

Academic and Research Writing in Science, Engineering and Business  
Course Guide, 2009

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English 128: Research Writing: Science, Engineering, and Business  
Green River Community College  
Auburn, WA 98092-3622  
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### *Abstract*

The *Course Guide* design purpose is to serve as a tool for success in formal research writing. The *Course Guide* includes explanation of specific course assignments as well as assignment samples which students can use as models for their own work. It also includes a calendar for work due and descriptions of evaluation criteria. The guide's form mimics many major components of a research paper. Although the *Course Guide* is not an elaborate research document, the *Appendix* does include samples of student work done at various levels of success. Overall, the *Course Guide* serves as a valuable tool and handy reference for successful research writing for this course and subsequent research writing tasks.

Elements of course outline, format, and components are provided by the courtesy of Dr. Rob Casad  
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Revised, 2009 by Walter Lowe.

## *Course Purpose*

Science, engineering and business writing is an advanced writing course that emphasizes explanation and develops the following thinking and writing skills:

1. Clarity of purpose: Students can distinguish between objective and subjective claims, issues, and problems; explain a particular issue or problem; and document original points of view regarding the issue or problem.
2. Clarity of style: Students write from within a context to an audience and use formal prose with an obvious order and informative intent.
3. Students analyze point of view, voice, and evidence [emphasis on quantitative data] for validity, reliability, and relevance. Students can also document opinion.
4. Students recognize popular or received opinion and check evidence to the contrary.
5. Students are able to accurately reconstruct an original piece of writing without misrepresentation of facts or insertion of personal opinion.
6. Students can identify sources of error and apply the principle of falsifiability to theory.
7. Students understand the concept of likeliness of being true.
8. Students submit neat and correctly formatted papers on time.
9. Students read and revise text for clarity, completeness, accuracy, and neatness.
10. Students orally deliver a summary of a documented research paper which includes the purpose, methods of research, major sources of evidence and conclusions.

Students should select practical topics where current research is developing and changing our popular opinions and understandings. They should try to develop information from the field and laboratory as well as from the library. They should choose topics that have their interest and meet the interests of a practical, skeptical, and experienced audience.

Unless I have agreed beforehand, I do not accept late papers. The students should have their papers ready on the due date noted in this *Course Guide*. Attendance is required and students should make arrangements if absences continue for more than one day. Attendance during the final portion of the quarter during the oral presentations is required for credit. Students who merely turn in their work without participating in the course activities will not receive credit regardless of the quality of their written work.

## *Course Plan*

The course has six sections as listed below. These are explained in further detail throughout this course guide. While the sections will be introduced in this order, we will be covering several sections concurrently. Supplementary materials and activities will be used from selected handouts. While the course guide gives a general overview of the procedures and standards to be used, it does not serve as a stand-alone reference material.

### **Selecting a Documented Research Paper Topic.**

This section includes current interest topics, issues, problems, samples, testable and verifiable claims, generalizations, suspension of disbelief, writing memoranda, etc. This section also includes distinction between issues of Humanities, Social Science, Natural Science, and Business.

### **Analyzing Received or Popular Opinion.**

This section includes the sub-topics active and passive voice, jargon and usage errors, wordiness, format errors, historical context, purposes, issues analysis, and problem solving. Logic and logical fallacies serve as in-depth tools.

### **Developing Information Sources.**

This section examines the variety of source material, distinction of primary and secondary sources, editorial policies, audience analysis, professional standards, interviews, and letter writing.

### **Conducting and Documenting a Descriptive Survey or Experiment.**

The section includes population samples, random testing, purpose statements, procedures, observations, application of data, summing of ranks, data tables, conclusions, principles of graphs and illustrations, and generalizing.

### **Developing a Research Procedure.**

This section includes assumptions, hypothesis construction, developing a research approach, developing a research outline [much like this outline], methods of organization, documentation, dummy development, and background statements.

### **Writing and Orally Summarizing a Documented Research Paper**

This section includes writing abstracts, works cited pages, paper headings, and conclusions. In addition, activities include principles of editing, summarizing, proofreading, revising, and presenting.

## Course Papers

The course papers, their due dates, and their respective weights [relative weight on the total paper grade] are as follows:

- Documented research paper topic memorandum: [10%] \_\_\_\_\_
- Topic background statement including historical context: [10%] \_\_\_\_\_
- Example business letter --- letter of inquiry: [10%] \_\_\_\_\_
- Complete background section with key questions or issues paragraph, paper plan paragraph, and working dummy including five or more (at least one primary) source entries in Works Cited: [20%]. \_\_\_\_\_
- Complete paper reviewed - conference sign-up:
- Finished documented research paper due: [50%] \_\_\_\_\_
- Oral reports. Final quarter activity (Mandatory), beginning \_\_\_\_\_.

