Physics Assessment Plan and Tools for Written & Oral Communication

Reviewer:_____ Presenter:_____

Written Communication Scoring Draft – See "Training" Draft (next page) for slightly more description.

Written Communication	**Exceeds Expectation (3)**	**Meets Expectations (2)**	**Insufficient (1)**
Audience and Context (particularly Introduction, Summary, and Ending) *Adequately* tells what the work is and why it is significant, gives necessary background, and in the end a plausible discussion of the future of the work or how the results may be used			
Physics Thesis / Journal Article Conventions Demonstrates *consistent use* of Formal (such as AJP's) and informal (see Alley notes) conventions particular to a physics thesis / journal article including organization, content, presentation, illustrations & equations, citations, formatting, and stylistic choices.			
Structure: 1. (in Intro) gives **roadmap** to the thesis, gives main findings where appropriate (throughout thesis) 1. *Fairly Consistently* employs an **expositional strategy** that is *appropriate* to subject, purpose, audience, and thesis; each section and paragraph clearly relates to the paper's central idea.			
Structure: 2. (throughout) generally uses *Logical* **transitional devices** to *relate* ideas to each other and the paper's central idea.			
Structure: 3. *Generally*, **paragraphs and subsections** are appropriate sizes, have clear focus and internal coherence; informative and grammatically parallel headings			
Control of Syntax and Mechanics Uses *straightforward* language that *generally conveys meaning* to readers with clarity and precision. The language has *few* errors. *Generally* balances between generalities and details.			
Development – content, sources, and evidence Uses appropriate and relevant content to *explore ideas* within the context of the discipline and shape the whole work. Demonstrates *consistent use of* credible, relevant sources to *support* ideas and cites them appropriately.			
Quantitative Representation & Interpretation *Fairly* clear mathematical portrayal (equations, tables, graphs, diagrams…) Provides *accurate* explanations of information presented in mathematical forms.			
Analysis, Conclusions, and Related Outcomes (particularly the Ending) Is *reasonably* clear, informed, and accurate, with *few* or no significant errors. Conclusion is *logically* tied to a range of information, including opposing viewpoints; related outcomes (future work, consequences and implications) are *identified clearly*.			

This Rubric borrows heavily from AAC&U's Written Communication, Quantitative Literacy, and Critical Thinking VALUE Rubrics; Loyola Marymount University Paper (generic) Example Rubric; and Santa Clara University Natural Science Rubric. It is also informed by *The Craft of Scientific Writing* (3rd edition) by Michael Alley.

Physics Assessment Plan and Tools for Written & Oral Communication

Written Communication Training Draft – "Exceeds Expectations", "Meets Expectations", and "Insufficient" descriptions included, and some categories are split for finer detail.

