

# **Reporting Requirements for ABEN and ASM Students**

Agricultural and Biosystems Engineering

&

Agricultural Systems Management

Programs

**Agricultural and Biosystems Engineering Department  
North Dakota State University  
Fargo, ND 58105-5626**

This booklet is a guide to provide you with information about the required format for the solution of problems and for laboratory reports for courses in the Agricultural and Biosystems Engineering and Agricultural Systems Management programs. The format for problem solution and laboratory reports **is required, not optional**, in both ABEN and ASM programs. Your instructor may modify the format or require additional information. These requirements, if any, will be explained to you in that particular class.

This booklet also includes information on proper grammar, writing style, and format for the preparation of reports and term papers. It includes information on the development of graphs and tables and the proper use of figures in a report. Also included is information on proper writing style and grammar. In addition, it contains information concerning proper citation of references and a bibliographic listing.

Much of what is included is excerpted from the requirements for publication of ASAE papers journal articles. ASAE is your professional organization. You should be familiar with this technical writing style. Other parts of the booklet have been taken from the NDSU Graduate School requirements for the preparation of disquisitions to ensure writing uniformity and quality.

The Agricultural and Biosystems Engineering faculty hope these guidelines are helpful to you. The faculty feel it is important that every student learns to express himself/herself in both oral and written form; employers are demanding it. The faculty are also using this format to make grading not only easier, but more consistent.

**NORTH DAKOTA STATE UNIVERSITY**  
**Agricultural and Biosystems Engineering Department**

**REQUIRED FORM FOR PROBLEM SOLUTION IN**  
**AGRICULTURAL and BIOSYSTEMS ENGINEERING**

&

**AGRICULTURAL SYSTEMS MANAGEMENT**

1. All problems should be worked on 8 ½ x 11 paper.  
**Do not use paper from a spiral bound notebook!**
2. Necessary diagrams should be made with a straight edge or computer rather than freehand.
3. A single line through mistakes is acceptable if neat erasures cannot be made.
4. Answers must be clearly identified
5. The form for a typical problem sheet would be as follows:

	Date	Course Number	Name	Page No.
○	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; width: 40px; height: 20px; transform: rotate(45deg);"></div> <span>Chapter Number</span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="border: 1px solid black; width: 40px; height: 20px; transform: rotate(-45deg);"></div> <span>Problem Number</span> </div> <p>Given: _____</p> <p>Find: _____</p> <p>Solution:</p> <p style="padding-left: 40px;">Theoretical basis (if applicable)</p> <p style="padding-left: 40px;">Assumptions (if applicable)</p> <p style="padding-left: 40px;">Sketch</p> <p style="padding-left: 40px;">Analytical calculations</p> <p style="text-align: right; padding-right: 20px;">_____ Answer</p>			
○	<div style="border: 1px solid black; width: 40px; height: 20px; transform: rotate(45deg);"></div>			

**NORTH DAKOTA STATE UNIVERSITY**  
**Agricultural and Biosystems Engineering Department**

**Instructions for Writing Laboratory Reports in**  
**AGRICULTURAL and BIOSYSTEMS ENGINEERING**  
**&**  
**AGRICULTURAL SYSTEMS MANAGEMENT Courses**

All laboratory reports are to be typed (word processor or computer) on 8½ x 11" paper. Use only one side of the paper and double space. Reports are to be stapled in the upper left hand corner before being turned in to the instructor.

The report should include the following;

1. Title page (see attached example)
  - a. Name
  - b. Lab partner's name (s)
  - c. Course number and section
  - d. Experiment number and title
  - e. Date due
2. Introduction section  
State the title and objectives of the laboratory in your own words.
3. Theory section  
Write a concise and pertinent discussion of the theory.
4. Procedure section  
State, in your own words, the procedures you used to arrive at the results. Draw and refer to sketches or flow diagrams when possible.
5. Equipment list section  
The list of equipment and apparatus used in performing the laboratory exercise. The list of equipment should include: make, model, serial number, scale range, etc. The use of a sketch to illustrate the procedure(s) or equipment is encouraged. Sketches should be drawn with a straightedge or computer rather than freehand.
6. Sample calculations section  
Show a sample of each type of calculation that was made.

