

Written Assignment: Biology and Technology in the Real World

UMGC BIOL 103 Introduction to Biology

Please see our Course Schedule for the Due Date for this assignment.

This assignment addresses Course Outcomes 1-4:

- *make observations and discriminate between scientific and pseudoscientific explanations*
- *weigh evidence and make decisions based on strengths and limitations of scientific knowledge and the scientific method*
- *use knowledge of biological principles, the scientific method, and appropriate technologies to ask relevant questions, develop hypotheses, design and conduct experiments, interpret results, and draw conclusions*

DIRECTIONS

1. Select one of the following topics:

A. Genetically Modified Food. Humans are now capable of manipulating the genetic codes of certain plants and animals in our own food chain. What are some of the foods in your supermarket that have been genetic altered? How have they been altered and why? What does sound science have to say about potential risks to the environment and human health, associated with GMOs (genetically modified organisms)? Be careful to search for the science in *scientific journals* rather than GMO industry's own websites and reports! Based upon your research, do you think there is a clear answer as to how safe these foods might be to humans and the environment? Clearly explain your reasoning. This should be a discussion of genetic alteration of organisms *by laboratory methods* (such as gene insertions, etc.) and not by *selective breeding* (breeding one animal or plant with another for desired traits). ***Important Note:** *This topic is a contentious one with conflicting information occurring in the general public and even within the scientific literature. There is a great deal of industry interference in any online discussion of GMOs, increasingly resulting in their strong influence over the general narrative. If you choose this topic be sure you investigate it well, employing your best critical judgement, and seeking out the most recent scientific points of view.*

B. Stem Cells. A relative of a friend of yours has had a spinal cord injury due to a bad accident. The medical team has decided that this patient is a good candidate for a clinical trial using stem cell therapy. Your friend has not had a biology course since high school, so you are going to research and present to him/her some of the most important points about stem cells. In your discussion, include a description of the biology of stem cells, and explain exactly how these cells are unique in their ability to treat diseases and injury. The following website from the NIH regarding stem cell research will be very helpful: <http://stemcells.nih.gov/info/basics/pages/basics1.aspx>. Conclude by expressing your own thoughts on the topic to your friend.

C. Vaccines. Your friend is worried about the many vaccines that her newborn son is scheduled to receive and asks you for advice since you are taking a biology course. Start with an explanation of how vaccines work, and list some of the diseases that babies and children in the US are routinely vaccinated against. How have vaccinations impacted the frequency of these diseases over the past 100 years? Next briefly contrast the traditional methods used to create vaccines with more recently used biotechnology techniques. Discuss some of the reasons people might be worried about giving their children vaccines. Is there scientific evidence to support these concerns? Conclude with advice to your friend, backing up your opinion with sound reasoning based on the references you used.

D. Hydraulic Fracturing (for natural gas, also known as “fracking”) OR Tar Sands (also known as “oil sands”). As yet, our society is dependent upon non-renewable fossil fuels (coal, oil, natural gas) for the majority of our energy production. As supplies of these once-inexpensive products dwindle, industry is turning to reserves which are increasingly expensive, difficult, and environmentally hazardous to extract. Hydraulic fracturing for natural gas and tar/oil sands mining the Canadian boreal forests are two such relatively new industries. A friend asks you, "What's all this controversy in the news about fracking OR tar sands?" Pick ONE of these techniques and briefly explain to your friend what it involves. Then, in more detail, describe what we know about the potential human and environmental health risks arising from the industry. The following websites may be helpful: <http://www2.epa.gov/hydraulicfracturing>, http://www.nrdc.org/energy/dirtyfuels_tar.asp, http://www.ucsusa.org/clean_vehicles/why-clean-cars/oil-use/what-are-tar-sands.html. Finally, give your own opinion on the issue, backing up your reasoning with the sound references that you used.

2. In peer-reviewed scientific journals, find three (3) scholarly articles which relate to your topic. Why the emphasis on peer-reviewed journals? If you are unsure, see <https://libguides.unf.edu/peerreview>, or my **Guide to References and Citations** under Course Resources > Profs Helpful Docs. For more on how to find the peer-reviewed articles see this UMGC library webpage <https://sites.umgc.edu/library/libhow/articles.cfm>.

These articles should be the most recent you can find that still relate well to your topic. While you are definitely encouraged to use other kinds of scholarly websites and books to help you learn about your subject, note that the assignment still requires you to find the three articles from peer-reviewed journals, and this is not the same as webpage (even in article form) from scholarly websites. Remember that encyclopedias, Q&A or “How-To” web sites are not appropriate references in any collegiate research paper and you should also be critical of the information they supply, as most of these sites are open-sourced (i.e., not verified). Lastly, don’t forget to list as references any resources I have given you in the above descriptions, if you use them.

3. Write a paper of 1000-2000 words - not including your references – which is double spaced, in 12-point Times New Roman font. Note that I am happy to approve a larger word allowance if you feel you need it. Your paper’s format should be as follows:

- **Title Page**
- **Introduction**
- **Provide clear summaries of your three scholarly articles.** My advice: *Be very sure to make it clear to me that you are summarizing an article and which article that is.* I strongly suggest you use headers or at least phrases like, “According to the article by so-and-so...” so that I know when you are summarizing an article as directed. *If I have to struggle to determine when and/or which article you are summarizing you will lose points.*

- **Address any remaining Qs or requirements in your topic's description.** Use what you've learned from your research to answer *each of the questions* asked in the topic description if they have not already been answered in your article summaries. Be sure to give credit to your sources as you do this by using in-text citations, and strive to incorporate the concepts and principles of BIOL103 in your answers.
- **Conclusion.** Express your own opinion or ideas on your topic.
- **End your paper with an alphabetical Reference List, formatting your sources in APA style** (please also number this list). Cite all references/sources you used. If you need help please see this UMGC website with examples of APA formatting: <https://libguides.umgc.edu/apa-examples>. You can also see my **Guide to References and Citations**, under Profs Helpful Docs. *Don't use other sources out there on the web as many are not correct or offer variations in the style!*

4. For the best grade: Please use subject headers in your paper. Remember to limit your use of direct quotes when writing! Collegiate Writing Standards dictate that quotes should account for no more than 5% of the total text. If you do use quotes, you must include a specialized in-text citation including the page or paragraph number (Adams, 2014, para.12).

