

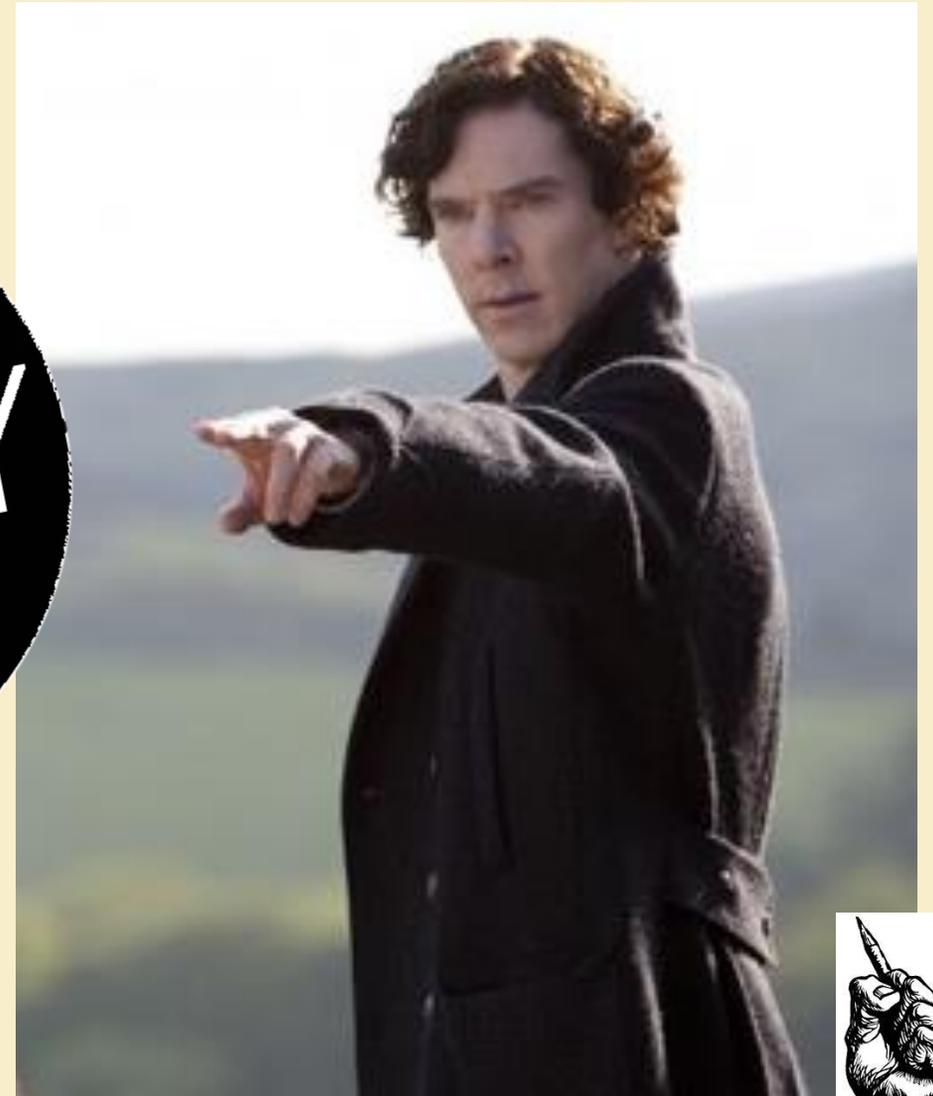
# EFFECTIVE WRITING FOR FIRST YEAR SCIENCE STUDENTS

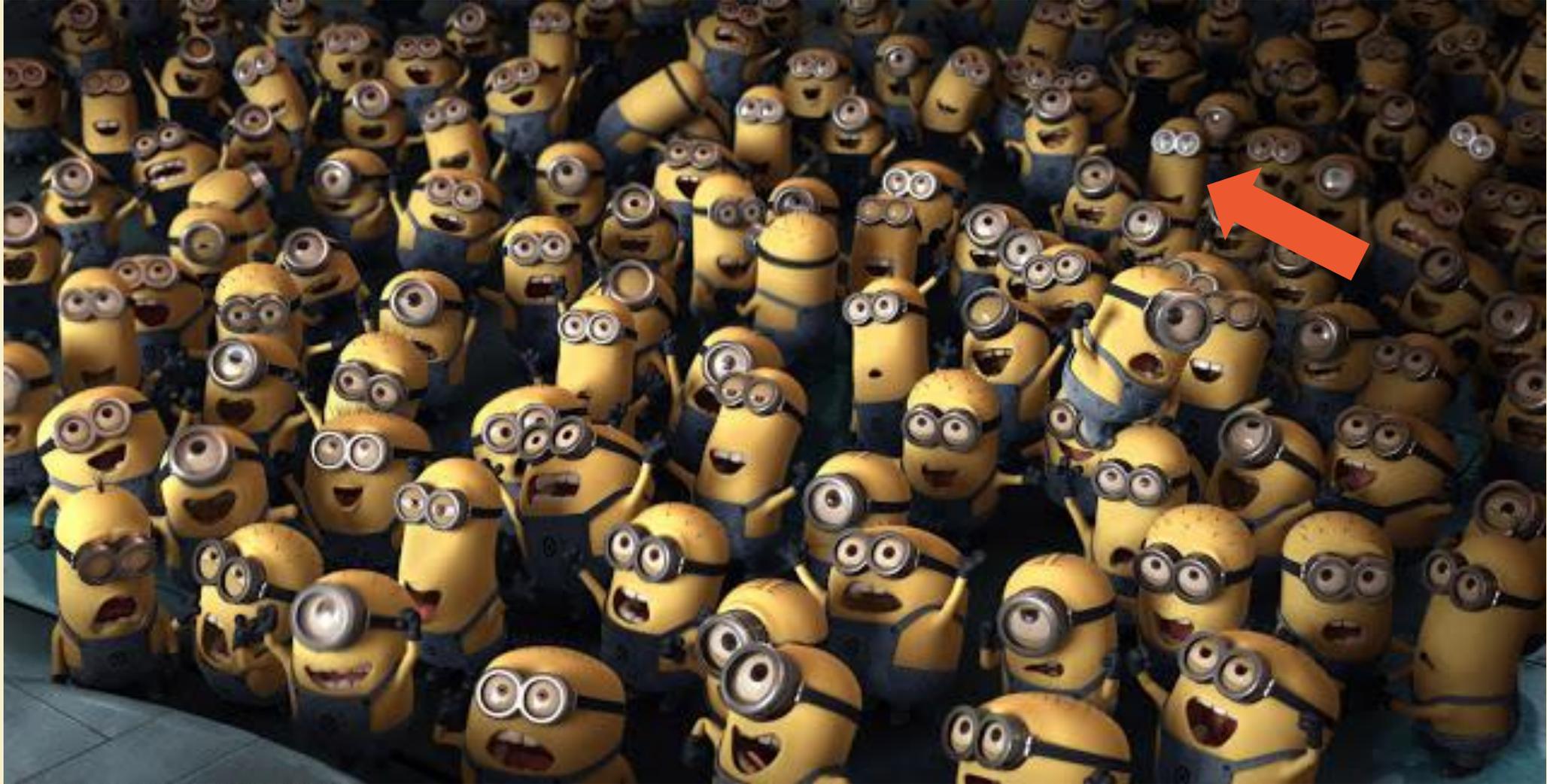
**FALL 2015**

# WHAT YOUR READER IS LOOKING FOR:

- Your engagement with the ideas you've paraphrased
- Finding links, seeing patterns
- Persuasion
- Coherent and logical organization
- Concision and ...