7. Results and discussion section

The results should be in the form of tables or curves and graphs and discussion. Curves and graphs showing the test data should be plotted on appropriate graph paper or generated with a computer. Base lines should be one inch from the bottom and one inch to the right of the left edge of the paper. Curves should be drawn with the aid of a French curve or be generated by the computer program. When possible, place the independent variable on the horizontal axis of the graph. A title is to be included. See attached example. In the discussion, the results should be interpreted and should satisfy the objectives as listed in the introduction. Compare experimental data with expected results or references. Discuss sources or causes of error. All questions should be answered in this section. Also include any suggestions for improving the laboratory project.

8. Conclusions section

Write statements that are clearly supported by data and results and discussion section.

9. References

State all references used in the report and use footnotes if necessary.

10. Appendix

Data

Show all data taken in the laboratory and include laboratory data sheets when they are provided.

Computer program

If a computer program is used for the project, indicate the name of the program used. Results or print-out from the program can be used in the results section. Include file name information for your future reference.

Handouts

Any handouts received in class are to be included in this section.

A penalty will be assessed to the report grade for failure to follow the above instructions or failure to turn the report in to the instructor by the due date.

**Course Number and Name**

**Report Number**

**Report Title**

**Date Due**

**Performed by:**

**Lab partner (s):**

**GRADING**

<b>Item</b>	<b>Max. Pts.*</b>	<b>Pts. Off</b>
Introduction	?	
Theory	?	
Procedure	?	
Equipment	?	
Sample calculations	?	
Results and discussion	?	
Conclusion	?	
References and Appendix	?	
Neatness, proper grammar and spelling	?	
<b>Total</b>	_____	

\* Point values determined by the instructor

## CAPITALIZATION

Follow the common rules for capitalization in the text (proper names, first word in the sentence, etc.). In addition, use capitals for the following items:

1. Regions, sections, or groups of states commonly associated together, i.e., the Corn Belt, North Atlantic States, the South, Midwest, etc.
2. The first letter of genera, family, order, etc., but not species which should be in *italics*.
3. Trademarked names, but not adjectives derived from them.
4. The first word after a colon, if it begins a clause not logically dependent on the preceding clause.
5. The names of stars or other astronomical bodies, except the sun, moon, and earth.
6. Any title immediately preceding a name; President Clinton, but not a descriptive phrase which follows a name; Mr. Clinton, the president.

## TABLES

Tables in a report should use the same base font as the text. However, the font size can be different to accommodate inclusion of all data. However, appropriate top, side, and bottom margins must be maintained.

The word "Table," the correct table number, and a period are typed centered above the table. The title follows the same line. If longer than one line, the title is single-spaced; and additional lines are typed flush left. Only the initial letter of the first word and initial letter of all proper nouns are capitalized. There is no ending punctuation.

A line separating the title and body of the table should extend the width of the page within the margins. Another line separating the table and notes should also extend the width of the page.

All abbreviations and symbols within the table must be identified through footnotes or notes used at the end of the table.

Two tables on the same page must be separated by at least one-half inch.

**EXAMPLE**

Table 2. Speed and torque used in tests 1 and 2.

Test	Speed (rpm)	Torque (lb-ft)
1 <sup>a</sup>	1000	2000
1	1250	2465
1	1500	2830
2 <sup>b</sup>	1000	2125
2	1250	2670
2	1500	2992

<sup>a</sup> Test run on October 12, 1993

<sup>b</sup> Test run on October 24, 1993

**FIGURES**

Titles and legends for figures should be produced in the same font and style as the text when possible.

The word "Figure," the correct figure number, and a period are typed flush left below the figure. The title follows on the same line. If longer than one line, the title is single-spaced; and additional lines are typed flush left. Only the first word and initial letter of all proper nouns are capitalized; ending punctuation is a period.

When the figure is "landscape" oriented, the title must also be "landscape" oriented.

All abbreviations and symbols within the figure must be identified.

Two figures placed on the same page must be separated by at least one-half inch.