Written Com.	**Exceeds Expectation (3)**	**Meets Expectations (2)**	**Insufficient (1)**
Audience and Context (particularly Introduction)	*Thoroughly and concisely* tells what the work is and why it is significant, gives necessary background.	*Adequately* performs the tasks *noted in the cell to the left*	*Insufficiently* performs these tasks.
Physics Thesis / Journal Article Conventions *Formal(AJP's) and informal (see Alley notes) rules inherent in the expectations for scientific writing*	Demonstrates *detailed attention to and successful execution* of conventions particular to a physics thesis / journal article including organization, content, presentation, illustrations & equations, citations, formatting, and stylistic choices	Demonstrates *consistent use* of important conventions *noted in cell to the left*	Frequently departs from these conventions.
Structure/Organization 1. overview and expositional strategy	Within the introduction, gives *clear* roadmap to the document and main findings where appropriate. Throughout the body, consistently employed and appropriate to subject, purpose, audience, and thesis; successfully guides the reader through the progression of ideas.	Within the introduction, gives roadmap to the document and *some* main findings. *Fairly* consistently and *useful* ; each section and paragraph clearly relates to the paper's central idea.	Missing roadmap and findings, ill-suited or inconsistently employed
Structure/Organization (particularly Middle.) 2. transitional sentences	Sophisticated and logically relates ideas	*Logical* transitional devices are used; some logical links *may be lacking*	Transitions may be merely sequential (first, second, third) rather than logical.
Structure/Organization (particularly Middle.) 3. Paragraphs and subsections	Appropriate sizes with clear focus and internal coherence; informative and grammatically parallel headings	*Generally* achieves qualities noted in cell to the left.	too long or short, unfocused and not internally coherent; their titles may be un-parallel or uninformative.
Control of Syntax and Mechanics	Uses *graceful* language that *skillfully* communicates meaning to readers with *clarity, precision, and fluency*, and is *virtually error-free*. *Balances* between generalities and details.	Uses *straightforward* language that *generally conveys meaning* to readers with clarity and precision. The language has *few* errors. *Generally* balances between generalities and details.	Uses language that sometimes impedes meaning because of errors in usage, lack of precision, or over generalities or too lengthy detail without generalization.
Content Development	Uses appropriate, relevant, and compelling content to *illustrate mastery* of the subject, conveying the writer's understanding, and shaping the whole work.	Uses appropriate and relevant content to *explore ideas* within the context of the discipline and shape the whole work.	Frequently uses inappropriate or irrelevant content; mostly develops simple ideas.
Sources and Evidence	Demonstrates *skillful use of high-quality*, credible, relevant sources to *develop* ideas and cites them appropriately.	Demonstrates *consistent* use of credible, relevant sources to *support* ideas and cites them appropriately.	Frequently *unsuccessful* task *noted in the cell to the left.*
Quantitative Representation & Interpretation Ability to present relevant information in various mathematical forms (e.g., equations, graphs, diagrams, tables, words)	Skillfully presents relevant information in an insightful mathematical portrayal in a way that contributes to a further or deeper understanding. Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information.	Fairly clear mathematical portrayal (equations, tables, graphs…) Provides accurate explanations of information presented in mathematical forms.	Mathematical portrayal is unclear, inappropriate or inaccurate. Attempts to explain information presented in mathematical forms, but draws incorrect conclusions about what the information means.
Analysis, Conclusions and related outcomes (implications and consequences)	Analysis of important information is clear, convincing, informed, and accurate, with no significant errors. Conclusions and related outcomes (future work, consequences and implications) are *logical and reflect student's informed evaluation* and ability to prioritize evidence discussed.	Is *reasonably* clear, informed, and accurate, with *few* or no significant errors. Conclusion is *logically* tied to a range of information, including opposing viewpoints; related outcomes (future work, consequences and implications) are *identified clearly*.	Is at an *inappropriate level* or *incomplete,* may lack cited support, or may contain substantial errors. Conclusion is *inconsistently* tied to some of the information discussed; related outcomes (future work, consequences and implications) are *oversimplified or implausible*.

Notes on good writing from the text used in our Sr. Seminar - *The Craft of Scientific Writing* (3rd edition) by Michael Alley

1. **Audience**
    a. Who is the Audience for the paper?
    b. What will they already know?
    c. Why will they read it?
    d. How will they read it?
2. **Structure: Bits and Pieces**
    a. Beginning
        i. Title
            1. Clear and Exact
            2. Identifies field (note, journal selection may do some of this already)
            3. differentiates from other works in the field
        ii. Introduction
            1. tells what the work is
            2. tells why the work's important
            3. gives (or at least directs toward) the background necessary to understand the work
            4. gives a road map for how the work will be presented in the Middle of the paper.
        iii. **Summary** (a key component of the introduction)
            1. Further helps to differentiate the present work from other ones in the field
            2. Two main types
                a. Descriptive: tells what *type* of info will appear, but doesn't actually give much of the info.
                b. Informative: gives the key info.
            3. If the paper is primarily *informative* it should give the main conclusions. If it's primarily *persuasive,* it may not.
            4. Gives a Road Map for the Middle of the paper to help the reader navigate and contextualize the different points that will be presented.
        iv. Introduction
            1. (given the subject matter implications of the particular journal in which the paper's published) does the title differentiate this
    b. Middle
        i. Strategy(ex. chronological, spatial, energy flow, etc.)
            1. Is a single strategy consistently employed?
            2. Is the chosen strategy appropriate?
        ii. Subsections
            1. Not too long, not too short
            2. headings
                a. grammatically parallel to each other
                b. informative (as opposed to being too vague)
    c. Ending
        i. No new information
        ii. Important information from the Middle is analyzed holistically
        iii. The Future Perspective is offered (the future of this work or how the results may be of use)