Assignments are due by 7:00 pm on the scheduled dates. The student must plan ahead. I do not accept late papers without previous agreement. The course grading scale is as follows:

- 4.0 Exceptional - exceeds most standards [See sample check sheet, page six.]
- 3.5 Superior - exceeds many paper standards
- 3.0 Good - exceeds some standards
- 2.5 Acceptable - meets all standards-
- 2.0 Average - meets most paper standards
- 1.5 Fair - meets some paper standards
- 1.0 Poor - meets few paper standards
- 0.5 Inadequate - meets very few or no standards
- 0.0 Inferior - at or below prerequisite levels.

### Evaluation

In addition, I will look for evidence of higher level thinking presented in the approach and process of course writings and discussion. For the final grades, I will use the above decimals. Work for this course is based upon the basic writing principles taught at the lower level English courses, and I do mark spelling, punctuation, sentencing, paragraphing, and word and number usage errors, **even though these principles are not specifically covered during this course.** The students must follow standard conventions of formatting in all papers. If they do not know the standards, then they can refer to this guide, a college writer's handbook, a documentation style sheet, or other library resources.

*Note to students: Feel free to see me if you are having problems. If you need course adaptations or special accommodations because of a disability, please see me so I can make appropriate accommodations.*

#### *Standards Checklist*

The final paper evaluation will come from equal emphasis on the following twenty categories on a scale of 4.0-0.0

- \_\_\_\_\_ Components. (abstract/ historical context/ issue/ overview/ major topics/ graphics/ conclusion/ source list)
- \_\_\_\_\_ Abstract. (design /content)
- \_\_\_\_\_ Historical Context.
- \_\_\_\_\_ Issue/ Claim. (clear, contemporary)
- \_\_\_\_\_ Paper Plan.
- \_\_\_\_\_ Major Topic Development.
- \_\_\_\_\_ Major Topic Coherence.
- \_\_\_\_\_ Major Topic Support.
- \_\_\_\_\_ Major Topic Analysis.
- \_\_\_\_\_ Major Topic Transition.
- \_\_\_\_\_ Source List.
- \_\_\_\_\_ In-text Citations. (including graphics)
- \_\_\_\_\_ Source Analysis/ Application.
- \_\_\_\_\_ Primary Source Use.
- \_\_\_\_\_ Source Reliability.
- \_\_\_\_\_ Graphics Application.
- \_\_\_\_\_ Grammar: Syntax/ Word Order.
- \_\_\_\_\_ Grammar: Mechanics.
- \_\_\_\_\_ Language. (phrasing).
- \_\_\_\_\_ Topic Originality/Relevance.

## *Selecting a Documented Research Paper Topic*

The key to selecting a suitable topic is interest: both yours and your audience's. Find a topic that sparks your imagination – it could be gene splicing, harvesting tropical fish, or colonizing Mars (terraforming). If you don't feel a passion for the topic, you will have difficulty stimulating your readers' interest. Essentially, your purpose is to draw some conclusion by explaining the problems, issues, and developments within the topic. Choose something current. (See Fig. 1.) Move your audience to understanding and reflection. Your writing will emphasize information and explanation. Some people start with the big picture and focus down. Thus, the general concept of "Cloning" may be focused down to "organ farming." Some writers start with a few facts and follow any emerging patterns. In this process, the researcher may start with the splicing of corn genes with BHT, then note subsequent impact on beneficial insect populations, and follow to consequences involving pollination and new pest problems.

Make a claim. Analyze it. Avoid foregone conclusions. Critically examine popular or received opinion. Look for patterns in the facts: steady increases, decreases, limits, omissions, bias, error, etc. Remember that you are assembling some complex application out of facts and data. The information will help your audience understand the issues or problem(s). This should move them to incorporate this new information into their mental maps [their picture of reality].

Some preliminary topics used in the past have included:

Volcanic activity, electric or hybrid cars, alternative fuels, Internet taxation, retail store security, effects of fluoride treatments, artificial wetland management, hidden costs of self-employment, particular endangered species, water quality, the lethal white gene, the Euro dollar, low carbohydrate diets, chiropractic care, osteoporosis, acupuncture, Echinacea, organ cloning, hearing loss, diabetes, Down's Syndrome, the Gulf War Syndrome, automotive safety, software piracy, Moore's Law, plastic surgery, overuse of antibiotics, concussions in athletics, cell phone technology, cell phone health effects, financial impacts of professional sports, Vitamin C and cancer, aluminum's link to breast cancer, . .