## EXAMPLE

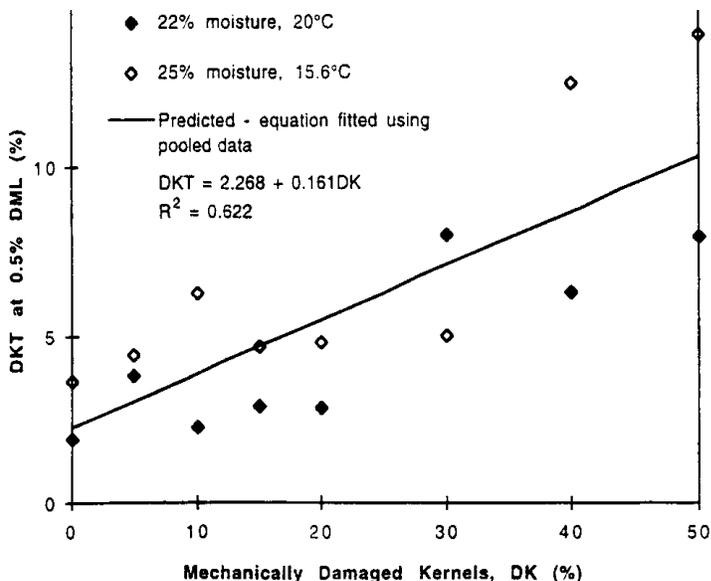


Figure 5. Total damaged kernels (DKT; mostly mold damage in this study) at 0.5% dry matter loss as a function of mechanical damage (as determined by visual inspection) for two storage conditions.

## REFERENCES

Your references should aid the reader, librarian, or indexer to retrieve the items cited.

- Place all bibliographic references together at the end of the text in the references section.
- Arrange the list alphabetically by the names of the first author followed by the second and third authors if necessary.
- List two or more articles by the same author (or authors) chronologically from oldest to most recent.
- Indicate two or more articles by the same authors in the same year by the letters a, b, etc. For example: 1987a, 1987b, etc.
- Place single-authored articles before those in which the individual is the senior joint author.

There must be a text citation for each reference and vice versa. The preferred method for giving references in the text is the name-year system, as in Bowen (1966). The form used for citing the reference in the text varies according to the construction of the sentence in which it occurs as in Bowen (1974), or (Bowen, 1974), or Bowen and Smith (1974). When there are three or more authors use the form Bowen et al. (1966). Include initials and given names as in the referenced articles, but when both initials and names are used for the same person, make them consistent in your list.

References to a book or bulletin must give the author or authors, the year, the title, the edition if other than the first, the city of publication, and the publisher. If particular pages in a book are cited, mention them in the text. Do not capitalize the titles of articles, bulletins, or reports except for initial letters and proper names. Abbreviate the names of federal agencies when such abbreviations are clearly understood (USDA, EPA, NRCS).

Theses that are available on microfilm and have been assigned numbers by the Library of Congress or the Dissertation Abstracts may be included in the list of references. References to other theses must be shown in parentheses in the text. If available, the Library of Congress or the Dissertation Abstracts number must be given in the reference.

Patents and ASAE meeting presentation papers on file at ASAE headquarters may be listed in the reference section. For additional information, consult *The Chicago Manual of Style*, 14th Ed.

A few of the more common types of references follow. Always double-space references in the manuscript you are preparing. Include the complete title of the publication being cited.

### **Book**

- Allen, J. S. 1988. *The Complete Dictionary of Abbreviations*. New York: MacMillan & Sons, Inc.
- Cool, J. C., F. J. Schijff and T. J. Viersma. 1991. *Regeltechniek* (Control Engineering). Overburg, Germany: Delta Press.

### **Part of a Book**

- Overstreet, H. A. 1925. The psychology of effective writing. In *Effective Report Writing: Principles and Practices*, ed. W. H. Pierre, ch. 3, 87-109. Chicago: Graphic Publishing Co.

### **Bulletin**

- James, D. 1980. United States fruit and vegetable harvest projections D 1990. USDA-1007. Washington, D.C.: GPO.

### **Computer Documentation and Programs**

- (The year of publication and trademark symbol are unnecessary.) Lotus 1-2-3 Rel. 2, ch. 6. Cambridge, Mass.: Lotus Development Corp. *SAS User's Guide: Statistics* Ver. 5, pp. 60-70. Cary, N.C.: SAS Institute, Inc.

### **Dissertation or Thesis**

- Weed, D. J. 1992. Effect of tillage and crop rotation on soil nitrate and moisture. M.S. thesis. Ames: Iowa State Univ., microfiche.
- Workman, S. R. 1990. Development and application of a preferential flow model. Ph.D. diss., Biological and Agricultural Engineering Dept., North Carolina State Univ., Raleigh.

### **Government**

#### *Congress-*

- U.S. House Committee on Conservation Needs and Opportunities. 1986. Soil conservation: Assessing the national resource inventory, vol. 1. Washington, D.C.: National Academy Press.

