

## **Sabbatical Proposal 2018-2019**

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### **Background**

Biology is a complex and constantly changing field, with new discoveries and advancements being made daily. The Moorpark College Biology Department is fortunate to have faculty with diverse backgrounds and job experiences that enable them to impart their knowledge, experience, and technical skills to students. Students who take our Biology courses prepare for entry into four-year universities, graduate school, and professional programs in medicine, pharmacy, veterinary medicine, dentistry, and nursing. Our majors Biology curriculum includes core lecture courses along with laboratory components. While the lecture textbook for our majors Biology M02A course (first course in a three course sequence for Biology majors) has been updated almost every 1-2 years, the laboratory manual (Symbiosis: Pearson Custom Library for the Biological Sciences; ISBN: 9780536193261) has not changed for at least 15 years. Likewise, the content of this laboratory manual has not been updated since its original publication. Most of the original faculty who helped develop this lab manual are no longer at Moorpark College or near retirement. There has been much advancement in the field of Biology since the original publication of this lab manual. Though current faculty have imparted these advancements and knowledge to our students through literature and their own lectures, it is vital for us to update this laboratory manual so that our Biology students have an up-to-date and comprehensive background to be successful in a highly competitive Biology field.

I have taught Biology full-time at Moorpark College since Fall 2011. My knowledge in the field comes from my education as well as my numerous years of experience in academic research. In addition, I have kept up with the advancements in my field through continued networking with academic professionals, attending conferences as well as other professional development activities, taking online courses, and reading scientific literature. Furthermore, I have been teaching the majors Biology M02A course as one of my main classes for the last three years. Lastly, since I am one of the lead instructors in our summer Bridge to Biotechnology

courses for high school students and workshops for high school teachers, I have been developing new and relevant curriculum and lab exercises yearly. For the above-mentioned reasons, I am qualified to be the faculty member to take on the project of revising the aforementioned lab manual.

### **Proposal**

I propose to utilize the sabbatical leave of one semester (Spring 2019) to completely revise the lab manual entitled “Symbiosis: Pearson Custom Library for the Biological Sciences” in order to bring the content of the book up-to-date with current technologies that have become a common part of the field since the original publication of the book. I have not applied for a sabbatical leave prior to this time. The last time a Biology faculty was granted a sabbatical was in Spring 2016 (Dr. Subhash B. Karkare). The process of revising this book will entail researching new laboratory exercises that will be added to the new lab manual, writing and testing new lab protocols, and updating/modifying current lab exercises so that they are relevant and more easily carried out by the students.

**Plan:** The current Biology M02A lab manual includes labs that cover various Biology topics.

The Table of Contents of the book is given below:

<b>TOPIC</b>	<b>PAGE</b>
<b>1. Scientific Investigation</b> Judith G. Morgan and M. Eloise Brown Carter	1
<b>Biology 2A Introductory Lab</b> Tom McAdam	33
<b>Tools for Scientific Inquiry</b>	41
<b>2. pH and Buffers</b> Jean Dickey	71
<b>Biologically Important Molecules</b> Vodopich and Moore	89
<b>3. Enzymes</b> Judith G. Morgan and M. Eloise Brown Carter	105

<b>4. Microscopes and Cells</b> Judith G. Morgan and M. Eloise Brown Carter	131
<b>Diffusion and Osmosis</b> Judith G. Morgan and M. Eloise Brown Carter	155
<b>Cellular Respiration and Fermentation</b> Judith G. Morgan and M. Eloise Brown Carter	181
<b>5. Photosynthesis</b> Judith G. Morgan and M. Eloise Brown Carter	207
<b>Protein Chromatography: Gel Filtration</b> Department of Biology, Moorpark College	229
<b>HeLa Cell Splat</b> Department of Biology, Moorpark College	235
<b>6. Mitosis and Meiosis</b> Judith G. Morgan and M. Eloise Brown Carter	237
<b>Genetic Problems</b> Marie Panec and Moorpark Biology Department	267
<b>Mendelian Genetics</b> Dickey	285
<b>Transformation of Escherichia coli with pGLO</b> Department of Biology, Moorpark College	307
<b>PCR: Amplification of Human TPA-25 Gene</b> Department of Biology, Moorpark College	311
<b>7. Molecular Biology</b> Judith G. Morgan and M. Eloise Brown Carter	327
<b>8. Population Genetics I: The Hardy-Weinberg Theorem</b> Judith G. Morgan and M. Eloise Brown Carter	355
<b>9. Population Genetics II: Determining Genetic Variation</b> Judith G. Morgan and M. Eloise Brown Carter	385
<b>The Missing Link</b> CSU Sacramento	413

The original lab manual is organized and grouped by major Biology units that we cover in lecture. However, some of the labs are no longer relevant or not written intuitively so students can carry them out easily. I propose to introduce new lab exercises, modify, and/or eliminate current lab exercises so that they are relevant to current Biology topics and have easy to follow instructions.