### *Sorting Out Your Topic*

To work through a possible topic, we first look for current discussion. For example, you might be interested in the pet industry. You could begin by brainstorming the topic. Questions of breeding, species, pedigrees, costs, health, diet, disease, etc. could all come to mind. Identify the current research. What issues are being addressed? Examine the causes, conditions, controls, outcomes, etc. of the particular research.

You may wish to focus on a single species, such as cats, or a single breed within the species, such as Siamese cats. Within the general classification of "Asian Cats" your research could lead you into an examination of related breeds such as Ramese, Tonkinese, Burmese, Mandalays, Bombays, Burmillas, Spotted Mist, etc. The direction you take could just as easily focus on particular individuals who study the breeds.

Your research could also delve into areas related to the species in general, such as diet and nutrition. An advanced keyword search involving cats, diet, and nutrition may find research comparing dry food vs. moist food. Controversies revolving around the benefits of raw food vs. cooked/processed food or table scraps may also be the source of current debates and research. Some researchers may be investigating the differences [if any] between animal and vegetable protein in cat diets.

Review research publications or veterinary journals on cats in general. Are certain breeds more susceptible to certain disease or genetic disorders? Do cats need a "balanced" diet similar to humans?

Go to a pet supply store or a grocery store. Examine the products being sold for cats - what claims do the packages advertise? Study the product literature. Interview a veterinarian to learn what topics, if any, are "hot" in the academic discussion.

Review your preliminary research. Set out your paper plan. What does the body of your paper (your research) intend to do? You could choose one or more of the following:

- 1) Describe causes and how to lower costs and increase benefits.
- 2) Describe existing conditions and indicate trends.
- 3) Describe human interventions and how plans are developed and implemented.
- 4) Describe an intervention program and its outcome.

Remember that your paper will focus on some analysis and discussion on the causes, existing conditions, controls, and/or outcomes related to the topic.

## *Analyzing Claims*

We begin to analyze claims by categorizing three types: testable, categorical or conceptual, and animistic or moral. These types correspond roughly to the categories defined by statements of fact, concept, and value. They also correspond roughly to the categories defined by predictions, definitions, and judgments. Claims can also be empirical or non-empirical and the words can indicate both positive (measurable) and normative (consensual) conditions.

When doing research in science and business, the researcher emphasizes objective references, measurements, and processes that are in theory reproducible by an audience. The aim is explanation and logical analysis. Self-expression, literary analysis, and persuasion are not aims or targets of the research and resulting documents. Thus, science, engineering, and business place emphasis on claims that are falsifiable, factual, and predictive.

Once one has constructed a testable claim, the next step is to dissect that claim in order to narrow the scope of the research and experimentation. “You can start looking for data to test [your claim]. That doesn’t mean lining up all the sources you can find and plowing through them to see what turns up. You want to look for *reliable* sources whose data let you test your hypothesis because they support it or, more importantly, challenge you to alter or abandon it” (Booth, Colomb, and Williams 75). In other words, you need to identify and consider the essential components to your claim and how they contribute individually and collectively to the question, issue, problem, etc.

This dissection includes laying out the issues or defining the problem. One also wants to explicitly state the assumptions behind the claim which may indicate bias or covert purpose [intentional or not]. One would also analyze the verb in the claim. How will the action or event be measured? One can further focus by determining if the measurement assumption is valid. For example, when determining whether we are cutting down too many trees, does one measure “trees” by the number planted, by acres in plantations, by potential board feet of harvestable timber, by board feet per capita, or by photosynthetic carrying capacity? By interrogating the claim – asking what, where, when, how, how much, so what, and why – we can uncover the assumptions which motivate the claim.

The final step provides a reconstruction of the original claim, reversing the formulation process. Often when we rebuild claims, we may uncover associated topics that divert us from our original claim. If the researcher decides to investigate such diverting paths, the entire disassembling and reconstructing process should be repeated for the new claim.

Once we have determined a claim that is testable [falsifiable], disassembled it, and begun to rebuild it, we have begun to develop a hypothesis which we can test through our research.

### *Examples of Preliminary Claims*

Study the following examples of claims and determine which you would discard. Be prepared to support your decisions.

