

COMMUNICATING SKILLS

Science Writing

Suppose you are a scientist and you have just discovered a cure for "mad cow disease." Now you want to report your findings to other scientists. **Science writing** is a particular style of writing. It is different from the writing in newspaper articles or mystery stories. Science writing sticks to the facts, observations, and conclusions of an experiment or study. How is this different from the writing in a novel?

Find the Facts

One paragraph below is written like a scientific report, and one is written more informally. Read both paragraphs, and then answer the following questions.

Report #1:

I sat in the chair by the window, watching the rain. It seemed that the rain came down angrily, as if to punish the Earth. As I wrote in my journal, I thought about the earthworms. The worms were coming out of the ground, having been drowned out of their dark lairs. Did they feel differently when they reached the surface? Did they notice the pounding of the rain? Did they sense the poetry of the moment, as I did?

Report #2:

I watched the rain from a chair by the window. I wrote my observations in my journal. The rain was coming down quite hard. After it had been raining for a while, I noticed several earthworms emerging from underground. Over the next 20 minutes, more earthworms appeared. Apparently, as the ground became soaked with water, the earthworms came to the surface for air.

Which style seems more scientific to you? Explain your answer with specific examples from the paragraphs.

Science Writing, continued

Not Quite Human

When you tell a friend, "My turtle misses me when I am at school," do you think your turtle really has human emotions? Sometimes we act as if nonhuman things have thoughts or emotions similar to our own. Giving human thoughts, feelings, or actions to nonhuman organisms and objects is called **anthropomorphism**.

Most of the time, anthropomorphism is harmless. But in science writing, it can distort your experimental results and confuse your reader. **Be careful!**

From the two reports on page 54, list examples of anthropomorphism.

How do you think anthropomorphism in a science report can be misleading?

More Suggestions

There are different approaches to science writing. Sometimes you may give a report on your investigation and simply list your facts and observations in order. Other times you may debate a hypothesis. In that case, organize your paper or speech as a series of facts or observations that support your position.

Always remember who you are writing for. Writing your science report for a class of third-graders is different from writing about it for a science magazine. What are some of the differences you can think of? Write those differences below.

TROUBLESHOOTING

The primary characteristic of science writing is that it is **objective**, meaning that it relies on facts and avoids inferences. Keep this in mind as you practice your science writing.

TRY THIS!

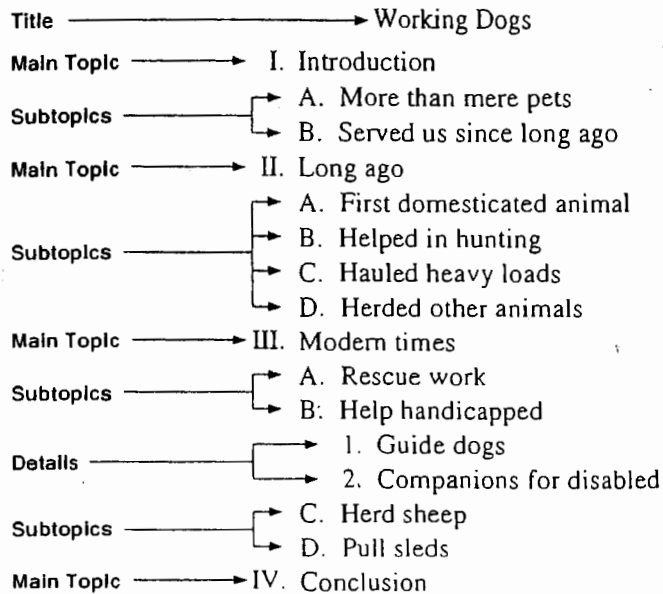
Find and contrast two examples of scientific writing. Even though they are both science writing, how are they different?

Lesson 21

Research: Outlining

Use sequencing skills to organize your information into an outline.

Once you have organized the information for your report, it is time to make an **outline**—a general plan for your report. Study the outline for a report on Working Dogs. Notice that the writer used the questions from Lesson 20 as the basis for the outline. Then read the guidelines for outlining.



Guidelines for Outlining

1. Capitalize the first word of each line.
2. Write each main topic with a roman numeral and a period.
3. Write each subtopic with a capital letter and a period.
4. Write each detail with a number and a period.
5. Indent each subtopic and detail.
6. Make sure subtopics support main topics and that details support subtopics.
7. Each time you list subtopics or details, list at least two.