#### *State/Local-*

- Arizona Water Commission. 1992. Arizona State Water Plan, Phase 1, Inventory of resources and uses. Phoenix: State of Arizona.

## **Patent**

Boulart, J. 1983. Process for protecting a fluid product and installations for the realization of that process. French Patent No. 2513087 (In French).

## **Personal Communication**

In the text, include references to correspondence or to conversations either in person or by telephone. It is unnecessary to include personal communications in the reference list since they are not usually available to the public. For example: C. Williams, personal communication, St. Joseph, Mich., 22 November 1991.

## **Proceedings**

Cundiff, J. S., D. H. Vaughan and D. J. Parrish. 1985. Pith separation procedure for processing whole-stalk sweet sorghum. In *Proc. 5th Annual Solar and Biomass Workshop*, 133-136. Atlanta, Ga., 23-25 April.

Miller, F. R. and R. A. Creelman. 1980. Sorghum -- A new fuel. In *Proc. 35th Annual Corn and Sorghum Industry Research Conf.*, eds. H. D. Londen and W. Wilkinson, 219-232. Washington, D.C.: Am. Seed Trade Assoc.

## **Series**

*Agricultural Engineers Yearbook of Standards*. 1983. S358. 1. Moisture measurement -- Grain and seeds. St. Joseph, Mich.: ASAE.

Anthony, W. S. 1989. Performance characteristics of cotton ginning machinery. ASAE Paper No. 89-1010. St. Joseph, Mich.: ASAE.

*ASAE Standards*, 36th Ed. 1989. S352. L Moisture measurement -- Grain and seeds. St. Joseph, Mich.: ASAE.

Burner, A. D. 1989. Driveline design considerations. *Agricultural Engineering* 70(July/August): 16-19.

Griffin Jr., A. C. 1977. Cotton moisture control. In *Cotton Ginners Handbook*. Agricultural Handbook No. 503, USDA, Washington, D.C.

Jacobson, L. D. 1989. Reluctance to drink, stray voltage symptom. *Int. Pigletter* 8(12):47-48.

Slaughter, D. C. and R. C. Harrell. 1989. Discriminating fruit for robotic harvest using color in natural outdoor scenes. *Transactions of the ASAE* 32(2):757-763.

## **Unpublished Information**

Unpublished references include personal communication, interviews, mimeographed reports, theses or dissertations. Identify these as well as unpublished results and other source material in the text within parentheses; include the source, the year (if available),

title, location, or other information needed to establish the authenticity of the reference. For example, (Alan Smith, personal communication with author, Gainesville, Fla., 21 June 1987)

*or* (William Chancellor, interview by author, Davis, Calif., 1 August 1995).

If the information is included in the reference section, use the form (Smith, 1987) in the text and the following format as with other references: Smith, A. 1987. Personal communication with author. Gainesville, Fla., 21 June. Chancellor, W. 1995. Interview by author. Davis, Calif., 1 August.

Unpublished results would appear in the text (James E. Jones, unpublished data, 1990) as shown here.

A thesis or dissertation in the text should be written [Mark D. Campbell, "The lower limit of soil water potential for potato growth" (Ph.D. diss., Washington State Univ., 1991), 32-35] like this. Of course, the author of the work in which this type of source appears must be prepared to provide or be able to easily locate these materials as might be requested by a reader.

When an unpublished item is referred to more than once in the text, it should be placed in the reference section: Campbell, M. D. 1991. The lower limit of soil water potential for potato growth, 32-35, Ph.D. diss. Pullman: Washington State Univ.

If a work appears in *Dissertation Abstracts International*, the citation should appear as:

Campbell, M. D. 1991. The lower limit of soil water potential for potato growth. Ph.D. diss., Washington State Univ. Abstract in *Dissertation Abstracts International* 60:2405A-2406A.

## **Nomenclature**

This list of symbols and other terminology relevant to a specific manuscript appears immediately following the reference section.

## **Appendix**

An appendix may be used to provide additional detail. Appendices must be related to the text and cited in the text at the appropriate location.

## COMMON AND RECURRING ERRORS IN WRITING

### 1. Person

In formal, scholarly presentations, third person point-of-view is the accepted style. In certain circumstances (e.g., Experimental Results, Methods, Discussion), first person may be used with discretion.

*Example:*

This study focuses on one school district in eastern North Dakota, examining the extent to which its special education programs are addressing the social-emotional needs of students in grades 1-5 who have been identified as emotionally/behaviorally disordered (EBD), educable mentally retarded students (EMR), or learning disabled (LD).