1. Geothermal energy offers the most reliable and affordable alternative residential energy source.
2. In today's society, the increasing desire to look thin can cause Anorexia Nervosa.
3. Excessive alcohol use by women can increase the chances of developing breast cancer.
4. The use of alcohol based mouthwash can be detrimental to gum health.
5. The switch to HD television will improve the quality of life for American families.
6. Overuse of antibiotics has accelerated the rate of bacteria resistance.
7. Artificial food colorings should be banned because of their link to cancer.
8. Non-animal experiments yield more accurate and reliable information regarding human health than the more commonly used animal methods.
9. Current regulations on the testing of AIDS vaccines have caused the epidemic to increase.
10. Most sun block products do not prevent the forms of sunlight which cause serious cancer.
11. A glass of red wine with dinner can reduce the risk of heart attacks.
12. The fatality rate for heart attacks for women is much higher than for men.
13. Children in the United States use too much fluoride.
14. Chocolate serves as an anti-depressant for women more than for men.
15. Shade grown coffee produces a better tasting coffee bean.
16. The practice of releasing hatchery-raised fish has contributed to the decline of the catch.
17. The fishing treaties with the Native American tribes need to be rewritten.
18. With the development of the new drug Ripitin, the lives of epileptics have been improved.
19. Soy milk provides calcium and protein in a more easily digestible form than the protein and calcium found in cow's milk.
20. The use of computer designed athletic equipment has contributed to many new competition records.
21. The stock market is a risky investment for elderly people.

*(Example Memorandum)*

January 12, 2009

To: Walter Lowe

Fr: Mel Dumare

Re: Approval of Paper Topic and Claim

I have had problems with motion sickness and must take medication before traveling. However, when I once took some vitamin capsules instead of my similarly packaged motion sickness capsules, I had no symptoms of motion sickness on that trip. When I explained this to my doctor, he dismissed it as “The Placebo Effect” and recommended that I continue to use my regular medicine.

This experience has inspired me to select The Placebo Effect as my research paper topic. It is my claim that the success of medical treatment is often influenced by unspecified factors more than the 33% which is often attributed to The Placebo Effect. To support my claim, I will study the historical use of placebos and research on The Placebo Effect as well as the reliance upon the use of placebos in medical research. I will primarily consult journals and current field studies to find statistics and gather data. To be as objective as possible, I will include research from both proponents and opponents of the influence of placebos. I will also investigate the trends of reliance upon placebos in current research. In addition, I will schedule an interview with at least one local research company or university medical researcher.

Please assess whether an analysis paper on this topic is acceptable for the quarter’s documented paper topic.

*Example Memorandum-b*

January 9, 2009

To: Walter Lowe

Fr: Mel Dumare

Re: Approval of Paper Topic and Claim

Many people today are concerned about the effects of the use of chemicals to produce food supplies. Many growth hormones are fed to animals used for human consumption, and genetic engineering has altered the DNA composition of many fruits, grains, and vegetables. Even though the Federal Drug Administration [FDA] supervises the testing of these food items, many people are worried that the long-term negative effects of these altered foods may not be apparent for many years. Current scientific testing methodology uses double blind experiments using a placebo control group. In spite of these tests, many food items tested as safe have later turned out to be carcinogenic and have been taken off the market. Some studies on laboratory animals have indicated that a continued diet of processed food produces genetic problems in the second or third generation, even though the accepted research methods indicated that the food products had no harmful effects. This was never indicated during the placebo testing.

Due to this current situation, I have selected The Placebo Effect as my research paper topic. It is my claim that the results of double blind testing is often influenced by outside influences more than the 33% which is often attributed to The Placebo Effect. To test my claim, I will study the historical use of placebos and research on The Placebo Effect as well as the reliance upon the use of placebos in scientific research. I will primarily consult journals and current field studies to find statistics and gather data. To be as objective as possible, I will include research from both proponents and opponents of the influence of placebos. I will also investigate the trends of reliance upon placebos in current research. In addition, I will schedule an interview with at least one local research company or university medical researcher.

Please assess whether an analysis paper on this topic is acceptable for the quarter's documented paper topic.

## *Developing Material for the Background Statement and Business Letter*

### A. Background Statement.

As a starting point of your research, write a 250-word background summary of one to two paragraphs on your topic. In your commentary, focus on the historical development and current relevance of your topic. This should form the foundation for the particular question, issue or claim which your paper will examine. The background statement should help explain the basis of your paper's focus. The information may come from (one or more) encyclopedia articles, journal articles, or book content. This initial document will be revised at least one more time for the Dummy and the final paper.

### B. Letter of Inquiry.

Follow the following steps to produce a letter of inquiry for help in researching your topic.