### **Proposed Table of Contents**

<p><b>1. SCIENTIFIC INQUIRY</b></p> <ul style="list-style-type: none"> <li>–Scientific Method</li> <li>–Measurement and Scientific Inquiry</li> </ul>
<p><b>2. CHEMISTRY</b></p> <ul style="list-style-type: none"> <li>–Acids and Bases</li> <li>–Buffers</li> </ul>
<p><b>3. THE CELL AND BIOLOGICAL MOLECULES</b></p> <ul style="list-style-type: none"> <li>–Microscopes and Cells</li> <li>–Organic Molecules</li> <li>–Diffusion and Osmosis</li> </ul>
<p><b>4. METABOLISM</b></p> <ul style="list-style-type: none"> <li>–Enzymes</li> <li>–Cellular Respiration</li> <li>–Fermentation</li> </ul>
<p><b>5. PHOTOSYNTHESIS</b></p>
<p><b>6. CELL CYCLE</b></p> <ul style="list-style-type: none"> <li>–Mitosis</li> <li>–Meiosis</li> <li>–HeLa Cell Splat</li> </ul>
<p><b>7. MOLECULAR MARKERS AND MENDELIAN GENETICS</b></p> <ul style="list-style-type: none"> <li>–Human Genetics</li> <li>–Human Pedigrees</li> <li>–DNA Fingerprinting</li> <li>–VNTRs and Forensics</li> </ul>

<p><b>8. MOLECULAR BIOLOGY</b></p> <ul style="list-style-type: none"> <li>-Polymerase Chain Reaction (PCR)</li> <li>-Real Time-PCR (RT-PCR)</li> <li>-Using SNP's to Predict Bitter-Tasting Ability</li> </ul>
<p><b>9. BIOTECHNOLOGY</b></p> <ul style="list-style-type: none"> <li>-Transformation of <i>Escherchia coli</i> with pGLO</li> <li>-CRISPR/Cas 9</li> <li>-Stem Cells</li> </ul>
<p><b>10. GENOMES AND EVOLUTION</b></p> <ul style="list-style-type: none"> <li>-DNA barcoding</li> <li>-Phylogenetics</li> </ul>
<p><b>11. EVOLUTION</b></p> <ul style="list-style-type: none"> <li>-Population Genetics</li> <li>-Biodiversity</li> </ul>

The revised lab manual will contain new and revised lab exercises, which will bring the contents up-to-date. Some of the topic headings may be the same as the current lab manual; however, the lab exercises for each of the topics will be different or modified accordingly.

**Proposed Timeline:**

**January 2016:** Research lab exercises in Biology that could be included in the lab manual

**February-March 2016:** Drafts of the new lab exercises/protocols completed and ready for editing and testing

**April 2016:** Editing of the material

**May 2016:** Final drafts sent to publisher for editing

## **Outcomes**

At the end of the sabbatical leave, I will have a revised and updated version of the current Biology M02A lab manual available for students at Moorpark College. This book would be used year round without the need for additional handouts or instructions provided by the instructor.

The benefits of this proposal are addressed below:

### **Benefits to students and instruction**

The Biology M02A lab manual will be used for our Biology M02A course that is offered year round. In a given school year (2016-2017), a total of 22 Biology M02A sections are taught (Fall semester, 10 sections; Spring semester, 9 sections; Summer session, 3 sections). The average enrollment in each of these sections is between 24-29 students. Thus, annually between 528-638 students will be using the lab manual. Having an up-to-date lab manual will benefit a large number of students and prepare them well for a highly competitive and technical field. Furthermore, having multiple instructors using an organized and mainstreamed lab manual will improve instruction and make it more consistent across all sections.

### **Benefits to the College**

Moorpark College's mission states, "With a "students first" philosophy, Moorpark College empowers its diverse community of learners to complete their goals for academic transfer, basic skills, and career technical education. Moorpark College integrates instruction and student services, collaborates with industry and educational partners, and promotes a global perspective."

Moorpark College will benefit from the continued good reputation the college has at four-year universities and in industry. Our Biology students who transfer as Biology majors to four-year universities are competitive and sometimes better prepared than their peers. Similarly, students placed in local companies for internships (Amgen, Baxter) and university laboratories (UCLA, UC Berkeley, UCSB, CSUCI, CSUN) have a repertoire of essential lab skills and a deep understanding of basic instrumentation usage that is advantageous in the job market. By having an updated lab manual that utilizes current technologies and techniques, students will remain competitive amongst others.

**Benefits to the District**

The District's mission states, "Ventura County Community College District provides students, in its diverse community, with access to comprehensive quality educational opportunities that support student learning and student success."

The Biology Department supports the District's mission by preparing students well for various careers in Biology by continuing to award degrees and certificates in this area. In making sure the textbook and faculty have the latest and most updated information, student learning and success will continue to be supported and promoted.

**Benefits to the candidate**

As a result of my research and updating of the lab manual, I will be able to teach students more effectively, and help other faculty as well. It will also reduce a lot of extra time we currently waste while we are modifying lab protocols during each lab period. Likewise, it will eliminate the need to print handouts of labs that are not currently in our lab manual. Overall, it will make teaching the labs more efficient, streamlined, and effective.

**Conclusion**

As a result of this sabbatical leave, the Biology Department will have a lab manual that students can use to reinforce material learned in lecture and to stay abreast with current Biology topics. This will have a significant impact on a vast number of students and faculty.