**Plagiarism is more subtle that cutting and pasting: some guidance on avoiding plagiarism for Biology students**

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**Purpose**: To enrich your understanding of what plagiarism is (and Good Academic Practice is) in the context of scientific writing. It should take 30 minutes to read and digest. Reading this should not only help you avoid plagiarism, but also improve the quality of your scientific thinking and writing.

**Overview**: In any submission you make for any module at the university (be that an exam, essay, lab report, poster or any other form involving written or spoken text) we expect all the language used to be your own, except for small sections where you are quoting someone else’s language (indicated by using quotation marks around the quoted text).

[Notice that in science (unlike the arts) we use direct quotations from other texts very rarely. We should only use these quotations where we want to draw attention to and discuss the exact phrasing used by another scientist. You might use quotations, for example, if you wanted to contrast and discuss two published definitions of what a living organism is. Here the reader needs to appreciate the exact words used in the previous definitions in order to follow your arguments. In most other cases, using a lot of direct quotations unnecessarily in your essay is not misconduct, but it is not good scientific writing and you will be marked down accordingly.]

I can recognise my own writing. I could read a paragraph in a scientific paper that I wrote 5 years ago and recognise it as my own. My writing style is consistent but is different from other scientific writers. Another way to put this is that I have my own voice. You should strive for the same in your writing. Everything you submit should feel like your own ideas in your own words when you read it back. If your writing doesn’t feel like your own to you when you read it back, then this is a clear warning that you are using other peoples’ voices and not your own and this is what we mean by plagiarism. See the next paragraph for how to achieve this.

Science is cumulative. We build on previous ideas. So how do you avoid plagiarism in this context? You should of course read previous work and extract ideas and facts from what you read. However, you need to thoroughly digest what you read before you begin to write yourself. What do I mean by thoroughly digest? I mean examine what you read critically. Ask question of it – does it make sense to you? Does it agree with other ideas or facts you have read? How generally true is it? What are its underlying assumptions? How could we test it further? If you intellectually wrestle with the relevant material you read, examining it from different angles before you start writing, then you will end up utilising what you have read into some writing in your own voice. If you feel unable to achieve writing in your own voice, then this is a sign that you might want to try some more thinking and reading before writing. Or it may be a sign that you should reach out to staff for some help.

[As an important aside – you should treat all sources this way, including lecture materials. You should present understanding that you gained from lectures in your own words – and you should redraw diagrams used in lecture materials before you use them to better mesh with your own text.]

**A detailed example**

Below I have edited a document “Using Peer-Reviewed Literature and Writing in your own Voice” by Sarah Stockwell, Lisa McDonnell and Stanley Low of the University of California that I found very useful for cementing ideas about problems biology students have in scientific writing. It can be found in the supplementary material to the following article: Yang, A., Stockwell, S. and McDonnell, L., 2019. Writing in your own voice: An intervention that reduces plagiarism and common writing problems in students' scientific writing. *Biochemistry and molecular biology education*, *47*(5), pp.589-598.**Only the text in bold is my own.**

# An example to illustrate different types of plagiarism

When we write about information from other sources, such as journal articles, books, websites, it can sometimes be difficult to write in our own voice, for a variety of reasons. This exercise will help illustrate how to use others’ work appropriately and ethically, so that it’s always evident to your reader which ideas and writing are your own, and which you learned from your reading.

The most common types of plagiarism or writing problems we see in science writing are:

* Word-for-word plagiarism
* Paraphrasing plagiarism
* Patchwork writing
* Technical parroting

Please see examples below.

**Word-for-word plagiarism**

Word-for-word plagiarism is when a writer takes **phrases** directly from the source information, it can be with or without a citation (both cases are considered plagiarism because of the word-for-word copying **without inverted commas to indicate a quotation**). This example is modified from: <https://www.indiana.edu/~istd/examples.html>

**Example:**

|  |  |  |
| --- | --- | --- |
| Original Source Material and Source information | Plagiarised version | Corrected version |
| Constructivism is a movement that extends beyond the beliefs of the cognitivist. It considers the engagement of students in meaningful experiences as the essence of learning. The shift is from passive transfer of information to active problem solving. Constructivists emphasize that learners create their own interpretations of the world of information.  **Source:**Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1999). *Instructional media and technologies for learning.* Upper Saddle River, NJ: Prentice-Hall. | Constructivists do not hold views entirely opposed to those of the cognitivists. The position of constructivists extends beyond the beliefs of the cognitivist. One key element of constructivism is the acknowledgement that learners create their own interpretations of the world of information.  **Reference:**  Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1999). *Instructional media and technologies for learning.* Upper Saddle River, NJ: Prentice-Hall. | There are a variety of theories on how people learn, and these theories differ in the ways they consider the role of experience in learning. Constructivism, for example, stipulates that learners from their own knowledge and understanding through experience, not through passive absorption of information provided (Heinich et al., 1999). The constructivism framework is one that is often considered an extension of the ideas put forth by cognitivists (Heinich et al., 1999)  **References:**  Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1999). *Instructional media and technologies for learning.* Upper Saddle River, NJ: Prentice-Hall. |

The corrected version captures the ideas of the original source, but the writer is communicating the ideas in their own words, and the source of the information is cited as well as the full reference included. **To produce the corrected version the writer has intellectually wrestled with what they have read, in order to deepen their understanding and so produce material very much in their own voice.** **[Of course, sometimes apt phrases stick in our minds, and we very occasionally end up inadvertently using phrases we have read. So very occasional lapses of this kind should not concern you.]**

**Paraphrasing plagiarism**

Paraphrasing plagiarism is when the writer summarizes information and ideas from a source, using their own voice, but fails to cite the source and provide a proper reference. This example is modified from: <https://www.indiana.edu/~istd/examples.html>