1. Select an author working on or within your interests or claim and get a research report or experiment he or she has written.
2. Immediately write down the correct source list entry based on the style standard you have selected. [APA, MLA, CSE, or CMS.]
3. Read the report or experiment and take notes, writing down exactly [quoting] the author's important findings or conclusions.
4. Identify the simplest forms of objective truths - *e.g.* unit measures, ratios, professional standard procedures, and/or statistical tests.
5. Critically examine the author's conjecture, claim, hypothesis and determine whether the author has explained or whether you can explain under what condition the claim is false.
6. Examine the sources which the author has used. If none are cited, note whether or not the author has generated his or her own data/support or has merely generalized. Include any questions you may have about the research or experiment and the author's discussion.
7. Write a paragraph giving your assessment of the report or experiment especially noting how it relates to your topic and/or claim.
8. Write a formal letter to the author based on your assessment and ask any questions you have about the article. You should also request further information to help you support your own claim or pursue the issue/question you are researching.

Turn in copies of the letter, the original article, and your paragraph of assessment of the article.

### *Business Correspondence: Letter of Inquiry: How to Get Information*

Effective business correspondence is neat, complete, courteous, and clear. Your next class assignment is a formal business letter. This assignment is to write a letter of inquiry to a source. I will review the letter and return it with comments. I may ask you to revise and return the letter before you receive credit.

#### Instructions

1. Two sample letters are available for your review.
2. Center the body of the letter. The left margin should be 1¼ inches and the right margin 1 inch. The text should not drop below 1 inch on the bottom margin.
3. Use a letterhead or type a heading consisting of your name, address, and e-mail address.
4. Include a dateline separated from the heading by one white line.
5. Display, in order, (if known) the addressee's name, position, business, business address, and zip code. Vertical spacing will depend on the length of the letter, but it usually begins four white lines after the dateline.
6. The salutation varies with the formality of the letter. Informal or personal letters may begin with Dear Frank, etc., but formal business letters begin Dear Ms. Henson: Dear Mrs. Jones: Dear Sir: Ladies: or Gentlemen:
7. Never follow a salutation with a semicolon (;)--use a colon (:) in formal addresses.
8. The body should be single spaced, but the paragraphs double-spaced. Indent if you wish. (Indented is "semi-block," which is considered less formal.)
9. Write short sentences (under 20 words) which, in the first paragraph, introduce you, your context (student at college, lab tech with this-institution) and your need. In the second paragraph detail your request. Be specific. Finally, in the last paragraph, ask to hear from them and offer some thanks.
10. Conventional closing lines are Sincerely, Cordially, Sincerely yours.
11. Submit a copy of the letter to me.
12. Revise the letter per instructions.
13. Mail the letter (not required but recommended).

*Example: Letter of Inquiry, Block.*

Mel Dumare  
12401 S.E. 320th Street  
Auburn, WA 98002  
placebo@hotmail.com

April 15, 2009

John Mack  
Vir Sci Corporation  
2761 Trenton Road  
Levittown, PA 19056  
johnmack@virsci.com

Dear Mr. Mack:

I am a pre-med student at Green River Community College. I have just begun a documented research paper on placebo use in the medical field. Having seen some placebo studies listed on the PharmInfoNet web page produced by Vir Sci Corporation, I seek your assistance in locating field studies and current research projects. I would like to finish a background statement in the next few weeks for the paper due in late May.

My problem is that I cannot locate any specific studies of the use of Placebo Therapy. In my research, I have found general references to placebo use in medical research, but I have not found particular studies on the use of Placebo Therapy by medical practitioners. Although your web page referred to this use of Placebo Therapy, you did not cite any specific case studies. If you have a resource list or relevant Internet websites, I would appreciate copies. You can send them to placebo@hotmail.com or the above address, whichever is most convenient for you.

Again, I have just started my research, so I am not sure of the problems or issues typical of placebo studies related to Placebo Therapy. Your help would be very valuable. Please write back at your earliest convenience and include any suggestions on research methods you might recommend. I look forward to hearing from you.

Sincerely,

Mel Dumare

*Example: Letter of Inquiry, Modified Semi-block*

Mel Dumare  
12401 S.E. 320th Street  
Auburn, WA 98092  
placebo@hotmail.com

April 10, 2009

Krista J. Clark  
Institute of Synergistic Medicine  
1506 Franklin St., Ste. 104  
Chapel Hill, NC 36105

Dear Dr. Clark:

I am a pre-med student at Green River Community College where I have just begun a documented research paper on placebo studies due in late May. I would like to finish a background statement in the next few weeks. I found your article "What's Wrong With the Placebo Effect" defending the use of placebos quite helpful in understanding the complexity of the issue.