5. Submit your assignment to the specified assignment folder found in the weekly module by the due date specified in the course schedule. Submit your paper **only as a Word doc or a pdf** – any other format cannot be opened within LEO and subsequent late penalties will apply. **Give the document you submit a title indicating its topic.** I should be able to tell which topic you chose without opening the file. Some examples might include:

Fracking_Smith.docx
 Cho_Written Assignment _GMO.pdf
 Vaccines Paper_Juarez.doc
 Afaed _TarSands.docx
 CRISPR BIOL103 Paper_Omeze.pdf

6. Don't be late! Per our Syllabus, the Late Submission Policy for this assignment is **10% per DAY**, unless you have contacted me and been given an extension. **Note that the originality of your Paper will be automatically checked with Turnitin upon submission. Please review the Originality Report, and if needed, submit a revised paper before the submission deadline.**

GRADING RUBRIC

This assignment is worth 100 points and 10% of your overall course grade. Your paper will be graded using the following rubric:

Criteria	Excellent (100%)	Very Good (90%)	Good (80%)	Satisfactory (70%)	Needs Improvement (60%)	Failing (50%)	Partial Credit	(0%)
Length and General Directions (5 possible points)	5 Paper is of the correct length and all general directions followed.		4 Paper is of the correct length BUT has minor directional errors.		3 Paper is of the correct length BUT has minor directional errors.		1 Paper is of the correct length BUT has some direction	0 Paper is NOT the correct length AND/OR has

							al errors.	one or more directional errors.
Article Summarizations (30 possible points)	30 Three or more articles are summarized well in your own words. All articles are scholarly and relevant to the chosen topic and corresponding questions.	27 Three or more articles are summarized well in your own words. All articles are scholarly and relevant to the chosen topic and corresponding questions. BUT one or two minor issues or errors.	24 Three articles are summarized in your own words BUT issues with one of these AND/OR one or more articles not scholarly and/or relevant to the chosen topic AND/OR overreliance on quotations.	21 Three articles are summarized in your own words BUT issues with two of these AND/OR one or more articles not scholarly or relevant to the chosen topic AND/OR overreliance on quotations. OR Only two scholarly and relevant articles are summarized but this is done well and in your own words.	18 Three articles are referenced but issues with all summarizations AND/OR articles not scholarly and/or relevant to the chosen topic AND/OR overreliance on quotations. OR Only two articles summarized BUT issues with two of these AND/OR one or more articles not scholarly and/or relevant to the chosen topic AND/OR overreliance on quotations.	15 Only one scholarly and relevant article is summarized but this is done well and in your own words.	8 Partial credit given for some reference to articles and/or attempts to summarize.	0 No articles were summarized.
Content (50 possible points)	50 All questions are clearly addressed; Information is analyzed and defended based on literature research; good connections btwn answers	45 All questions are clearly addressed BUT some issues with description, analysis, connections btwn answers and	40 One or two of the questions are not addressed AND/OR some missing description and analysis AND/OR connections btwn answers and research lacking AND/OR minor errors in facts,	35 Several of the questions are not addressed AND/OR missing some description, analysis or depth AND/OR connections btwn answers and research lacking AND/OR errors in facts,	30 Most of the questions are not addressed AND/OR minimal description, analysis, depth AND/OR connections btwn answers and research lacking AND/OR errors in facts,	25 Most of the questions are not addressed AND/OR minimal description, analysis, depth AND/OR connections btwn answers and research lacking AND/OR errors in facts,	13 Partial credit given for some reference to questions.	0 Questions were not answered.

	ers and research; own ideas are expressed.	research, expressi on of own ideas, or organizat ion.	language, or organization.	language, or organization.	language, or organization.	language, or organization.		
Referenc ing (10 possible points)	10 All references listed at the end of the paper; in-text citations were used where needed; correct APA formatting of both in-text citations and full references.	9 All reference s listed BUT some minor errors with in-text citations or APA formattin g.	8 All references listed BUT some errors with in-text citations or APA formatting. OR All references listed in correct APA formatting BUT in-text citations missing.	7 Missing one reference AND/OR some problems with APA formatting or in-text citations.	6 Missing more than one reference. OR Significant problems with APA formatting.	5 Missing more than one reference. AND/OR References given but no attempt at APA formatting. OR Use of non-credible references (such as encyclopedias , Q&A websites, etc.)	2 Significa nt issues with referenci ng. Partial credit given for some attempt at referenci ng (such as giving weblinks).	0 No referenc ing in this paper. :(
Writing (5 points possible)	5 No spelling, grammar, or compositi onal errors.		4 Less than three minor spelling, grammar, or compositional errors.		3 More than three spelling, grammar, or compositional errors.		1 Numero us spelling, grammar , or compositi onal errors; May include issues of faulty sentence construct ion, interferi ng with paper's clarity.	0 Paper does not meet collegia te writing standar ds.