CLARITY



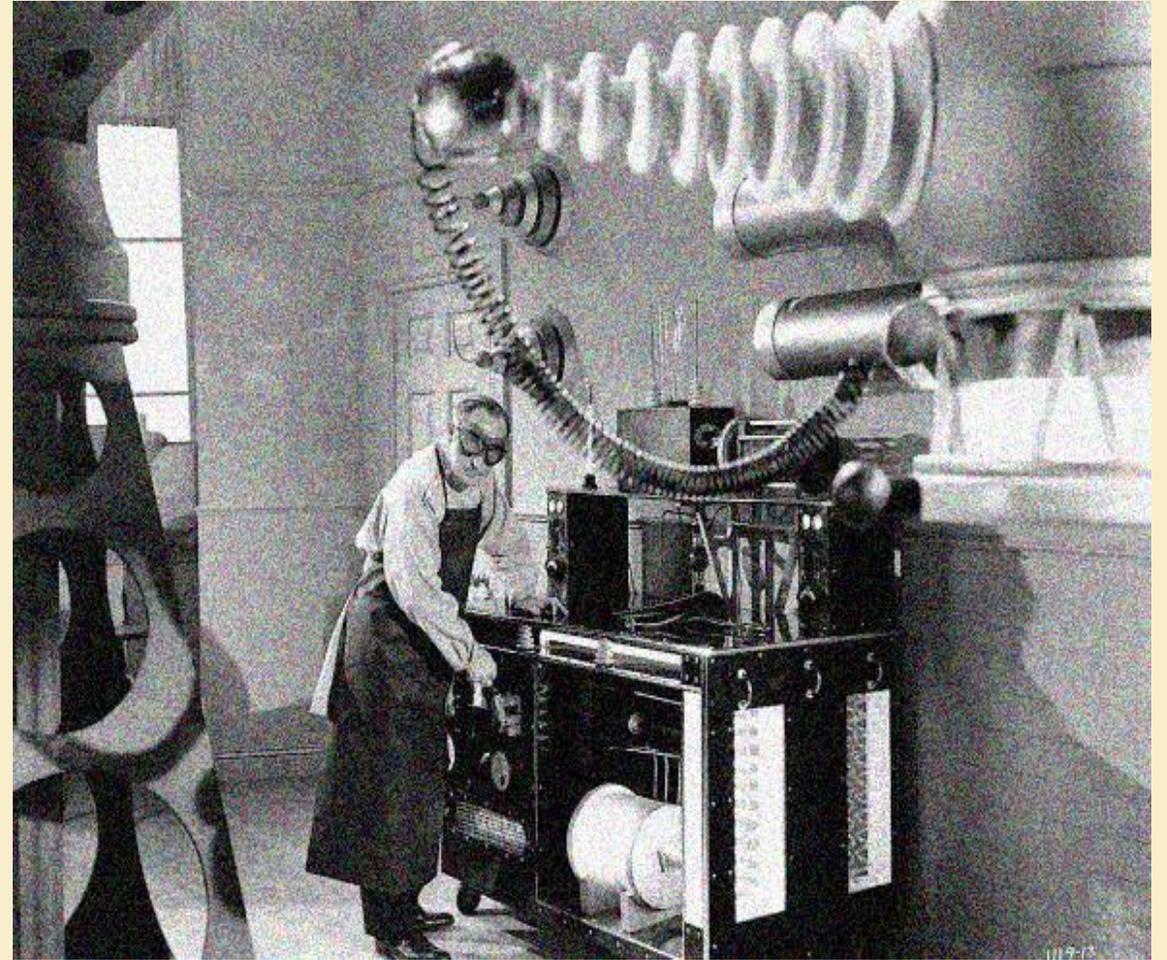




**Editing while you write is like pulling an item out of the washing machine, folding it carefully, and putting it back in the washing machine.**

# WHY WRITE LAB REPORTS?

- To accurately report the methods and findings of an experiment (experiment should be repeatable)
- To learn how to communicate effectively in a particular discipline
- To demonstrate understanding of theories, procedures and results related to an experiment
- “To discuss results in an analytical and professional manner” (BIOL 103 lab manual)



**1. What  
(the point)**

**Make very clear the point you intend to make.  
NOT just the subject, but your point about it.**

**1-2 sentences**

**2. How  
(the proof)**

**The evidence used to substantiate the point or back up the  
argument: examples, paraphrases, summaries, etc.**

**2-3 sentences**

**3. Why  
(the comment)**

**Commentary outlining the significance or implications of  
the preceding material**

**Your explanation of why this particular point matters with  
regard to the document you are writing**

**2-3 sentences**

# TRANSITIONS

Transitional words or phrases in your paragraph's topic sentence help your reader see the progression of your logic.

*I.E. "The benefits of eating kale are clear, but eating too much kale can cause digestive problems."*



# PARAPHRASING

Unlike a metaphrase, a direct line-by-line or word-by-word translation of a source, to *paraphrase* is to **express the idea itself as you understand it.**

While sanctions [in Iran] were imposed, Karbasian singled out lack of equipment and machinery as being particularly crippling. "In fact, one of the most important problems in the way of the mining sector in recent years has been non-application of modern equipment and advanced technologies while old and second-hand machineries are being used in many of the mines some of which have been used in other countries for over 50 years."