### 2. Active and Passive voice

Verbs indicate action, condition, or process. Writers need to understand the different aspects of verb usage to be accurate and clear about what they are trying to convey. Either active or passive voice may be used when composing sentences; each is preferable under different circumstances. When the subject of a sentence is also the agent (i.e., who performs the action described by the verb) of the action, the verb is in the passive voice. Although active voice is considered more direct and clear, the passive voice is often more appropriate when the action (the verb) is more important than the agent of the action (the subject).

*Examples:*

"We performed several tests to determine the composition of the substance." (active voice)

"Several tests were performed to determine the composition of the substance." (passive voice)

### 3. Indicative, imperative, and subjective mood

Mood is a term used to describe the writer's attitude toward a subject as it is expressed by the form of the verb. English has three such moods: the indicative, the imperative, and the subjunctive. It is acceptable to mix moods in a document; however, it is not advisable to switch moods within the same sentence or paragraph.

*Examples:*

"The situation should be handled carefully." (indicative - states facts, opinions, or asks questions)

"Handle the situation carefully." (imperative - indicates a direct command or instruction)

"It is recommended that the situation be handled carefully." (subjunctive - very formal; used to express situations that are improbable or contrary to fact; also used with certain requests, demands, recommendations, and in certain phrases)

#### 4. Verb tenses

The various verb tenses in English indicate particular moments or periods in time, and the writer should be cognizant of this when considering the intended meaning of sentences. Unnecessary shifts in tense (as from the present to the past, or the past to the future) can be confusing to a reader and inaccurately portray the sequence of events in the written text. Consistency and parallel construction should be the goal.

*Examples:*

##### **Past Time**

<u>Tense</u>	<u>Use</u>	<u>Example</u>
Past tense	Indicates something that happened at a particular time in the past.	I <b>went</b> to the library yesterday.
Past progressive tense	Indicates something that continued to go on during a period of time in the past and continues to happen.	I <b>was going</b> to the library often when I was a freshman.
Present perfect tense	Indicates something that has happened at various times in the past and continues to happen.	I <b>have gone</b> to the library often in the past year.
Past perfect tense	Indicates something that happened before another past time.	I <b>had gone</b> to the library once before I entered college.

##### **Present Time**

<u>Tense</u>	<u>Use</u>	<u>Example</u>
Present tense	Indicates something that happens or can happen in the immediate present.	I <b>go</b> to the library three times a week.
Present progressive tense	Indicates something that is continuing to go on at the present time and is still true.	I <b>am going</b> to the library to return these books.

##### **Future Time**

<u>Tense</u>	<u>Use</u>	<u>Example</u>
Future tense	Indicates something that can happen at some time in the future.	I <b>will go</b> to the library tomorrow.
Future perfect tense	Indicates something that will take place before some particular time in the future.	I <b>will have gone</b> to the library many times before I finish school.

## 5. Subject-verb agreement

A singular subject takes a singular verb, and a plural subject takes a plural verb. This is usually not a problem until the subject is separated from the verb by prepositional phrases, clauses, etc.

*Examples:*

The general **reason** for the complication of the procedure and for the inability to find a solution is...

The **data** that were compiled and analyzed by the computer graphics program installed in our system **indicate**...

In each of the above examples, the subject and verb in bold are separated by several clauses or prepositional phrases. Therefore, it is easy to lose track of which word is the subject. But the writer must identify the subject and make certain the verb agrees with it.

## 6. Pronoun-antecedent agreement

A pronoun must agree with the noun it is replacing. Therefore, a singular noun must be replaced by a singular pronoun ("he," "she," and "it" are the most common). A plural noun must be replaced by a plural pronoun ("they" is the most common.)

*Examples:*

The **company** shows new advancements in all of its various departments.

The **data** that have been collected for this project and their validity are examined in the following explanation.

In each of the above examples, the antecedent and the pronoun in bold show agreement. Again, the writer needs to identify the noun before deciding whether the pronoun should be singular or plural.

## 7. Missing articles

"A," "an," and "the" are articles. They are used to identify a specific, one-of-a-kind item (use "the" in this case), or a general, non-specific item (use "a" before a word or an acronym that starts with a consonant and "an" before a word or an acronym that starts with a vowel or vowel sound). The writer should be consistent in using articles.