Exercise A

Look over the outline for a report and the information in the box. Copy the outline on your own paper, filling in the blanks with the information in the box. One blank has been filled in for you.

Walt Disney

I. Introduction

II. Early life

A. _____

B. _____

C. _____

D. _____

III. Motion Pictures

A. Cartoon

Characters

1. _____

2. Minnie Mouse

3. _____

B. Nature Films

1. _____

2. _____

IV. Amusement Parks

A. _____

B. _____

V. Conclusion

1. Disney World in Florida
2. Made first cartoons at 19
3. Born in Chicago
4. Donald Duck
5. Showed animals in nature
6. At 16 studied art
7. Minnie Mouse
8. Rare scenes of animal life
9. Disneyland in California
10. Moved to Missouri when a child
11. Mickey Mouse

Exercise B

Make an outline from the notes you took for your research topic. Make the first main topic *Introduction* and the last *Conclusion*. Be sure to use correct outline form.

Lets Do Some Practice:

Directions: The author, page number and quote will be provided. Correctly write a sentence using parenthetical citation.

- 1) Author: James Doe, Page # 83, Computers become outdated every six months.
- 2) Author: Sarah Smith, Page # 5, The LCD flashlight was created in 1994
- 3) Author: Rob Schmidt, page # 22, Trees in the Amazon can live to be 150 years old. These trees are older and some are ruminants of the prehistoric period.
- 4) Author: Jevon Sappington, page #12, The dvd has been around longer than most people realize. It originated in 1986 with a laser disc, a larger disc the size of a record. Time and technology allowed the laser disc to become more compact to what is now called a dvd. Without the invention of the laser disc, the dvd could have never existed.
- 5) Author: Ray Furry, page # 25, Barry Sanders was the best running back in his time; he would have easily held all of the rushing records, however, he retired early to spend time with his family.
- 6) Author: Logan Hess, page #13, Electric power can be generated by riding a bike. If harnessed correctly the average family would have to ride the bike for five hours a day to provide energy to heat their house.
- 7) Author: Remy Creek, page #27, The sun outputs enough power each day to run the lights in all of North America and South America for twelve hours, however harnessing that energy is difficult.
- 8) Author: Chris Reile, page #33, Water is an important part of daily life. People who drink eight glasses of water a day have a life expectancy of 110.
- 9) Author: Elizabeth Patterson, page #2, The battle of Antietam was the bloodiest battle of the Civil War. The Union lost twice as many troops as the confederates but somehow managed to declare victory.
- 10) Author: Julie Anderson, page #7, The rubber band was created in 1931, before then twine was used to hold newspapers together.

Helpful Websites

- Inspire: www.inspire.net
 - Go to “Student Research Center” (second option on the left side).
- Google Scholar: <http://scholar.google.com>
- How Stuff Works: <http://www.howstuffworks.com>
 - Type key words in search box
- Son of Citation Machine: www.citationmachine.net
 - Choose your option in the left column
 - Type the information in the provided fields
 - Submit
 - Copy and paste citation in the box
 - Copy and paste in-text citation into paper

Example of a Works Cited Page

Ballard, Robert D. "From Exploring the Titanic." Literature and Language. Evanston: McDougal Little, 1994. 94-105.

Carly, Richard. "Writing for You." The Writer's Nook. 23 March 2005. <http://www.thewritersnook.com>.

"Density." Academic American Encyclopedia. Danbury, CT: Grolier, Inc. 1998. 6th Edition. 113.

Rowe, Richard, and Larry Jeffus. The Essential Welder: Gas Metal Arc Welding Classroom Manual. Albany: Delmar, 2000.

Smaldino, Sharon. Instructional Technology and Media for Learning. Columbus, OH: Pearson, Merrill, Prentice Hall. 2005.

"Writing a Paper." Library Spot. 17 January 2005. <http://www.libraryspot.com/features/paperfeature.htm>.

Other Tips for Creating Your Works Cited Page

1. "Works Cited" should be centered at the top of the page
2. Sources should be in **alphabetical order**.
3. If there is an author, the last name should always be listed first. If there is no author, then put the title of the article (in quotation marks).
4. Indent the second line of source citation
5. Put a period and a space after each major category.
6. Underline book, magazine, journal and newspaper titles.

