



### **Lab Reports for Specific Classes:**

\*Note: these are not all the classes at McGill requiring lab reports\*

This resource includes tips on the following lab courses in the Faculty of Science:

100-level: BIOL 111, BIOL 112, CHEM 110, CHEM 120

200-level: BIOC 220, CHEM 212, CHEM 222

300-level: BIOC 320, BIOL 301, MIMM 385

To request additional lab course resources, fill out the survey at the link below:

<https://forms.gle/TY7rb7775kaqmTFd8>

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#### **BIOL 111/112: Principles: Organismal Biology & Cell and Molecular Biology**

*Courtesy of Georgiana Ferguson (TA)*

##### **How can students best succeed in CHEM 212/222 labs?**

For doing the lab, it sounds basic, but carefully read the lab manual. Lots of students only skim the lab manual and end up asking a lot of questions and missing. Students should read the manual at least twice before the lab!

##### **What are common mistakes students make in these labs?**

Students often give vague/brief answers for the pre-lab & in-lab assignments. TAs grade from an answer key that usually goes by keywords and key phrases, so I encourage students to include as many “important-sounding” words as possible (while still remaining concise).

##### **Are there any recommended resources?**

Refer to your lab manual!

##### **How much time are students expected to be spending on lab reports for this class?**

These lab reports are mostly completed in class with a small pre-lab section.

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#### **CHEM 110/120: General Chemistry 1 & 2**

Coming soon!

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## CHEM 212/222: Organic Chemistry 1 & 2

*Courtesy of Dr. Danielle Vlaho*

### How can students best succeed in CHEM 212/222 labs?

Carefully read the syllabus (this goes for every class)! There is a lot of useful information that can help students make sure they are on the right track. Everything from the class schedule, contact information, details on activity and when/how to submit them, what to do if you have to miss a lab, etc. is all detailed there.

### What are common mistakes students make in these labs?

Attention to detail is critical! Many students omit or gloss over details that are actually very important. Things like document formatting, citation styles, and organized presentation of results are often overlooked but are often just as important as having the correct answer.

Many students forget that the goal of the labs is to learn new things! The answers to activity and lab report questions will not usually be found directly in the lab manual or activity instructions. Students are encouraged to search the internet (especially the scientific literature, using databases like SciFinder, PubChem, and Google Scholar) to find the answers to questions.

Using external sources is such a big part of lab reports, so understanding how to properly cite sources is extremely important. In the chemistry department, the ACS citation style is used to cite others' work in lab reports and lab activities.

Significant figures are a widespread issue in organic labs. Additional resources are currently being developed to help with this -- but often students need a refresher on what they've already learned in gen chem or CEGEP.

Students often forget that the instructor and TAs are here to help. We always encourage students to reach out when they have questions, whether it's on the discussion board, via email, or during office hours. Whenever you're not sure of something (and can't find an answer in our course resources), just ask!

### Are there any recommended resources?

We strive to provide many resources to help students succeed in our chemistry labs, including details on searching the chemical literature, how to keep a lab notebook, general guidelines for reports, videos and written descriptions of common techniques, etc. All of these resources are available on myCourses.

The library chemistry guide (<https://libraryguides.mcgill.ca/chemistry>) has some great resources on citation styles, citation management software, and how to use ChemDraw. There are also some additional resources here:

<https://libraryguides.mcgill.ca/chemistry/learn>

[Master Organic Chemistry](#) is an excellent resource for learning more about organic chemistry and reaction mechanisms. It is also a heavily used resource in the lecture components of both CHEM 212 and CHEM 222 since this site has effectively replaced the required textbook. The site is written by a McGill alum who completed his Ph.D. in organic chemistry -- so students can be confident that the information is correct!

SciFinder is perhaps the best way for students to find chemical properties and search the scientific literature. It is an extremely comprehensive and powerful database that provides access to millions of peer-reviewed articles and summaries of known chemical compounds. Students can access SciFinder via the McGill library:

<https://libraryguides.mcgill.ca/scifinder> (must register for an account)

SDS (Chemical Safety Data Sheets) is another source of useful information, specifically relating to physical and chemical properties and potential safety hazards. These are available for all chemicals used in the lab, and are easily found by searching online for "compound name SDS"

**How much time are students expected to be spending on lab reports for this class?**

This is quite difficult to answer from an instructor's perspective. While we aim to keep our reports and activities fairly short and straightforward (i.e. should take a few hours at most to complete), student background knowledge, experience, comfort with searching the literature, and work habits mean that the actual time taken to complete a lab report probably varies widely throughout the class.

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## **BIOC 220/320: Laboratory Methods in Biochemistry and Molecular Biology 1 & 2**

*Courtesy of Vicky Kottis*

**How can students best succeed in BIOC 220/320 labs?**

They need to closely follow the BIOC 220/320 lab course manual instructions and the tutorials on how to write a lab report, along with the instructions given to them by their TAs. They need to follow the directives of the course material when writing their course-specific lab reports. We encourage them to ask questions and meet with their TAs for extra help.