3. **Structure: Crafting**
    a. **Transitions**
        i. Mapping and references back to the map help prevent readers from getting lost.
        ii. It's important to have good section openers – not too specific or too general.
        iii. Parallelism between subsections helps smooth transitions.
    b. **Depth**
        i. Dictated by length constraints, audience, and purpose of the document.
        ii. Should communicate your desired points and also address anticipated questions that those points raise.
    c. **Emphasis**
        i. Key points should easily be differentiated from secondary facts.
        ii. Ways to emphasize points
            1. **Repeating**: The most important points should appear in the summary, the discussion, and the conclusion.
            2. **Phrasing**
                a. Within a sentence, using dependent ("because", "since", "as", "although",…) and infinitive phrases ("to [verb]") rather than prepositional phrases to show the relative importance of the different phrases.
                b. Within a paragraph, varying the sentence length so that a key point is in a relatively short sentence.
            3. **Placing**: Within a section, placing key information near white space: beginnings and ends of subsections and paragraphs.
            4. **Illustrating**: A picture draws attention to its subject.
4. **Language**: Being Precise
    a. Say what you mean.
        i. Choose the perfect word and stick with it. At the level of precision required for scientific writing, there are very few true synonyms. Even if there is are a few synonyms for something you're talking about, changing back and forth between them will loose your audience.
        ii. Consider a word's Denotation (what the dictionary says) and Connotation (how it's 'colored' by how the word's usually used).
    b. Be wary of absolutes – "always" and "never" challenges the audience to think of an exception and thus undermine your credibility.
    c. Level of Detail
        i. You need the right mix of generalities and details. Too much generalization, and you're writing is hollow; too many details, and it can't be navigated.
            1. Generalities are good for pointing your reader in the right direction.
            2. Details support your general claims.
5. **Language:** Being Clear
    a. Ambiguities and needless complexity make room for misinterpretation.
        i. Needless Complexity
            1. **Word Choice**: Don't use a complex word if a simple one will suffice.
            2. **Syntax**: A poorly placed modifier can change the meaning of a sentence or make the meaning ambiguous.
            3. **Pronouns**: Reckless use of pronouns can make it unclear to which nouns the pronouns refer.
            4. **Punctuation**: when in doubt, use a comma. When you say the sentence out loud, if you pause for a beat or change inflection between two words, you probably need a comma there.

6. **Language**: Being Forthright
    a. **Control your tone** – how it sounds like you feel about your subject
        i. **Avoid Pretentious words**
            1. Approximately – about
            2. Component – part
            3. Facilitate – cause, bring about (make easier)
            4. Implement – put into effect
            5. Manufacturability – can manufacture
            6. Utilize – use
            7. Utilization – use

            My sense is that there *are* appropriate uses of these words, and many have lost their pretension through use. Still, one should pause and ask 'is the simpler word better?'

        ii. **Avoid Arrogant Phrases**
            1. "as is well known"
            2. "clearly demonstrates"
            3. "it is obvious"
        iii. **Avoid Silliness**
            1. Cliché's
            2. Exclamations
            3. Catch phrases
            4. Ellipses "…"
    b. **Choose strong Nouns and Verbs**
        i. **Strong Nouns**
            1. evoke *specific* senses – sights, sounds, etc. not vague ones
            2. *Concrete* nouns. Sometimes an "abstract noun" is needed, but try keeping them to a minimum.
        ii. **Strong Verbs**
            1. **Maintain momentum** don't slow reading down
                a. E.g. "arranged" is better than "made the arrangement for"
                b. **Passive** tones are weaker than **active** ones "is beginning" vs. "begin."
                    i. **Conclusions** are often needlessly passive "x is addressed, Y is done" vs. "we addressed X, we did Y."
                    ii. **Exceptions**: there are occasions for passive voice – it helps to keep the emphasis on something that happens to be passive.
                c. **Silly vs. Passive.** Don't write silly phrases to avoid passive & 1st-person, like "It was determined that…"
                    i. **Exceptions:** Sometimes you intentionally downplay the human element and so avoid "I" or "we," particularly at the beginning of a sentence.
7. **Language:** Being Familiar
    a. Writer, not reader, is responsible for making the language familiar, so consider your audience when deciding what words to use, define, or avoid.
    b. **Avoiding Unfamiliar Terms**
        i. *Jargon* is only useful among parties that know the jargon and when it makes reading more efficient.
    c. Defining Unfamiliar terms

