

# What This Book Offers Instructors

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## Summary

This workbook is designed to:

- form a framework for flipping second semester sophomore organic chemistry classes;
- provide students with a set of questions and answers that they need to learn how to study organic chemistry effectively;
- steer students towards important chemical concepts necessary to major in biological sciences including medicine, dentistry, plant sciences, veterinary science, food science, as well as chemistry; and,
- enable students to avoid having to buy expensive textbook/online bundled resources.

## Philosophy

The emphasis of the *Sophomore Organic Chemistry By Inquisition* workbooks, of which this is the second, is *how students should study organic chemistry*, more than on organic chemistry itself. These workbooks are designed to enable an instructor to flip a sophomore organic chemistry class by working a fraction of the problems in class, and leaving the students to solve the rest (I share experiences on how to flip sophomore organic classes in the preamble to the first book in the series). Alternatively, students may work through the problems presented here to complement classes taught using conventional lecture styles.

Book 1 in this series covers essential concepts for the first semester of sophomore organic chemistry. This workbook, the second in the series, covers many of the essential concepts for the second semester of organic chemistry, but *with a particular emphasis on those which apply to carbohydrates, nucleic acids, proteins and peptides*. Those issues are dealt with first because they are the most important to students who are not chemistry majors.

Some advanced concepts that are important to chemical or biochemical syntheses of small molecule natural products are dealt with *after* the chemistry needed to understand carbohydrates, nucleic acids, proteins and peptides. This is not because syntheses of natural products are not important, they are. It is because chemical and biochemical syntheses of natural products involve such a huge array of reactions that it is almost impossible to comprehensively teach the fundamentals of those in two semesters without overwhelming a significant fraction of the audience. More importantly, few academics expect majors in the biological sciences outside of chemistry to learn and retain that specialized synthetic information from a sophomore organic chemistry class.

Inevitably, most instructors will realize there is some material they might expect to be covered that is not found in these workbooks. However, this is a workbook not a syllabus, and part of the appeal of flipping classes, teaching students to take the initiative for learning, is that instructors can augment the material in this workbook with other problems and reading assignments to produce optimal syllabi for their particular environment. Instructors may also use online homework selected from resources like Sapling Learning (<http://www2.saplinglearning.com>); there is no web-based package bundled with this book.

Students need to compare their answers against model solutions. Consequently, answers for this workbook are available via the *By Inquisition* website ([www.byinquisition.org](http://www.byinquisition.org)) and will also be covered in some videos online (details on the [byinquisition.org](http://www.byinquisition.org) web site).

Students will need access to textbooks and online materials to aid their understanding. They can use any decent textbook with these notes, including editions other than the latest, *ie* ones which can be bought relatively inexpensively.

# What This Book Offers Students

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## Summary

This is the bad news:

- it is going to take at least 40 – 0 hours of *focused, targeted* practice per semester to get a good grade in sophomore organic chemistry 2
- this book probably will not cover absolutely everything your instructor wants you to know
- material covered in this book does not follow that in any particular textbook, so there will be some effort involved in correlating chapters in a textbook with sections in this workbook
- there is repetition in the problems (with slight changes) to drive home the key points
- all students will find some questions in this book which they feel could have been phrased better (but I have done my best to make them crystal clear)

The good news is:

- students of sophomore organic chemistry who solve the problems in this book following the guidelines below, will significantly improve, irrespective of the exact course content and the order in which it is presented.

## How To Use This Book

- (i) Revise Org. Chem. 1 (using *Sophomore Organic Chemistry 1 By Inquisition?*).
- (ii) Gain a basic understanding of the new material covered in the appropriate section of this book.
- (ii) Attempt the problems *without looking at the ideal answers provided on the website for this book*.
- (iii) When unable to solve a problem, determine if it is probing for a fact or testing understanding of a key concept.
- (iv) If a problem requires memorization of a fact, but that memory is not available, look up the answer in the text, from the web, anywhere *except the ideal answers provided on the website for this book*.
- (v) If a problem requires application of a concept but the required understanding is not there yet, learn more about the concept, then try again *without looking at the ideal answers on the website for this book*.
- (vi) Crosscheck your answers with friends, and discuss if necessary.
- (vii) Finally, check the ideal solutions provided on the web if there is any uncertainty about the correct ones.

It is impossible to solve all the problems in this book without learning some organic chemistry first [see (ii) above]. These are ways to learn enough organic chemistry to begin to solve the problems in this book:

- going to lectures
- reading a textbook
- targeted web research
- talking to friends or instructors about organic chemistry
- watching appropriate videos online

The best way to gain that understanding is to do all these things, as necessary.