<http://www.mining.com>

Metaphrase:

As restrictions [in Iran] were declared, Karbasian pointed to the absence of tools and apparatuses as being especially challenging...



## SUMMARY / PARAPHRASE

While sanctions [in Iran] were imposed, Karbasian singled out lack of equipment and machinery as being particularly crippling. "In fact, one of the most important problems in the way of the mining sector in recent years has been non-application of modern equipment and advanced technologies while old and second-hand machineries are being used in many of the mines some of which have been used in other countries for over 50 years."

<http://www.mining.com>

Access to modern mining machinery in Iran has been hobbled by international sanctions, according to Karbasian (Cite here).



**Like Acme batteries, Stupendous batteries also explode with significant force if immersed in water above 15° Celsius. Research by Dusterson et al (2012) as well as Smith and Rupert (2011, 2015) refers to studies in which the solvent Q, used in Acme and Stupendous batteries, combusts when wet. We suggest further testing take place using solvent W to replace solvent Q; solvent W is not volatile.**

First sentence does three things well!

Second sentence does two things well!

Third sentence does one thing well!

# IMRAD

Section	Purpose	Answers these questions
Introduction	Explains central question Gives context for the investigation States primary results	What did you do? Why did you do it? Who else has done related work? How did you do it? What happened?
Materials and Methods	Details the experimental procedure step by step	How could someone else replicate your experiment?
Results	Reports, in detail, the results of the investigation	What actually happened?
Discussion	Comments on the significance of the results Suggests refinements, applications Offers possibilities for further study	Did the experiment do what you expected it to? Why or why not? How might the experiment be improved or adapted? What next?

# TITLE

- should not be too vague
- may relate to the main objective, species involved, location (if relevant)
- may be derived from the x/y axis of the main figure in the lab report

*Wolverine (Gulo gulo) hunting behaviour in the Claire Lake watershed, Yukon Territory*  
(includes main objective, species involved, and location)

*Heart Mountain and South Fork fault systems: architecture and evolution of the collapse of an Eocene volcanic system, northwest Wyoming*  
(includes location, geological feature, and age)

# THE ABSTRACT

- States the purpose of the study
- Summarizes the methods
- Summarizes the results
- Summarizes the discussion

One sentence for each of these is usually sufficient.



The wavelengths of light that are more effective than others in promoting photosynthesis in the aquatic plant *Elodea Canadensis* has not been tested. Rate of photosynthesis was determined at 25C, using wavelengths of 400, 450, 500, 550, 600, 650, and 700 nm and measuring the rate of oxygen production for 1-hr periods at each wavelength. Oxygen production was estimated from the rate of bubble production by the submerged plant. We tested 4 plants at each wavelength. The rate of oxygen production at 450 nm (approximately 2.5 ml O<sub>2</sub>/mg wet weight of plant/h) was nearly 1.5x greater than that at any other wavelength tested, suggesting that light of this wavelength (blue) is most readily absorbed by the chlorophyll pigments. In contrast, light of 550 nm (green) produced no detectable photosynthesis, suggesting that light of this wavelength is reflected rather than absorbed by the chlorophyll.

# THE INTRODUCTION:



- Introduces the topic and your point
- Provides a short review of relevant, current research (theoretical background)
- States purpose
- Is sometimes understood as a mini literature review
- Begins only as generally as necessary to provide essential context for the report.

*It is well known that plants can use sunlight as an energy source for carbon fixation (Ellmore and Reed, 1993). However, all wavelengths of light need not be equally effective in promoting such photosynthesis. Indeed, the green coloration of most leaves suggests that wavelengths of approximately 550 nm are reflected rather than absorbed so that this wavelength would not be expected to produce much carbon fixation by green plants.*

# RESULTS / OBSERVATIONS / MEASUREMENTS

This section includes several sentences that summarize the results of the study (simple description of trends) and figures, graphs and/or tables.

## Tips

- Do not forget axis labels and units
- Use past tense
- Avoid redundancy – in the text, do not write exactly what is in each graph; graphs and figures present their own information. Contextualize only.