i. Define in terms of words they already know
ii. Short definitions can be given within sentences
iii. Longer definitions merit their own sentence

d. **Abbreviations**
   i. Worth introducing and defining only if they'll be used several times.
e. Analogies & Examples
   i. Examples make the general (and forgettable) specific (and memorable).
   ii. Analogies there may be a prejudice in articles against "fluff" that makes the article accessible to the non-expert, and analogies demand imagination, but they *do* help the reader.

8. **Language**: Being Concise

a. Crisp, vigorous, quickly comprehended; Follows from being Clear & Forthright
b. **Eliminate Redundancies** – needles repetition
   i. **Adjectives** "Aluminum metal cathode
   ii. **Adverbs** "increasingly more widespread"
   iii. Examples
      1. Already existing
      2. Alternative choice
      3. At the present time
      4. Basic fundamentals
      5. Currently being
      6. Empty space
      7. Had done previously,…
c. **Eliminate Writing Zeros**
   i. "it is interesting to note that" it should be pointed out that"
   ii. "as a matter of fact: "in the course of"
   iii. I might add that " "the fact that "
   iv. "it is noteworthy that" "the presence of"
   v. "it is significant that"
d. **Reducing Sentences to Simplest Forms**
   i. Whatever structure, use the least words
   ii. Phrases
      1. At this point in time -> now
      2. Has the ability to -> can ….
   iii. Adjectives – cut the fat
   iv. Adverbs
      1. Cut the illogical (rather unique)
      2. Cut the crippling ("very important" weakens "important")
   v. Verbs turned into nouns (establishment, measurement,…
   vi. Needlessly Passive verbs
e. **Eliminating Bureaucratic waste (**really the point he makes is write to your audience, not to yourself.)

9. Language: Being Fluid
   a. Vary Sentence Rhythms – monotonous and tiring when sentences all have the same structure (order & length)

i. **Beginning options**
   1. Subject – verb
   2. Prepositional phrase
   3. Transition words
   4. Introductory clause
   5. Infinitive phrase
   6. Participle phrase – don't make too long since you'll try your audience's patience; or use too often since it's not common in spoken English so it's a little awkward.
   7. Verb (question) – not at the start of a document since it's cliché or at the end since it's unsatisfying

ii. **Varying Sentence Lengths** – monotonous to be *same* length
   1. average word count in the teens,
   2. change length every 2 – 3 sentences
   3. occasionally use particularly short or long sentences

iii. **Varying Sentence Structure –** varies locations and numbers of subjects and verbs.
   1. Simple – just one clause
   2. Compound – two or more independent clauses…,*and*…
   3. Complex – independent clause & one or more dependent clauses *Although…,…*

iv. **Varying Paragraph Lengths –**
   1. Paragraph ends are like traffic lights – long pauses.
   2. Almost an aesthetic / intimidation issue
   3. typically between 7 and 14 lines long, some a bit shorter, some longer.
   4. Word count per paragraph then varies with number of columns to the page.

v. **Eliminating Discontinuities**
   1. **Making transitions between ideas**
      a. **Transitional words** signal
         i. Ideas will continue in the same direction
         ii. Movement of ideas will pause
         iii. Movement of ideas will reverse

Continuation	**Pause**	**Reversal**
Also	for instance	however
Moreover	for example	on the other hand
First…second.	In other words	conversely

      b. **Beware of gaps in logic or missing info.**
   2. **Eliminating Needless Complex Typography**
      a. Needless abbreviations (extra periods; I think it actually helps for scanning to abbreviate reference words like "fig.")
      b. Needless capitalization (forces reader to actually read each letter instead of recognize word structures)
      c. Needless numerals, especially at the beginning of a sentence.

