Overview of the Writing Assignment for BIO206.

Similar to BIO205, there is a writing assignment for BIO206. Throughout this assignment please keep in mind your ultimate goal is to gain an understanding of a very focused topic in molecular and cellular biology. Topics in cell and molecular biology can be challenging as students are still coming to terms with thinking about biology at the microscopic level. The molecular world is fascinating and we hope that through this assignment you will gain a deeper appreciation of molecular and cellular processes and how these impact your daily life. Common challenges for students include dealing with new terminology, names of proteins, organelles and cellular processes that are not as intuitive as the organismal topics covered in BIO205. Throughout the semester different assignments will be given with the goal of helping to walk you through the process of becoming familiar with cell biology and conveying your ideas through scientific writing.

Important Note: One of the biggest mistakes students make is thinking they need to review the broad topic they were given (e.g., G-protein coupled receptors). This is NOT the goal. During your reading about your topic you should focus and write about a some small aspect of the topic (e.g., the role of a specific G-protein coupled receptor in the human pain response).

Assignment #1: Read assigned review article and generate three guiding questions.
You will be assigned a review article and asked to come up with three guiding questions that came to your mind when reading the paper. These questions will lead you into focused question(s) for you writing assignments to follow. This is a very short assignment, but it is essential that you read the review.

Assignment #2: Detailed Focused Question and Annotated Bibliography.
Based on feedback from Assignment #1, and personal preference, you will select one of your three guiding questions and perform a literature search to research this topic at the cell and molecular level. You will refine one broad guiding question to a single detailed focus question, or two to three very closely related focus questions. During your literature searches you will identify primary literature sources relevant to your topic. An annotated bibliography will also be submitted showing appropriate references for the chosen topic.

Assignment #3: Detailed Outline and Updated Bibliography
To gain practice synthesizing, or bringing together, information from multiple sources into a single, well constructed writing assignment a detailed outline will be submitted. Based on feedback from Assignment #2 and further research to provide cell and molecular details to the outline, an updated bibliography will be submitted.

Assignment #4: Updated Detailed Outline and Updated Essay and Bibliography.
A revised detailed outline and bibliography, based on feedback, will be submitted to ensure sufficient depth into the subject matter and appropriate usage of references. A bibliography must also be included.

NOTE: For all assignments a 10% point reduction for every 24 hours late will be applied.
Assignment #1: Reading Review Article and Generating Three Guiding Questions

**Purpose:** Students will read an assigned broad review article within the cell and molecular biology fields. During their reading, students will hopefully identify passages which lead them to ask questions that require more detail than is provided in the article. In other words, let loose your curiosity and find things that peak your interest and make you want to learn more. You will submit three guiding questions (these can be fairly broad at this point) that will help you focus on a specific topic.

**Introduction:** By now, you have received your assigned topic, or review paper, via a message through BlueLine². Each topic is still very broad and you will first need to narrow the focus of your paper within your assigned subtopic. Begin by reading the paper and find aspects that are most interesting to you. The more interesting the topic is to you, the easier it will be to research the topic.

Please be careful to focus on cellular and molecular topics. One of the biggest errors we see is a broad focus on human diseases or illnesses examining the number of patients, what types of symptoms they may have and commercial application. This is NOT the point of the essay. Your focus should be at the cell and molecular level, not the clinical descriptions.

**Assignment:** Please submit your three guiding questions to Blueline in a single .doc, .docx or .pdf file and include the title of your assigned review paper. Our main goal here is to steer you away from questions that we feel could be very challenging, so you may not receive much feedback here if your questions are all relevant.

**Rubric for Assignment #1 (10 points)**

1. Are there three guiding questions and the title of the assigned review?
2. Are the questions appropriate to their review topic?
3. Are the questions developed enough to show the assigned paper was read thoroughly.
4. Is thoughtfulness toward generating these questions demonstrated?
Assignment #2: Detailed Focus Question(s) and Annotated Bibliography (20 points)

Purpose: To practice focusing from a broad scientific question to a single, detailed question (or a group of very related questions). Students will learn to use a scientific database to locate primary literature pertinent to a specific topic and to practice selecting appropriate articles for a research paper. Students will also practice creating bibliographic entries in the correct format.

Introduction: Select one of your guiding questions from assignment #1 and focus on this. At this point the question is likely very broad. In this assignment you will need to fine-tune your question to become very specific at the cell and molecular level. This will require you to perform literature searches (Web of Science or PubMed) to identify relevant sources with sufficient details to help you review your focused topic.

