

Open Educational Resources in non-majors Biology

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Introduction

Non-majors biology classes are often the only science class for a majority of students with diverse career goals. Engaging this student population and transforming their scientific literacy during the course of 15 to 16 weeks is a herculean task for the teaching community. In addition, factors such as increased costs of textbooks and limited access to alternate resources impede the successful completion of the course.

Montgomery College has actively promoted the use of Open Educational Resources (OER) in certain introductory level courses, since 2014. As part of this initiative, we are in the process of developing an OER curriculum for non-majors Biology course. The adopted textbook costs for this course is \$160.00 and the OER version will lower the textbook costs while maintaining the quality of the content. We discuss our ideas for development of the course and highlight the challenges in our implementation efforts.

College's Guidelines

Some highlights of the IMAAG (links are provided at the bottom):

1. Order **instructional material bundles** only if all components are necessary and will be used.
2. Be aware of the **current price** of required course materials.
3. Allow students to purchase course materials in **electronic format** as appropriate.
4. Use free online alternatives, **"open source"** materials, whenever possible.

Criteria and Rubrics

CRITERIA	RANKING
CONTENT	1
PEDAGOGY	3
USABILITY	4
SUSTAINABILITY	5
REPURPOSABILITY	6
ACCESSIBILITY	2

Non-majors Biology Course

General Biology, BIOL 101, is a four credit lecture/lab course intended for non-science majors to fulfill the General Education science requirement. This course provides an introduction to some of the major theories of biology. Laboratory classes will provide hands on exercises that support concepts discussed in lecture.

Rubrics:

1. **EXCELLENT:** if the resources meet all the criteria
2. **GOOD:** if the resources meet most of the criteria
3. **FAIR:** if the resources meet only content, pedagogy and usability – among the six criteria
4. **POOR:** if the resources meet not more than two criteria
5. **N/A:** rubric not applicable

What are OERs?

Open Education Resources (OER) are teaching and learning materials freely available online for everyone to use, whether you are an instructor, student, or self-learner.

Three principles: openness, free availability, flexibility to customize

**Usually characterized by 5 R's:
RETAIN, REUSE, REVISE, REMIX,
REDISTRIBUTE**

Examples of OER include: full courses, course modules, softwares, syllabi, lectures, homework assignments, quizzes, lab and classroom activities, pedagogical materials, games, simulations, and many more resources contained in digital media collections from around the world.

Course Outcomes

Upon completion of this course, a student will be able to:

- analyze, interpret, and use scientific data to evaluate claims.
- relate biological concepts to personal and societal issues that affect daily life.
- demonstrate knowledge of fundamental biological concepts related to evolution and biodiversity.
... among other things
- apply your knowledge of the subject matter to problem solving situations.
- evaluate scientific information in order to come to your own conclusions about different issues.

IMAAG links:

<https://cms.montgomerycollege.edu/EDU/Department2.aspx?id=6512>

<https://cms.montgomerycollege.edu/EDU/Department2.aspx?id=9752>

Implementation and Plans

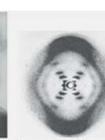
OpenStax textbook: peer-reviewed, and available in a variety of formats.

Cost to students

Printed copy: \$29.00!

eBook: \$4.99!

Pdf and Web-based versions: Free!



Rosalind Franklin

X-ray images of DNA

Summary

- Replacing expensive book with OpenStax addresses affordability for students.
- Creating curriculum elements that could be customized by instructors.
- Finding resources to manage and update resource content – a challenge.