3. **Incorporating Equations**
    a. Make their importance evident (don't give unimportant ones)
    b. Make as clear as possible – define all terms.
    c. Give limitations of applicability / validity
    d. Consider giving example using the equation
    e. Explain the meaning of the equation
    f. In a derivation, don't make weak transitions & needless jumps.

10. **Illustration: Making the Right Choices**
    a. **Choosing Tables** (vs. graphs)
        i. Numeric: High precision, easy to access individual elements
        ii. Can obviate parallelism in a short sequence
            1. Example: table 10-2 – sequence of events at Chernobyl
    b. **Choosing Figures**
        i. **Graphs**
            1. Show the relationship between data. If you're more interested in the *trend* / form of a dependence than individual points.
            2. Label units, designate scale
            3. **Line graphs** - show 2-D trends
            4. **Contour plots** - try to show 3-D info
            5. **Bar graphs –** show 2-D info that's more discrete, not emphasizing trends
                a. Good at showing dramatic *difference* but too many elements and they get too busy
            6. **Pi e graphs –** compare parts of a whole
        ii. **Photographs**
            1. Realism but can contain distracting details
        iii. **Drawings**
            1. You can eliminate distracting details, show things that can't be photographed
        iv. **Diagrams**
            1. Symbolic representation of characteristics – communicates ideas, principles, and logical relations.

11. Illustrations: Creating the Best Design
    a. Precise
        i. Simple as possible, no unexplained or extraneous detail
    b. Clear
        i. Simple as possible, focused on main point, stand-alone caption
    c. Fluid
        i. Smooth transitions between text and image

15. Preparing Presentations

It doesn't matter how valuable your message is if you can't present it well.

A. Presentations vs. Documents

a. Presentation Advantages
    i. Presenters can make the work come alive

ii. Presenters can respond to the audience in real time
iii. Presentations can be multi-media

b. Presentation Disadvantages
   i. Transitory - You've got to say it right the first time & your audience has got to hear it the first time.
   ii. Can't pause for someone to look up information so must be understandable on its own

B. Constraints of Presentations

a. **Audience** – more so than with a paper (that has back matter for the secondary audience), you have to communicate well to your *whole* diverse audience
b. **Format** – length, time of day (how tired your audience is), questions only at the end, equipment

C. Style of Presentations

a. Organizing Presentations

i. **Beginning** – address these questions (implicitly or explicitly):
   1. What's it really about?
   2. Why is it important?
   3. Will your audience member understand it (level)?
   4. How will it be arranged?
      a. Particularly important since the audience can't 'flip ahead' to get a preview and will tire quickly if (s)he feels like (s)he's wandering.

ii. Middle
   1. Follow a logical strategy / path through the material
   2. Divide into few parallel parts

iii. End
   1. Most memorable part of a talk, so use it to emphasize main point
   2. Overall analysis & future perspective

b. Creating Visuals for Presentations

i. Why?
   1. Some things are much easier to communicate in images than in words
   2. Images are more memorable
   3. Emphasize structure
   4. Emphasize key points
   5. Aesthetics

ii. What Structure
   1. Slide headings should be full sentences (personally, I think people tend to put sentences when bullets would be better)
   2. Common mistakes
      a. Overcrowding
         i. Lack of white space
         ii. Long passages of text
         iii. Long lists (more than four items)
      b. Small Font
      c. Imbalance between words spoken and on slide
         i. Spoken words should include, but be more than, those on slide.

c. Delivering Presentations

i. Voice, gesture, posture

ii. **Source of spoken words**
    1. He says best to use outlined points rather than reading written script or memorizing written script – that's so you can maintain eye contact and speak naturally
        a. He may be mistaken or just not communicating clearly here – particularly given time constraints, you *should* speak from outlined points, but you *should also* practice enough that you've memorized what you'll say – you want to already know how best to articulate your thoughts.

iii. **Stage Presence**
    1. Enthusiasm (not faked)
    2. *Feeling* nervous is natural, *looking* nervous is bad.
        a. Prepare in advance, make sure things are technically ready (lights, slides,…) then focus on something else like chatting with your audience.
    3. Think of overall presence – don't dissect gesture, stance, eye contact, etc., imagine an excellent speaker giving your talk and do what they'd do.