Often when doing research into a topic it is easiest to work backwards. Start with textbooks or other review articles (secondary sources) to become familiar with the “big picture” and then search for the primary sources or studies in which the experimentation was performed. One you have identified relevant primary sources decide which ones will work best as sources for your review.

Your assignments should rely heavily on new information presented in the peer-reviewed scientific articles. A peer-reviewed article is one that has been evaluated by a panel of experts that judged the scientific merit of the work before recommending that it be published. There are two types of peer-reviewed scientific literature:

- Primary articles are first reports of new research findings.

- Review articles do not present new experimental findings, rather they discuss, evaluate, and synthesize the current primary literature of a specific field. Review articles are an example of a secondary source – one that does not present new research findings for the first time. Textbooks, websites, and encyclopedias are other examples of secondary sources.

Distinguishing primary research articles from review articles is sometimes difficult. As primary research articles present new experimental findings they have two identifiable features:

1. Most of the figures show actual data, and are not just schematic diagrams or models.

2. They must include detailed information on how the experiments were performed. This information is usually found in a specific section called “Methods”, “Materials and Methods”, or “Experimental Procedures”. A few scientific journals, including Science and Nature, use an abbreviated format for their research articles that does not include a separate methods section. If you have questions, please ask.

As you research your topic you may ask questions that do not have full and final answers – that is a good thing. The incomplete and tentative nature of scientific knowledge is important to convey in your paper. Mention current hypotheses that remain to be further tested. Mention possible experimental approaches for testing those hypotheses. Note important remaining problems to be solved for which no testable hypotheses have yet been proposed.
Assignment:

1. State your detailed focus question, or series of related questions. In 2-3 sentences briefly describe how this has narrowed the topic of your paper relative to your broad guiding question.

2. Generate a bibliography. The following bibliography requirements apply to Assignments #2, #3 and #4 – please refer back to this section in later assignments to review the requirements.

   - You must use a minimum of four peer-reviewed articles as sources.
   - At least two must be a primary scientific articles published within the last five years.
   - The remaining peer-reviewed sources do not necessarily need to be published within the last five years and can include:
     - additional primary articles.
     - secondary (review) articles from journals.
     - chapters in scientific books other than textbooks
     - secondary (review) articles from biology-specific encyclopedias such as *Encyclopedia of Life Sciences*.

   - You can have more than four total peer-reviewed sources – those are simply the minimal requirements.
   - Other sources, that do not count towards the required four peer-reviewed sources, can be used provided there is some editorial control. Examples include: articles in popular science magazines (e.g. *Scientific American* or *Discover*), chapters in college textbooks, or websites maintained by scientific research institutions.

One of the most common bibliography errors is to use non-peer reviewed sources as the primary basis for information. Such sources do not provide sufficient quality nor quantity of information; their role is to aid in providing a larger context and beginning point for understanding. You can use these for background information as introduction, but the bulk of your future assignments should be based on what you learned from your four (or more) peer-reviewed sources.

**Do not cite the following as they lack sufficient scientific editorial control:**

- Personal websites (even those of scientists) that are not hosted by scientific research institutions
- Wiki-type sources whose content is open to manipulation, even if the focus of the source is scientific
- General rather than science-specific encyclopedias (e.g. *Encyclopedia Britannica*)
- General rather than scientific magazines and newspapers (e.g. *Newsweek, New York Times*)

You can consult these sources if you wish as they might give you some ideas, but you must first find that same information in more reliable (preferably peer-reviewed) sources. Then use those more reliable sources.

**Searching a Database for Peer-reviewed Sources:**

The two main database search engines that you can use to find and access peer-reviewed articles (both primary and secondary) are PubMed and Web of Science. Links to both search tools and tutorials on how can be found under the “Find Articles” tab in the library’s *BIO 206 Course Guide* developed by Mary Nash.
The BIO206 Course Guide is an excellent resource for performing literature searches, formatting your bibliography and properly citing your sources for your final essay assignment.

**Formatting a Bibliography:**

In scientific writing it is essential to indicate where information came from and give credit to those individuals who performed experiments that answered previously unknown questions. Once you have located appropriate scientific articles, and other sources, for your assignment a bibliography must be generated that includes all of the sources you will be using.