My purpose in writing is to ask for more information regarding that article. In the article you referred to other articles which you have read; however, my version of the article did not include any bibliography for your article. Even with the help of the school librarians, I have not been able to locate an article copy with the bibliography. I would sincerely appreciate details on specific issues which researchers must face in identifying the placebo effect. If you have a resource list or relevant Internet websites which could guide me to further my research, I would deeply appreciate copies. You can send them to placebo@hotmail.com or the above address.

Again, my research is in the preliminary stages, so I am not sure of the problems or issues typical of placebo studies. Your help would be quite valuable. Please write back at your earliest convenience and send any primary research material you feel will be helpful. Of course, I will cite you in my research.

Sincerely,

Mel Dumare

### *Writing the Complete Background Statement (Introduction)*

The complete “Background Statement” serves as the introductory section of the paper. This section sets the stage for the overall paper discussion. A good background statement includes several paragraphs which cover three distinct elements.

#### **Historical Context.**

The first few paragraphs of the background statement should include relevant historical information. Introduce the basic events and conditions which led up to the question, issue, or claim you are researching. The historical background should be pertinent to the particular focus you will take in your research. This section should use information from pages 9 and 12 of this *Course Guide*. (This section should be an expanded version of the previous assignment.)

#### **Question, Issue, or Problem.**

At least one paragraph needs to summarize the reason for writing the report, the question to be answered, the issue laid out and analyzed, or the problem defined and alternative solutions presented. In some cases, this content can be integrated with the historical context in tracing how the particular issue has emerged; however, some clear indication of purpose for discussion should come as a thesis statement or a hypothesis at the end of the historical context.

#### **Paper Plan.**

The final paragraph of the background statement should give an overview of the paper’s organization. This paragraph should present the major heading or subtopics developed in the report in order of their appearance. The nature of the conclusion should be indicated, but the details of the conclusion should be reserved for the end of the paper itself. For example, you could state, “the paper concludes with predictions of the impact on [your topic] in the future,” without specifying what impacts you anticipate the research will have.

### *Instructions for Constructing a Dummy*

1. Take about 20 pieces of paper, punch holes in them and place them in a three-ring binder.
2. Put a heading on each of the pages starting with the Title page and proceeding through to the Works Cited page. Include the following major headings: Title, Abstract, and Works Cited. Also include the following sub-headings: Background, at least three specific topical headings, and Conclusion/ Discussion/ Recommendations. If your paper will include technical vocabulary, include a glossary ( or Key Definitions) page after the background section or before the bibliography section.
3. Leave sufficient space under each heading to contain a generous description of the heading topic.
4. Outline areas where illustrations will go. Note the area for text reference to direct the readers to the illustrations.
5. Sketch in paragraphs under each topic heading. Indicate where paragraphs of introduction, source material, transition, and explanation/analysis will occur.
6. Begin inserting key quotations.
7. Include the authors with the quotation.
8. Put in the correct parenthetical notation, according to the documentation style for your discipline [APA, MLA, CBE, CMS, or other?].
9. List specific sources on the bibliographic pages.

Note dummy checklist on the next page.

*Dummy Checklist*

Attach or tape the following checklist to the inside of a three ring binder which holds your dummy. Check each item as it is completed.

- \_\_\_ Title Page
- \_\_\_ Abstract
- \_\_\_ Historical Background
- \_\_\_ Key Questions/Issues (Claim included?)
- \_\_\_ Paper Plan

(First) Topic Heading

- \_\_\_ Introduction
- \_\_\_ [1] Source Evidence/Example
  - \_\_\_ Illustration
  - \_\_\_ Quote
  - \_\_\_ Paraphrase
  - \_\_\_ Citation
- \_\_\_ Explanation/discussion of source material
- \_\_\_ Transition
- \_\_\_ [2] Source Evidence/Example
  - \_\_\_ Illustration
  - \_\_\_ Quote
  - \_\_\_ Paraphrase
  - \_\_\_ Citation
- \_\_\_ Explanation/discussion of source material
- \_\_\_ Transition
- \_\_\_ [3] Source Evidence/Example
  - \_\_\_ Illustration
  - \_\_\_ Quote
  - \_\_\_ Paraphrase
  - \_\_\_ Citation
- \_\_\_ Explanation/discussion of source material
- \_\_\_ Transition
- \_\_\_ Conclusion to Topic Heading
  - \_\_\_ Integration of all source evidence/examples