16. Dressing Documents for Success

A. Typesetting

1. **Don't use too many in one document**
2. **Font type**
    a. **Body**
        i. Serifs to guide the eye along the line, and it's traditional
        ii. Narrow like times for columns, wide like schoolbook for full page
    b. **Headers**
        i. San-serif; contrast stands out, and no need for guiding the eye along a line
3. **Emphasis**
    a. **Underline – no**
    b. **Bold** – headings
    c. **Italics –** sub-headings, foreign and emphasis
4. **Font Size**
    a. 12 for single column, 10 for multi column
    b. Larger for headings and for posters & presentations
5. **Avoid needless complexity –** "fig.", "ref." ALL CAPS – if you must, use small caps (caps are tiring since we don't see them enough to get familiar with the shape of words in them)

B. Layout

1. Consider subject and audience
    a. One column for single-sitting reading, multiple columns for multi-sitting readings
2. Be generous with white space
    a. Margins
    b. Column divisions
    c. Headings

d. Illustrations

3. Hierarchy of headings and subheadings with white space and typography
    a. White space
        i. more for higher-level headings
        ii. about twice as much above as below a heading
    b. Size
        i. Bigger for higher-level
    c. Bold for higher, italics for lower

17 Actually Sitting Down to Write

A. Setting the Stage
    a. Life seldom makes room for you to write, so *you* need to make room for it.
    b. Writing takes focus / lack of distractions / uninterrupted
    c. Prepare – exercise, sleep, something to give you a fresh head

B. Two Types
    a. Tortoise – slow, revising as going:
        i. labor over 1st paragraph; then 1st & 2nd; then 1st, 2nd, & 3rd,…
        ii. Takes a long time
        iii. 1st draft ends pretty refined, especially at the beginning
    b. Hair – brain dump & not looking back
        i. 1st draft is done quickly
        ii. 1st draft is really unrefined

C. Recommendation – even Tortoise try being a hair for the introduction since that's often the bottle neck to getting to working on all the other parts.

Appendix

A. Avoiding the Pitfalls of Grammar and Punctuation
Avoiding the Pitfalls of Grammar

1. *For reader expectation, do not join two independent clauses with an adverb.*
    a. Mistake: "There is no cure for Alzheimer's, however, scientists have isolated the gene that causes it."
    b. Solutions:
        i. Begin a second sentence: "There is no cure for Alzheimer's. Scientists have isolated the gene that causes it."
        ii. Join the clauses with a semicolon: "There is no cure for Alzheimer's; however, scientists have isolated the gene that causes it."
        iii. Join the clauses with a coordinating conjunction as "and", "or", or "but": "There is no cure for Alzheimer's, but scientists have isolated the gene that causes it."

2. *For reader expectation, in a list, present the items in a parallel fashion.*
    a. Mistake: "The Process involves three main steps: cooling, chopping, and pulverization."
    b. Correction: "The Process involves three main steps: cooling, chopping, and pulverizing."

3. *For clarity, have modifiers point to the words that they modify.*
    a. Mistake: "First, you find a latent. After being detected, you dust with the powder."
    b. Correction: "First, you find a latent. After detecting it, you dust with the powder."

4. *For reader expectation, have each subject agree in number with the verb.*

   a. Mistake: "A series of shocks often precede a large earthquake."
   b. Correction: "A series of shocks often precedes a large earthquake."
   c. Tricky business
      i. Compound subjects are sometimes treated as singular
      ii. Some words have unfamiliar singular or plural forms (criterion and criteria, phenomenon and phenomenon, datum and data?)
      iii. None of…, some of…, all of… depend on whether the object is discrete ("none of the water is…" none of the people are…")
      iv. or, either…or, neither…or depends on whether the last in the list is singular or plural.

5. *In each section of a document, maintain the same reference frame for the tenses of verbs.*
   a. If you set an event in the past, then previous events are in the pluperfect tense, and time-independent facts can simply be in present tense. Example: "The experiment *consisted* of a Wolfhard-Parker burner in a stainless-steel container. The burner slot for the fuel flow *was* rectangular and *was surrounded* on all sides by passages for flow of air. Previous experiments *had shown* that such geometry *provides* a nearly two-dimensional flame."