Each bibliographic entry must include appropriate information to enable the reader to find the source directly. There is no consistent bibliography format used across the biological sciences; therefore, we have selected a common one for this assignment – the American Psychological Association, or APA. **Failure to use this formatting style throughout this assignment will result in a significant loss of points.** Under the “Citing Your Sources” tab on the BIO206 Course Guide there is a pdf which lists how to follow this format for different sources. It can also be found in the Writing Assignment Module in BlueLine for the BIO206 course. PLEASE refer to this pdf when generating all bibliographies for this assignment.

Also under the “Citing Your Sources” tab is a link to RefWorks – a bibliography manager that can be helpful. Only use this if you find it helpful. Whether you use RefWorks or not, **always** carefully proofread each bibliographic entry. Include the DOI whenever possible.

**Annotating a Bibliography:**

After you have written your focus question(s) and formatted your bibliography, please annotate each bibliography entry. Each annotation must include:

- Whether the source is primary or secondary.

- A brief description written in complete sentences of what the paper is about, what information you plan to use from the source. To successfully annotate your bibliography, you must have read and analyzed the papers you include and have thought critically about the structure of your paper. Each annotation should be between approximately 50 and 150 words.

**Submission:**

Submit your bibliography using the **submit assignment** button on Blueline². You must save your file as a .doc, .docx or .pdf and include your name in the file name submitted.
Detailed Focus Question and Annotated Bibliography Rubric

Total: ___/20

Focus Question(s)
Total _____/5
1. Detailed focus question(s) is given at the top.
2. The focus question(s) is related to the assigned topic.
3. The focus question(s) is sufficiently detailed (not overly broad).
4. The description of how this question(s) narrows the topic is well described.

Comments:___________________________________________________________

Annotated Bibliography
Total _____/15
1. At least four appropriate sources are used (-1 pt for each missing)
2. At least two of the sources are primary literature (-1 pt for each missing)
3. At least two of the primary literature articles are within the last five years (-1 pt for each missing)
4. The Bibliography meets the APA format guidelines (-0.5 pt for each error)
5. A DOI is given for each article if available (-0.5 pt for each missing)
6. Is primary or secondary listed for each source and is this correct?
7. Does the annotation description show understanding of the paper?
8. Does annotation description describe how this relates to the focus questions?

Comments:_____________________________________________________________
Detailed Outline and Updated Bibliography Assignment (30 points)

Purpose: Students will write a detailed outline and updated bibliography (no annotations needed). Through this exercise, students will begin the process of synthesizing information from various sources into a coherent story. By outlining their paper, students will learn how to compile, extract, and synthesize molecular information from a variety of sources to develop a detailed framework and flow of ideas.

Too often students use a single source for information in a single, or multiple paragraphs. Then a second source is used for another series of paragraphs and so on. This assignment is designed to help students avoid that mistake and integrate information.

Introduction:
Due to the technical nature of scientific writing, it is essential to think about the logical progression of ideas and the flow of topics to effectively convey the story/information in a narrative fashion. To write a successful outline the student must extract related, pertinent information from different sources and then organize these based on specific topics. This outline assignment gives students the practice of learning how to compile cell and molecular information from a variety of sources into a cohesive story.

An excellent detailed outline represents a significant time investment to extract and organize information. The bulk of the information in your outline should come from your primary sources. In particular, this information must come from the results section of these papers (which presents findings done by the researchers) and not simply information from the introduction (which is summarizing work done by other groups).

Remember to focus on the cellular and molecular aspects of the topic and not on medical or commercial applications. Practical applications are interesting, but their relevance to this assignment should be very limited. Avoid giving statistics about clinical or pharmaceutical applications and instead focus on the cellular and molecular aspects.

You must start each major section of the outline with two to three sentences briefly describing the major point of that section and how it fits and flows with the overall paper topic. The remainder of that section of the outline will then lay out how your different sources will address that major point. Often in scientific investigations, answering one question leads to the formation of new ones. As you delve into your topic in detail, some of these questions will probably not have full and final answers. The incomplete and tentative nature of scientific knowledge is important to convey. Including questions that require further testing and possible experimental approaches for testing is encouraged.

The detailed outline itself must be at least two pages and no more than three pages (1” margins and single spacing). Point deductions will be taken off for over/under length. It is essential to provide sufficient depth in your outline by delving into the specifics of cellular and molecular details.

Pay careful attention to your wording in the outline. It is essential that your grader be able to determine that you understand the material that you are outlining and that one can follow how subtopics relate to one another. To properly demonstrate this all of the assignment must be in your own words – no quotation are allowed.
You MUST include in-text citations in your outline to show which sources the information you plan to use came from. This information helps us determine how well you are synthesizing information from multiple sources. Please see the bottom of Page #2 in the “APA.pdf” document on the library’s BIO206 course guide (or the BIO206 BlueLine course) for correct APA formatting of in-text citations.