Textbook

Website with author

Encyclopedia

Book with more than one author

Book with one author

Website with No Author

Possible answers to citation worksheet:

1. Because it seems that technology changes so quickly, James Doe believes that “computers become outdated every six months” (83).
2. According to Sarah Smith, “the LCD flashlight was created in 1994” (5).
3. Studies by Rob Schmidt reveal that “trees in the Amazon can live to be 150 years old. These trees are older and some are ruminants of the prehistoric period” (22).
4. Sappington sheds light on how the modern DVD originated:

The dvd has been around longer than most people realize. It originated in 1986 with a laser disc, a larger disc the size of a record. Tim and technology allowed the laser disc to become more compact to what is now called a dvd. Without the invention of the laser disc, the dvd could have never existed. (12)

5. Based on people’s opinions, “Barry Sanders was the best running back in his time; he would have easily held all of the rushing records, however, he retired early to spend time with his family” (Furry 25).
6. After riding a bike for five hours, enough electric power can be generated for a family to heat their house (Hess 13).
7. Also discussing alternative ways to obtain energy, Remy Creek states that “the sun outputs enough power each day to run lights in all of North America and South American for twelve hours, however harnessing that energy is difficult” (27).
8. Another aspect of healthy living is drinking water and “water is an important part of daily life. People who drink eight glasses of water a day have a life expectancy of 110” (Reile 33).
9. During the Civil War there were many battles. However, “the battle of Antietam was the bloodiest battle of the Civil War. The Union lost twice as many troops as the confederates but somehow managed to declare victory” (Patterson 2).
10. The rubber band is a handy invention that has helped to make life easy. In 1931 the rubber band took the place of twine to hold newspapers together (Anderson 7).

Author's Name

Peer Editor's Name

Peer Editing Checklist for Science Fair Research Paper

Directions: The peer editor should read the paper and circle any grammar, spelling or punctuation errors that he/she sees. Then, the peer editor needs to fill out ALL PARTS of the checklist below.

	Yes	No	Suggestions for Improvement
1. Opening Paragraph	XX	XX	XXXXXXXXXXXXXXXXXXXXXX
Is there a lead sentence?			
Is there a thesis statement?			
Is there background information between the lead and thesis?			
2. Body Paragraphs	XX	XX	XXXXXXXXXXXXXXXXXXXXXX
Are there at least 3 body paragraphs?			
Is there a topic sentence in the first body paragraph that explains what the rest of the paragraph is about?			
Is there a topic sentence in the second body paragraph that explains what the rest of the paragraph is about?			
Is there a topic sentence in the third body paragraph that explains what the rest of the paragraph is about?			
3. Closing Paragraph	XX	XX	XXXXXXXXXXXXXXXXXXXXXX
Does the closing paragraph summarize the paper?			
Is the last sentence the reworded thesis statement?			
4. Are there transitions between paragraphs?			
5. Is the paper confusing?			
6. Is there a correct works cited page?			

Research Paper Checklist

Brainstorming: Notes

- Detailed notes from every source you use
- Title of the source
- Page numbers from the sources that you get information from
- Complete URL Address if the information is from an internet site

Pre-Writing

- Graphic Organizer- Main Idea and Supporting Details
- Topic
- Topic Sentences
- Facts

ROUGH DRAFT: USE THE FOLLOWING GUIDELINES:

Introduction

- Attention Grabber
 - o Interesting fact
 - o Question
 - o Quote- from a newspaper, from the actual person etc.
- Thesis statement
 - o States your topic
 - o Sets up the rest of your paper by briefly listing the topics of the paragraphs in the body of your paper

Body Paragraphs

- Topic Sentence
 - o The main idea of the paragraph
- Facts
 - o Give at least three or four facts to support your topic sentence
 - o Correctly cite the facts according to MLA standards.
- Transition words
 - o Use transitional words to connect your paragraphs and sentences smoothly
 - Examples of transitional words are on Pg. 528 in your grammar book
- A paragraph consists of at least 5 sentences.