### What are common mistakes students make in these labs?

We strongly encourage students to be proactive and start the introduction section of their lab reports as soon as possible. When they have a few minutes, they should look up the required journal references that they will need to write their lab reports. They can start this before they even start the experiment, which also helps them better understand the experiments. This is what takes a long time, finding the information and references to start the introduction section of the lab report. We also encourage them to follow the manual guidelines given after each experiment, on what is required in their lab report for each specific experiment.

There are no real common mistakes; students come from different educational backgrounds and have different writing skills. For these reasons, we do not grade the grammar or sentence structure of these lab reports, just their content and the understanding of the material.

### Are there any recommended resources?

We strongly recommend students to closely follow the lab course manuals, tutorials, and the guidelines given to them in the U1 BIOC 220/BIOC 320 lab course guides. TAs are a great resource as well!

### How much time are students expected to be spending on the lab reports for this class?

This really depends on students' writing and research abilities, citation resource knowledge, and understanding of their research topic. For all these reasons, we cannot estimate the time students need to write their lab reports. Some students tell us they take less than 10 hours, others take more than 25 hours. We try to help them decrease the time spent on their lab reports by giving them tutorials on EndNote, Word, Excel and guidelines on writing lab reports.

The only way to improve is to be proactive, follow the specific lab report guidelines in the lab manual, ask questions, and meet with the TAs for extra help. Of course, if there is time, taking a writing course can help with lab report writing skills.

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## **BIOL 301: Cell and Molecular Laboratory**

### **How can students best succeed in BIOL 301 labs?**

Students should read the lab manual carefully. This often has all the answers for the quizzes, as well as the worksheets. TAs will often refer students to the lab manual, and reading this in advance is key to success in the lab. It is also essential to perform the Labster Simulations (specifically for the Fall 2020 semester) and watch the weekly lab workflow video. For the research proposal, students should aim to find a novel idea for the topic. For example, in winter 2020, only a few groups came up with novel ideas for bioremediation. It is nice to look at what has been done and what is available in the literature, but this should be more of an inspiration rather than reusing an idea.

### **What are common mistakes students make in these labs?**

As previously mentioned, most of the questions students ask are in the lab manual, so it is imperative to read this before the lab. It is also important to answer questions on the quiz and worksheet clearly and concisely. Most TAs are looking for keywords when grading, so it is nice to either underline the keywords in the text and only write what is necessary to answer the question. For the research proposal, it is very important to follow the grading rubric and make sure your proposal considers every point in the rubric. Research proposals are like writing a scientific grant - it is an idea that you want to suggest to a board for funding. Students will benefit by looking at grants published online for guidance. Finally, students should ask their TAs for information and clarification regarding citations.

### **Are there any recommended resources?**

The lab manual is the best resource in this course for quizzes and lab worksheets. It is also important to ask TAs when you have questions, as they are a powerful resource in the course. For the research proposal, students should go on PubMed and look up journals, articles, and papers discussing their area of interest for inspiration.

### **How much time are students expected to be spending on lab reports for this class?**

BIOL 301 "lab reports" are worksheets to be completed in the allotted lab time. This will not be the case for the Fall 2020 semester, as students are expected to complete the worksheets outside the lab.

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## MIMM 385: Laboratory In Immunology

*Courtesy of Marieme Demble*

### How can students best succeed in MIMM 385 labs?

Students should start by reading the syllabus and asking any questions if needed. It is essential to come to laboratory sessions prepared. Make sure to regularly update and organize your laboratory notebook. Understanding the experimental procedure beforehand will help diminish chances of making mistakes. In the lab, evaluate the strengths and weaknesses of your lab partner to avoid wasting time and reduce frustrations. Divide laboratory work equally. While it is possible that one student may be more experienced, all team members are expected to contribute to the experiment equally. Ask relevant questions and participate in class. Plan to arrive on time or 5 min early. Prepare and clean your work area. Follow your TAs instructions. Maintain clear communication with your TA and laboratory partner. For example, notify your TA if you are going to be late. Start your reports early! Make sure you are able to submit your reports on time. If any clarifications are needed, ask the TA grading your work AHEAD OF TIME. Have a friend proofread your work. Time management skills are important to learn both in the lab and in life.

### What are common mistakes students make in these labs?

Rushing to finish and making mistakes. Lack of patience and problem-solving skills. Misunderstanding the goal of each experimental procedure and not understanding or adapting to changes in the protocol. Not submitting, clear and error-free high-quality work. Understanding what you are doing is as important as applying yourself to your work.

### Are there any recommended resources?

Peer-reviewed articles from reputable journals can help you frame your reports (organization, flow etc. ). Follow the instructions given to you and verify expectations from your grader and instructor.

### How much time are students expected to be spending on lab reports for this class?

This will vary based on your preparedness for each class. Outside of class time, consistently dedicate time each week to make the process smoother.