**Example:**

|  |  |  |
| --- | --- | --- |
| Original Source Material and Source information | Plagiarised version | Corrected version |
| Constructivism is a movement that extends beyond the beliefs of the cognitivist. It considers the engagement of students in meaningful experiences as the essence of learning. The shift is from passive transfer of information to active problem solving. Constructivists emphasize that learners create their own interpretations of the world of information.  **Source:**Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1999). *Instructional media and technologies for learning.* Upper Saddle River, NJ: Prentice-Hall. | There are a variety of theories on how people learn, and these theories differ in the ways they consider the role of experience in learning. Constructivism, for example, stipulates that learners form their own knowledge and understanding through experience, not through passive absorption of information provided. The constructivism framework is one that is often considered an extension of the ideas put forth by cognitivists. | There are a variety of theories on how people learn, and these theories differ in the ways they consider the role of experience in learning. Constructivism, for example, stipulates that learners form their own knowledge and understanding through experience, not through passive absorption of information provided (Heinich et al., 1999). The constructivism framework is one that is often considered an extension of the ideas put forth by cognitivists (Heinich et al., 1999)  **References:**  Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1999). *Instructional media and technologies for learning.* Upper Saddle River, NJ: Prentice-Hall. |

**Explanation:** Here we can see that the writer has summarized the ideas from the source using their own words, but there is a lack of citations to indicate where the ideas came from. In addition, the reference is missing, so the reader is unable to find the original source information.

**Patchwork writing**

Patchwork writing occurs when someone uses a large amount of both language and order of information from the source(s), with or without citations. This typically occurs when a writer just replaces words here and there from the source information.

**Example:**

|  |  |  |
| --- | --- | --- |
| Original Source Material and Source information | Plagiarised version | Corrected version |
| (  Constructivism is a movement that extends beyond the beliefs of the cognitivist. It considers the engagement of students in meaningful experiences as the essence of learning. The shift is from passive transfer of information to active problem solving. Constructivists emphasize that learners create their own interpretations of the world of information.  **Source:**Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1999). *Instructional media and technologies for learning.* Upper Saddle River, NJ: Prentice-Hall. | Constructivism is a movement that elaborates on the beliefs of the cognitivist. It incorporates the engagement of students in significant experiences as the key to learning. The change is from passive transfer of facts to active problem solving. Constructivists stress that it is important for learners to create their own understanding of the world of information.  **References:**  Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1999). *Instructional media and technologies for learning.* Upper Saddle River, NJ: Prentice-Hall. | There are a variety of theories on how people learn, and these theories differ in the ways they consider the role of experience in learning. Constructivism, for example, stipulates that learners form their own knowledge and understanding through experience, not through passive absorption of information provided (Heinich et al., 1999). The constructivism framework is one that is often considered an extension of the ideas put forth by cognitivists (Heinich et al., 1999)  **References:**  Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1999). *Instructional media and technologies for learning.* Upper Saddle River, NJ: Prentice-Hall. |

**Explanation:** Here we can see that the order of information is completely maintained, and only some words are substituted from the original source. This is not a genuine attempt at properly paraphrasing. **Proper paraphrasing involves developing our own understanding of the material and writing about it in our own voice, while properly citing the source ideas/information.**

**Technical Parroting**

Technical parroting is commonly a problem in methods sections of scientific writing. This is when writers use methodological information and descriptions from a source (such as a lab manual) without any change, or minimal change. Although it may seem there are only so many ways to describe certain techniques, it is still important to understand the methods for yourself and then use that understanding to construct a methodological description that best represents your own voice and understanding.

**Example:**

|  |  |  |
| --- | --- | --- |
| Original Source Material and Source information | Plagiarised version | Corrected version |
| The RFP coding sequence was cloned from the plasmid using PCR. Primers annealed 100 bp upstream and downstream of the coding sequence, thus amplifying the restriction enzyme sites. The PCR product was verified by agarose gel electrophoresis and digested using XbaI and PstI. The digested product was then used as the insert in a ligation reaction.  **Source:**Butler, Mel, and McDonnell (2018). *BIMM 101 Recombinant DNA Techniques Laboratory Manual.* McGraw Hill, New York. | We PCR amplified the RFP coding sequence using primers that annealed 100 bp upstream and downstream of the sequence. The PCR product was checked by agarose gel electrophoresis, and then digested using XbaI and PstI. The digested product was used in a ligation reaction. | In order to ligate the RFP coding sequence into the plasmid it had to first be amplified using PCR. Methods were followed as stated in Butler *et al*. (2018). The PCR was performed using primers that amplified the entire coding sequence, as well as restriction enzyme sites at the 5’ and 3’ end of the coding sequence. The PCR product was run on a 1% agarose gel to verify size and concentration, and then digested using XbaI and PstI. The digested product was then used in a ligation reaction (1:1 insert: vector molar ratio).  **References:**  Butler, Mel, and McDonnell (2018). *BIMM 101 Recombinant DNA Techniques Laboratory Manual.* McGraw Hill, New York |

**Explanation:** The problems with the plagiarised version are 1) there is very little attempt to summarize what was done in the writer’s own words, 2) there is no citation indicating the source of the protocols followed. The corrected version incorporates the citation, the necessary protocol information, and there is an attempt by the writer to write in their own voice. **Students frequently claim that the way a given procedure is explained in a lab manual is simply the only way that the procedure can be described properly – but this is never true. If you intellectually engage with each step of the procedure and ask yourself questions (why we are doing this step? what alternatives might achieve the same purpose? how do we know if this step has been successful? why does this step follow naturally from the last one? How does it contribute to the overall protocol? Is this step easy to do or does it require practice? What are the consequences of missing it out or doing it poorly?) then you will find ways to re-express a procedure in your own voice.**