Conclusion

- Restates the thesis statement
- Sums up the facts in your paper

Works Cited Page

- 3 sources cited
- alphabetical order
- correct punctuation
- correct format

Peer Edit

- Did they grab the reader's attention?
- Do they have a thesis statement that states their topic and sets up the rest of their research report?
- Do they have topic sentences?
- Do they have at least three facts for each topic sentence?
- Did they use transitional words and phrases?
- Does each paragraph in the body of the paper have at least 5 sentences?
- Do they correctly cite their facts?
- Do they restate their thesis in the conclusion?
- Do they sum up the facts in the conclusion?
- Do they have at least 3 sources cited on their works cited page?
- Are their sources in alphabetical order?
- Did they correctly punctuate each source?
- Did they use the correct format on the works cited page?
- Did you check for grammar mistakes?

Revise

- Make any necessary corrections to your paper
- Ask yourself the questions under the heading: PEER EDIT

Final Draft

- Make sure to turn in every step of the writing process
 - o Brainstorming-Notes
 - o Pre-writing
 - o Rough Draft with peer editing marks
 - o Final draft

Science Fair Research Paper Rubric

Student Name: _____

Science Fair Topic/Title _____

1	3	5
Project is more than two days late	Project is one day late	Project is on time
Cover is uninteresting and irrelevant to topic, sloppily done and and not appealing to reader	Cover is somewhat interesting and relevant to topic, neatly done and and appealing to reader	Cover is interesting and relevant to topic, neatly done and and appealing to reader
Missing many of the required parts: <ul style="list-style-type: none"> • Cover • Title Page • Dedication • Table of contents • Purpose (opening) • Content (the three subtopics you researched) • Closing • Illustrations • Bibliography 	Missing some of the required parts: <ul style="list-style-type: none"> • Cover • Title Page • Dedication • Table of contents • Purpose (opening) • Content (the three subtopics you researched) • Closing • Illustrations • Bibliography 	Contains all required parts: <ul style="list-style-type: none"> • Cover • Title Page • Dedication • Table of contents • Purpose (opening) • Content (the three subtopics you researched) • Closing • Illustrations • Bibliography
Paper is totally out of order	Paper is somewhat out of order	Paper is in correct order
Many sections of report are not clearly marked and do not start new page	Some sections of report are not clearly marked or start new page	Each section of report is clearly marked and starts new page
Title page, table of contents and bibliography have many mistakes in format	Title page, table of contents and bibliography have some mistakes in format	Title page, table of contents and bibliography follow correct format
Only one resource used	Two resources used	Three or more resources used

Much information is inaccurate and irrelevant	Information is somewhat accurate and relevant	Information is accurate and relevant
<p>Project is done in messy and careless manner: no attention is paid to detail; too much white-out cross-outs, crooked writing, done in pencil</p>	<p>Project is somewhat neatly done : some attention is paid to detail; some white-out cross-outs, crooked writing, may be done in pencil</p>	<p>Project is neatly done; creative and organized, great deal of attention is paid to detail; writing or word processing is neatly done; pen, markers and rules are used</p>
<p>Project is poorly written and difficult to understand:</p> <ul style="list-style-type: none"> • Much evidence of copying • Writing is unfocused and off topic • Grammar is poor; many punctuation, grammar and spelling errors • No evidence of proofreading and editing • Much of report is illegible 	<p>Parts of project are difficult to understand:</p> <ul style="list-style-type: none"> • Some evidence of copying; • Writing is not completely focused on topic • Difficult to follow because of sentence and paragraph structure • Some evidence of proofreading and editing • Some parts of report are illegible 	<p>Project is well-written:</p> <ul style="list-style-type: none"> • Written in own words in interesting style • Focused and on-topic • Good sentence structure
<p>Little evidence of proofreading and editing</p> <ul style="list-style-type: none"> • Illegible; not neatly typed (12 or 14 font, double spaced) or written in pen cursive • Many grammar, spelling and punctuation errors 	<p>Some evidence of proofreading and editing</p> <ul style="list-style-type: none"> • Somewhat legible; typed (12 or 14 font, double spaced) or written in pen cursive • Some mistakes in grammar, spelling and punctuation 	<p>Evidence of proofreading and editing</p> <ul style="list-style-type: none"> • Legible; neatly typed (12 or 14 font, double spaced) or written in pen cursive • Good grammar, spelling and punctuation