(Second) Topic Heading

- \_\_\_ Introduction
- \_\_\_ [1] Source Evidence/Example
  - \_\_\_ Illustration
  - \_\_\_ Quote
  - \_\_\_ Paraphrase
  - \_\_\_ Citation
- \_\_\_ Explanation/discussion of source material
- \_\_\_ Transition
- \_\_\_ [2] Source Evidence/Example
  - \_\_\_ Illustration
  - \_\_\_ Quote
  - \_\_\_ Paraphrase
  - \_\_\_ Citation
- \_\_\_ Explanation/discussion of source material
- \_\_\_ Transition
- \_\_\_ [3] Source Evidence/Example
  - \_\_\_ Illustration
  - \_\_\_ Quote
  - \_\_\_ Paraphrase
  - \_\_\_ Citation
- \_\_\_ Explanation/discussion of source material
- \_\_\_ Transition
- \_\_\_ Conclusion to Topic Heading
  - \_\_\_ Integration of all source evidence/examples

Repeat for each additional Topic Heading

- \_\_\_ Discussion/Conclusion
- \_\_\_ Works Cited/References/Bibliography (according to particular documentation style)

### *Illustrating the Research Paper*

In your paper you **must** include at **least three** illustrations, with a variety of two or more different types. In other words, you cannot just download three pictures from the Internet. Data tables, graphs, charts, drawings, photos, exploded views, schematics, sketches, lists, diagrams, etc. all aid in transfer of your quantitative information to the audience. They should enhance your discussion and not intrude upon it. Whether you are producing your own graphics or reproducing work from your research, generally accepted rules for illustration include the following:

- Show the data.
- Induce the reader to think of substance, not design.
- Avoid distorting what data have to say.
- Present many numbers in a small space.
- Make large data sheets coherent.
- Encourage the eye to compare different pieces of data.
- Reveal data at several levels of detail.
- Give the viewer the greatest number of ideas with the least ink.
- Serve a purpose: description, exploration, and/or tabulation.
- Be closely integrated with verbal descriptions.

When including the illustration in your paper, remember to include all of the following elements:

- ✧ A number for each illustration which also appears in the text of your paper with a discussion of the significance of the illustration.
- ✧ A descriptive title which identifies the significance or relevance of the illustration. (For example, a diagram of the photosynthesis process may be used to emphasize the role of sunlight in one instance, while it may be used to focus on the role of CO<sub>2</sub> in another instance. A good title tells your audience what you feel the importance is. *e.g.* "The Role of CO<sub>2</sub> in Photosynthesis" is much better than "The Photosynthesis Process.")
- ✧ A key to identify the meanings of numbers, letters, and labels.
- ✧ A source citation. If you have generated the illustration on your own, indicate the source of your data (Houp 273-275, Markel 351-361).

**Remember:** The illustration should be yours. Use your own title and explain the significance.

Make sure the illustration can stand alone.

*Taxis, Dispositio (Getting Organized and Under Way)*

Once you have the Dummy's basic skeleton assembled, you can begin to "flesh out" the substance of your paper. Each section can now be put together in coherence with the entire paper's organization. The Dummy lays out the paper.

Since your paper's purpose is to explain and analyze (report and interpret) and your readers are educated and generally familiar with the topic, they will expect to find a focused purpose and direction that drives the organization and content. Thus, you offer generalizations, support with specifics, and close with assessment and application.

Your paper's basic structure has the essential components of introduction, body, and conclusion interwoven at each level of organization. Your background section will serve as the introduction to lay a foundation for the main body discussion. You have chosen the particular headings to support the issue, claim, or question set up by this background discussion. The overall conclusion addresses the "so what?" of the paper to connect the significance of the research findings to the lives of the audience.

Likewise, within each topic heading discussion, the organization is clear and focused. The general nature of the specific topic heading is introduced in connection to the central issue, claim, or question. This general introduction does not repeat historical background. Source material and research data (including graphics) follow to provide specific evidence within this topic heading's relevance to the issue, claim, or question. Analysis and transition follow the evidence. The evidence does not provide support in and by itself. Unless **you** explain the importance or significance of the evidence, you are only reporting observations, and your readers must do the interpretation and analysis without your help. **In essence, you are expecting them to do the work!** If the information/analysis is obvious based on the evidence, why do they need you? (Often they will "read" the evidence differently than you might.) This pattern continues throughout every topic section.

## *Citation Strategies*

In your writing you should try to accomplish two goals simultaneously: accuracy of content and smooth transitioning between source material and explanation. One way to do this is to use transitional commentary in your text discussion. Even when you use quotation marks to indicate quoted material, an abrupt shift from your discussion to the source material will disrupt the flow of the text as well as the reader's concentration. Note the following examples:

The reliability of The Placebo Effect is one of the main complaints. "The unexpected reaction to the form of the delivery of the medical substance rather than the substance itself can never be adequately predicted" (Chojke and Phlegm 410). The patients' reactions could have improved the effect or they might have made the medicine less effective.....