**Bibliography:**
Please update your bibliography by including new sources and removing ones that will no longer be used. Based on comments received in Assignment #1 and Assignment #2 prepare an updated bibliography to reflect the sources you now plan on using for your essay assignment. There are two important notes:
1. Please follow the Bibliography guidelines previously given (Page #4 of this document).
2. You do not need to annotate the bibliography for this assignment.

**Detailed Outline and Bibliography Rubric**

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<thead>
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<th>Section</th>
<th>Total: ___/30</th>
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<tr>
<td>Outline</td>
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1. Proper outline structure is followed throughout and length is correct
2. The outline is broken into discrete sections of related information
3. Descriptive sentences accompany each major section and convey importance and fit
4. Cell and molecular details are emphasized; clinical significance is avoided
5. When primary sources are cited the information comes from the results section of the primary source
6. Grammar and spelling

**Comments:**

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**Synthesis and Organization**

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<tr>
<td>1. Main points of outline are presented clearly and organized well (e.g., focus questions used)</td>
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<tr>
<td>2. Information presented is accurate</td>
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<td>3. Content from multiple sources is synthesized into a coherent and comprehensive plan throughout each major sections</td>
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<td>4. The author correctly extracted and incorporated material from the different sources (e.g., no quotations)</td>
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<tr>
<td>5. The outline is within the boundaries of the focus question(s) and developed to sufficient cell and molecular depth.</td>
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**Comments:**

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**Citations and Bibliography**

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<td>1. Citations are provided and formatted correctly.</td>
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<tr>
<td>6. A DOI is given for each article if available (-0.5 pt for each missing)</td>
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**Comments:**

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Updated Detailed Outline and Bibliography Assignment (35 points)

Purpose: Students will submit a revised outline and bibliography based on grader comments to improve their detailed outline. Receiving feedback is a critical part of scientific writing. Often this feedback improved logical progression of ideas within major or minor sections. Another common error of not going into sufficient cell and molecular details can be addressed in this revised outline. Part of your grade for this updated outline is to incorporate the recommended changes.

The same primary and secondary literature requirements for Assignment #2 and #3 are to be followed in this assignment (see page #4 above). You are encouraged, and expected, to consider the relevance of additional material encountered since the submission of the annotated bibliography and outline assignment. Therefore, this bibliography might not be identical to the bibliography you previously submitted as your sources have changed.

To allow for the incorporation of grader comments this outline should be 2.5 - 3.5 pages in length, 1” margins and single-spaced. You MUST put terms in your own words; therefore, quotations are not allowed. You assignment will be run through anti-plagiarism software when you upload. Remember to include citations and provide a bibliography.
Updated Detailed Outline and Bibliography Rubric

**Outline**

1. Proper outline structure is followed throughout and length is correct
2. The outline is broken into discrete sections of related information
3. Descriptive sentences accompany each major section and convey importance and fit
4. Cell and molecular details are emphasized; clinical significance is avoided
5. When primary sources are cited the information comes from the results section of the primary source.

Comments:___________________________________________________________

**Synthesis and Organization**

1. Main points of outline are presented clearly and organized well (e.g., focus questions used)
2. Information presented is accurate
3. Content from multiple sources is synthesized into a coherent and comprehensive plan throughout each major sections
4. The author correctly extracted and incorporated material from the different sources (e.g., no quotes)
5. The outline is within the boundaries of the focus question(s) and developed to sufficient cell and molecular depth.

Comments:___________________________________________________________

**Citations and Bibliography**

1. Citations are provided and formatted correctly.
2. At least four appropriate sources are used (-1 pt for each missing)
3. At least two of the sources are primary literature (-1 pt for each missing)
4. At least two of the primary literature articles are within the last five years (-1 pt for each missing)
5. The Bibliography meets the APA format guidelines (-0.5 pt for each error)
6. A DOI is given for each article article if available (-0.5 pt for each missing)

Comments:___________________________________________________________

**Updating**

1. Were the grader comments and recommendations sufficiently incorporated
2. Grammar and spelling

Comments:___________________________________________________________

* Failing to cite articles appropriately may be considered plagiarism and result in the appropriate penalties.

** A 10% grade reduction will be applied every 24 hours past the submission deadline.