# DISCUSSION

In the Discussion section, you analyze and interpret the data. In analysis, you explain what you know with certainty based on your results and draw conclusions. The discussion:

- analyzes/interprets the results of the study; provides possible explanations
- suggests sources of errors and how experiment could be improved
- provides support from sources

The paragraphs in your Discussion section may progress in the following order:

- 1) Data
- 2) Generalizations or analyses of data
- 3) Conclusions with regard to your hypothesis
- 4) Inferences you can make from your conclusions to larger issues



## DISCUSSION

I find the small number of species represented in our sample surprising, since the pond is fed by several streams that might be expected to introduce a variety of different species into it, assuming that the streams are not polluted. It appears that the conditions in the pond at the time of our sampling were especially suitable for one species in particular out of all those that are most likely to have access to it. Perhaps the physical nature of the pond is such that the number of niches is small, in which case competition would become very keen; only one species can occupy a given niche at any one time (Ricklefs and Miller, 2000). The reproductive pattern of the fishes might also contribute to the observed results. Possibly *Lepomis macrochirus*, the dominant species, lays more eggs than the others, or perhaps the young of this species survive better, or prey on the young of other species.

(from Pechenik)

## INTEGRATE SUPPORT

To support your analysis and interpretation of results, you should use the findings of other related studies.

To integrate sources effectively, be sure that the studies you are using are relevant to your experiment.

Place information from sources in the context of your discussion of your experiment.

Use citations, not quotations, when you are referring to others' research.

## CONCLUSION

This section may or may not be included in the report. The conclusion provides an answer to the problem raised in the introduction and concisely restates the result.

## BE *REALLY* CONCISE

Use plain language *to show confidence*.

Choose precise terms.

You rarely need that adjective.

(Not 'precisely fifteen grams but fifteen grams'.)

Use language to get your reader **THROUGH** your report with ease.

Your reader is interested in your thinking, not your access to a thesaurus or your ability to stretch a phrase out to the breaking point.

**We, as human beings, need to consider the needs of the many as well as the few in order to provide social safety networks for all, since we live in a democratic nation. (33)**

**Democracy requires equal benefits for all citizens. (7)**

**This essay will examine and explore the complex, dynamic relationships between our digital communications (Internet, email, IM, text, etc.) and the degree to which our mental health is impacted by these communications. (32)**

**Social media use and mental health are intertwined. (8)**

# CONCISION

Avoid weak, wordy verbs

**Not** “make an assumption” **but**  
“assume”

**Not** “come to a conclusion” **but**  
“conclude”

**Not** “come to the realization” **but**  
“realize”

Make negatives positive

**Not** “did not succeed” **but** “failed”

**Not** “does not have” **but** “lacks”

Drop most “There is” and “There are”  
sentence openers

**Not** “There are serious  
consequences in failing to yield right  
of way” **but** “Failing to yield right of  
way can have serious consequences.”



Avoid using a phrase when a word will do

**Not** “at this point in time” **but** “now”

**Not** “due to the fact that” **but** “because”

Eliminate redundant words

**Not** “viable alternative” **but** “alternative”

**Not** “mix together” **but** “mix”

Avoid needless repetition

The product we are attempting to design, in cooperation with group 32, is not currently found in the market. For this reason there is not, currently, any direct competition for our product. For this reason the final price for the device will not be as critical as it would be for a product that the market is already saturated with. What will be more important than the price our product is safety. As a traditional prosthesis requires no surgery post amputation the type of surgery our instrumentation would be used for is completely elective. For this reason patients will have a low tolerance for risk both during surgery and over the life of the implant. If our products yield a considerable chance of, death, infection, or injury, which may require more surgery, patients will likely opt for a more traditional prosthetic system. 141 words!



**WE ARE DESIGNING AN ALTERNATIVE TO THE TRADITIONAL PROSTHESIS, THE USE OF WHICH WILL REQUIRE CANDIDATES TO UNDERGO A SURGICAL PROCEDURE. 21 words**

## MAKE USE OF ALL YOUR EDITORS

- **Your eyes:** Print out a final draft **in a new font** and read it.
- **Your ears and mouth:** Read the document aloud, ideally to someone else.
- **A second set of eyes:** your classmate, friend, the Writing Centre...



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