The reliability of The Placebo Effect is one of the main complaints. In their research on the effects of nonspecific factors in medical efficacy, Chojke and Phlegm noted, "The unexpected reaction to the form of the delivery of the medical substance rather than the substance itself can never be adequately predicted" (410). In other words, a patient may react in fear upon seeing a hypodermic needle or the patient may have no confidence in a pill with a pink colored coating. Chojke and Phlegm explain that the results could be negative or positive, depending on the patients' previous experiences....

In the second example, the transition between text and evidence is smoother and the explanation afterward helps clarify the meaning and application of the source material as evidence for the opening idea.

Other transitional phrasings could be as simple as:

Arthur Auburn suggested ...

As Auburn's comments indicate ...

In his paper, Auburn maintained ....

In their NASA funded research, Kent and Auburn discovered ...

Kent's research indicates ...

Auburn's work was advanced by Kent when .....

In his research conclusion, Buckley concluded (asserted) (stated) (defined) (postulated) (established) (exposed) (revealed) (held) (claimed) (demonstrated) (disproved) .....

***Make sure that you present your evidence and then explain how you feel it should be applied. Don't just lay out your evidence and expect it to speak for itself. Like lawyers in a courtroom, you do not want your jury to jump to their own conclusions.***

### *Errors Found During Review of Complete Drafts*

1. Draft is not spell-checked. (Standard: Not more than two minor punctuation errors or spelling errors per page and not more than two major grammar errors per paper [e.g. fragments, weak passives, subject-verb agreement, etc.].)
2. Sources in Works Cited do not appear in text. (Standard: All Works Cited appear in text. Exceeding this standard involves the introduction of sources; accurate quotation of a source's key phrases, ideas, and data; and the analysis of source limits or errors.)
3. Purpose, method, and conclusion are not present in the Abstract. (Standard: Required.)
4. Text references to graphics/illustrations do not include location or page reference. (Standard: Required.)
5. Heading pattern is inconsistent. (Standard: Parallel order with paper plan and formatted consistently. No more than two errors in layout and display - including capitalization.)
6. Graphic/illustration titles are vague, frames are overdrawn or absent, abbreviations are not explained, purpose for insertion is unclear, and/or sources are incomplete. (Standard: At least three properly integrated and complete graphic/illustrations per paper, including a variety of two or more types -graphs, tables, charts, maps, photos, etc.)
7. The paper plan paragraph is missing or vaguely stated in the background statement. (Standard: Parallel development of at least three sub-sections or sub-topics directly related to the paper's purpose.)
8. Documentation is used inconsistently or not at all. (Standard: Use a Works Cited/References page in conjunction with in-text citation throughout the paper according to documentation style protocol of CBE, APA, MLA, CMS or ?.)
9. Primary and secondary sources are not differentiated. (Standard: Review at least one work of a primary researcher doing an experiment, show the research data, and quote directly from that primary source.)
10. Paper relies on out of date references. (Standard: Paper analysis draws upon material current within the past five years, includes material of the last year or two, and comments on material with future proposals.)
11. The paper has a narrow scope and/or a limited foundation by referring to too few pages or from outdated references. (Standard: Two relevant sources or studies with specific experimental or survey data in the last five years, including one in the last two years.)

## **Guide for Oral Reports**

### Objective

The oral reports give students the opportunity to present the results of their documented research with an emphasis on information exchange about issues, principles, and procedures. They encourage the habits of assessment based on reason, evidence, logic, and good sense.

### Five Presentation Requirements.

1. Introduce yourself, your paper topic, and explain need (question, issue, claim, problem)
2. Summarize the main points of discussion with an overview of how the material is organized.
3. Introduce evidence and sources for each main point.
4. Describe your conclusions, hunches, insights, concerns for further study, etc.
5. Ask for questions and discussion.

## **When Listening to Reports**

On a separate page for each speaker, write the date, the speaker's name, the topic, and a basic outline which includes the main points. Include any questions you have about the topic, evidence, sources, conclusions, etc. Keep these notes, as you will probably have an assignment or activity associated with them.

## Works Cited

- Booth, Wayne C., Gregory G. Colomb, and Joseph M. Williams. The Craft of Research. Second edition. Chicago: Univ. of Chicago Press, 2003. Print.
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- Houp, Kenneth W., Thomas E. Pearsall, and Elizabeth Tebeaux. Reporting Technical Information, 9<sup>th</sup> Ed. Boston: Allyn and Bacon, 1998. Print.
- Markel, Mike. Technical Communication: Situations and Strategies, 5<sup>th</sup> Ed. New York: St. Martin's Press, 1998. Print.