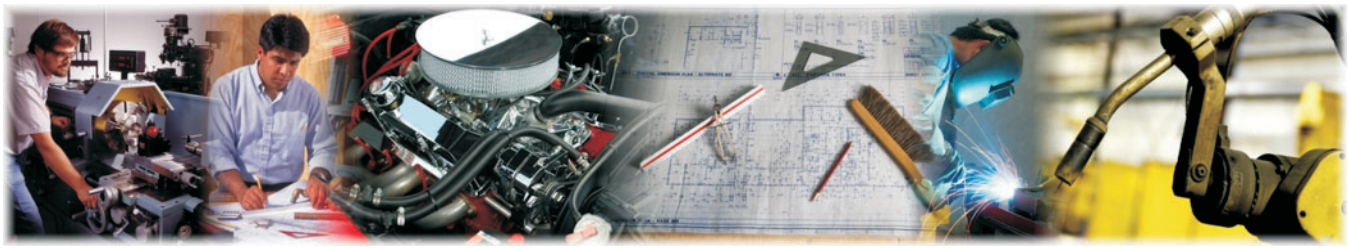
Part Two: True/False

Instructions: **Write *T* for true or *F* for false.**

_____1. Technical writers work in almost every industry creating manuals, documents, books, and instructions.

_____2. Technical writing jobs range from full-time employees to part-time contract employees.

_____3. Technical writing jobs require a degree in technical writing.



_____4. It is not necessary for technical writers to convey ideas so the majority of the readers understand the information.

_____5. Clarity is achieved by defining unfamiliar words and avoiding abbreviations and slang.

_____6. When unfamiliar words are used, they should be defined the first time in the document and should be italicized.

_____7. Never put the most important information first in a sentence.

_____8. It is best not to overwhelm the audience with too many details.

Part Three: Short Answer

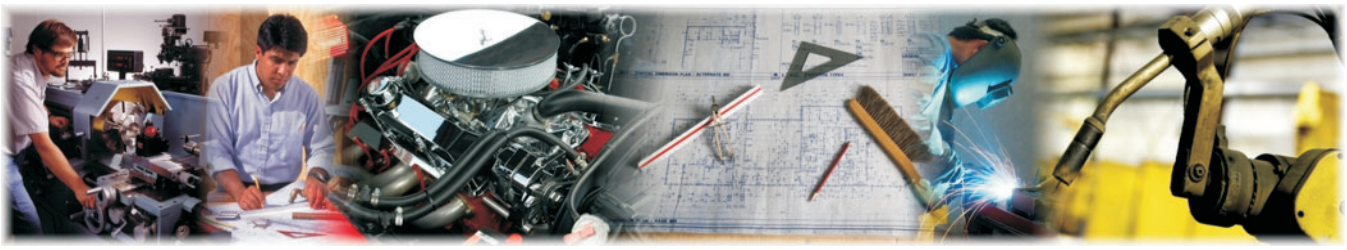
Instructions: **Answer the following.**

1. List three techniques that a good technical writer should use.

2. Give an example of an ambiguous sentence. Then give one example of how it may be interpreted differently.

DEFINITIONS

- **Active voice** is a sentence structure in which the subject performs the action.
- **Ambiguity** is uncertainty of meaning.
- **Brevity** is briefness; expressing thoughts in as few words as possible.
- **Clarity** is clearness.
- **Jargon** is a term or expression used by a particular profession.
- **Planning stage** is a time when the writers gather, outline, and make a draft of the writing.
- **Simplicity** is clearness.
- **Technical writing** is the process of simplifying complex ideas into documents or texts.



LS–A

Name _____

Technical Writing Instructions

{Insert L670099 LS-A}

Purpose

The purpose of this activity is to write a short instruction sheet.

Objective

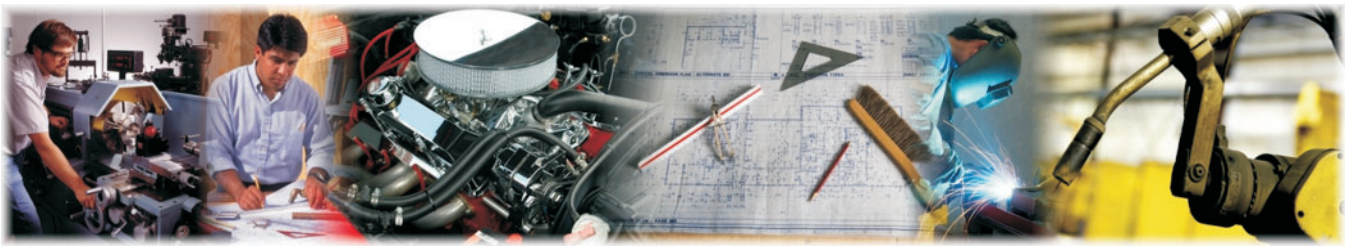
Write a short instruction sheet on how to assemble something.

Materials

- lab sheet
- paper
- writing utensil
- access to a computer with a word-processing program
- Lego bricks, VEX Robotics kits, or K'NEX (something similar)

Procedure

1. Your teacher will assign you to a group of four to five students.
2. Each group will decide on a name for its group.
3. Your teacher will give you building pieces, and your team will construct something out of it (e.g., a car, a crane, a boat, a plane, or a building). **Do not make the structure too complex. Also, do not let other teams see what you are building.**



4. After your team constructs its design, write a set of instructions that details the assembly process. The team may *not* disassemble the design while writing the set of instructions. Your team may look at it and touch it, but team members are not allowed to take it apart.
5. Your team may include illustrations of how to assemble the design.
6. Once the instructions are complete (after 15 to 20 minutes), your team needs to take a picture of the design.
7. Then your team must disassemble the pieces and switch instructions and pieces with another team.
8. Now your team will assemble another team's design using their instruction sheet.
9. As your team is assembling another team's design, take notes (on your paper) detailing the problems you find with the instructions.