## 8. Missing transitions

The writer needs to make clear to the reader the connection of thoughts and logic. This is accomplished by using transitions. Transitional words indicate how to get from point A to point B to point C. Be careful to use the correct transitional word so that the connection of written ideas is logical.

*Example:*

The results of the research initially indicated that the findings supported our original theory. However, upon closer examination of the results, we saw....

"However" is a transitional word and illustrates a contradiction to what was expected.

## 9. Use of the comma before the final "and" or "or" in a series

The writer should separate the items in a series with commas. In formal writing, it is customary to use a comma before the "and" or the "or" which introduces the last item in the series, thereby conveying a clearer sense of the meaning.

*Example:*

The weighing, measuring, examining, and analyzing of the data...

The above example indicates four steps instead of three because of the comma before the "and." Without that comma, "examining and analyzing" could be interpreted to be a single step. To be sure the reader understands that each item is separate, use a comma before the "and."

## 10. Use of the comma in a compound sentence

When writing a compound sentence (a subject-verb-complete thought connected with another subject-verb-complete thought and written as one sentence), the writer needs to indicate that there are two complete thoughts in that one sentence. This is done by using a comma before the conjunction (and, or, nor, but, so, for, yet) which connects the two complete thoughts.

*Example:*

The importance of this discovery cannot be emphasized enough, **and** we need to examine the far-reaching consequences.

The above example contains two complete thoughts and two sets of subject/verb, separated with a comma before the conjunction "and."

## 11. Use of the colon to introduce a list

Use a colon, not a semicolon or a comma, to introduce a list. The portion of the sentence before the colon needs to be a complete thought.

*Example:*

Scholars frequently cite the causes for the decline of Rome: the deterioration of the army, barbarian invasions, economic decentralization, and inefficient agriculture.

## 12. Periods and commas inside quotation marks

Periods and commas go inside quotation marks. The only exceptions are when a reference citation follows the quotation and is in parentheses, when the quotation marks are part of a computer program's name, and when using single quotation marks with a variety name in agronomy.

*Examples:*

“The interest of the later German Romantics in their national past cannot, however, be credited solely to the intrinsic interest of historical study.”

As she passes through the village, the “Clang” of the blacksmith’s hammer rings out, “And everything except the river holds its breath.” (Bishop, “In the Village” 274).

## 13. Separation of compound verbs

In a sentence containing a compound (two or more) verb, do not separate the subject from any element of the verb with a comma, even though several clauses or phrases may occur between the subject and the second verb.

*Example:*

**The discovery** of this new element **has created** great excitement in this field because it was unforeseen and **has heralded** a new age of research and experimentation.

In the above example, a comma before “has heralded” would be wrong because the subject is “discovery” and the two verbs are “has created” and “has heralded.” The writer should not separate the second verb from the subject of the sentence.

## 14. Appositives and commas

Appositives are words, phrases, symbols, or clauses that directly follow a word and rename that word. An appositive can be restrictive or nonrestrictive. The nonrestrictive appositive is set off by commas, while the restrictive is not.

*Example: (non restrictive)*

**R, the rate,** and **P, the product,** allow us to...

The above example shows that R stands for rate and P stands for product. Without the commas, the reader might be confused.

*Example: (restrictive)*

Thomas Mann's novel **Buddenbrooks** has been made into a film.

The appositive Buddenbrooks should not be set off with commas because Thomas Man wrote more than one novel. The title Buddenbrooks appears here to help the reader pick out from all the novels he wrote the one to which the writer is referring.

## 15. **Introductory phrases**

Introductory comments are separated from the main part of the sentence with a comma. The comma signals that the first words of the sentence are lead-ins to the main part. This is especially important when one noun is followed by another noun.

## 16. **Modifying phrases**

When there is a phrase or clause modifying a word (like an appositive), that phrase or clause must directly follow the word it is modifying.

*Example:*

The discovery **that will revolutionize** this industry occurred...

The clause “that will revolutionize this industry” tells us more about the “discovery,” so that clause must directly follow placement of modifying clauses and phrases, inaccurate information or meanings can be conveyed.

## 17. **Use of the semicolon between long or internally punctuated independent clauses.**

If one or both of the independent clauses are long or contain commas, the clauses are separated with a semicolon.

*Example:*

Although behavior disorders are not preconditions of learning disabilities, they are known to exist among the learning disabled population; and, more and more, research is focusing on the significance of behavioral dysfunction for this group.