Avoiding the pitfalls of punctuation

1. The **Period**.
   a. Many scientists err with overly long and complicated sentences – break them into shorter sentences.
   b. Abbreviations bring in periods and make sentences needlessly choppy.
2. The **Comma**.
   a. The main use is to avoid confusion. My own rule of thumb is 'if I pause there, I probably need a comma there'.
   b. Separate contrasted elements (often separated by a "but" or a "not" as in "I like ice cream, not yoghurt.")
   c. Separate items in a list – in science, that *includes before the last item*.
3. The **Colon**.
   a. Introduces a list, but doesn't break statements.
      i. Mistake: "The five types of marsupials studied were: opossums, bandicoots, koalas, and kangaroos."
      ii. Correction: "The five types of marsupials studied were opossums, bandicoots, koalas, and kangaroos."
      iii. Correction: "We studied five types of marsupials: opossums, bandicoots, koalas, and kangaroos."
   b. Introduces a definition.
4. The **Semicolon**.
   a. Separates two sentences closely related.
   b. Separates complex items (which themselves contain commas) in a list.
5. The **Dash**.
   a. Sets of parenthetical statements that cannot unambiguously be set off by commas.
   b. Sets of end phrases that cannot unambiguously be set off by commas.
6. The **Quotation** mark.
   a. In the U.S., it goes *after* the period.
7. **Hyphens.**
   a. Generally do *not* hyphenate compound nouns ("cross section" not "cross-section")
   b. Generally *do* hyphenate compound adjectives ("cross-sectional")

B. A Usage Guide for Scientists and Engineers.

-ability. Generally better to write the simpler "can operate" than the pretentious "operability."

Abstract nouns: avoid or give concrete examples for nouns that do not appeal to one of the five senses like "factor" or "nature."

Active vs. Passive voice: Go with whichever is more natural for the idea; usually that's active.

Affect vs. effect. **Affect** is the verb, **Effect** is a result or you can "effect a result."

Alright. Isn't all right.

Always – begs contradiction.

Approximately: okay if the subject can be fractional (approximately 10 meters) not if discrete (around 10 people.)

Center around: "center on" or "revolve around", not a mix.

Clichés: to be avoided.

Component: usually simpler to say "part."

Comprise/compose: "comprise = "to include" so "the whole comprises the parts" not the other way around.

Conjugations. It's slowly becoming more widely accepted to start sentences with them.

Continuous/continual: "Continual" = "repeatedly"; "continuous" = "without interruption."

Criterion/criteria: singular / plural.

Data/datum: plural/singular; however, most now accept "data" as both; a compromise is "a data point."

Facilitate: bureaucratic; say "cause" or "bring about."

Farther/further: "farther" is for distance, "further" is for anything else; but "further" is generally accepted for distance too.

Fewer/less: countable/uncountable (or infinitely divisible).

First person: Perfectly acceptable (though not to some curmudgeons), just make sure it doesn't distract from the real subject.

However: Almost anyone will accept a sentence begun by "however." To serve as "but", it needs a semi-colon.

Implement: bureaucratic. Try "put into effect" or "carry out."

Interface: Not a verb.

Irregardless: not a word.

Its/it's: "Its" is possessive, "it's" is "it is."

-ization nouns: often pretentious.

-ize verbs: often pretentious.

-ized adjectives: often pretentious.

Like/as: "like" is a preposition – prepositional phrase; "as" is a conjunction - clause.

Never: begs contradiction.

Only: place it carefully – its location strongly affects the meaning since it can be read to modify a verb or a noun.

Phenomenon/Phenomena: Singular/Plural.

Possessive: generally 's, but sometimes just '.

Principal/principle: main/law.

Redundancy: there are some common word pairs that are redundant and to be avoided: already existing, at the present time, introduced a new,…

Stratum/strata: singular/plural

Unique: almost any modifier is redundant

Weak verb phrases: make them shorter if possible: "is beginning" -> "begins", "performed the development of" -> "developed",…

Which/that: "that" introduces a defining / essential phrase ("the options that present themselves"), "which" gets a comma and introduces a non-defining/non-essential phrase ("we're going to my car, which has a great stereo.")

Writing zero: phrases that add nothing, for example, "the fact that" or "the presence of."