

Fall 2015

# Principles of Biology I (Dalton State College)

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# Grants Collection

Dalton State College



UNIVERSITY SYSTEM  
OF GEORGIA

Susan Burran, David DesRochers

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# Principles of Biology I

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## Grants Collection

Affordable Learning Georgia Grants Collections are intended to provide faculty with the frameworks to quickly implement or revise the same materials as a Textbook Transformation Grants team, along with the aims and lessons learned from project teams during the implementation process.

Each collection contains the following materials:

- **Linked Syllabus**
  - The syllabus should provide the framework for both direct implementation of the grant team's selected and created materials and the adaptation/transformation of these materials.
- **Initial Proposal**
  - The initial proposal describes the grant project's aims in detail.
- **Final Report**
  - The final report describes the outcomes of the project and any lessons learned.



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# Syllabus

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## Principles of Biology I (Biology 1107), Fall 2015

Instructor: Susan Burran    Office: 230 Sequoya Hall

Phone: 706-272-2490    E-mail: [sburran@daltonstate.edu](mailto:sburran@daltonstate.edu)

Office Hours: Mondays 12:05-3:05, Tuesdays 10:40-1:40, and Wednesdays 12:05-2:05; or by appointment

Textbook: *Biology* (OpenStax) <https://openstaxcollege.org/textbooks/biology>

Lab Manual: Principles of Biology I Lab Manual

<http://libguides.daltonstate.edu/PrinciplesofBiology/labmanual>

iClicker: Either iClicker or iClicker 2. You must register your iClicker either in class or online.

Course Prerequisite: READ 0098 unless exempt

Course Description: This course is designed to provide an introduction to the fundamentals of biological science. The focus is on the organization of life, the scientific method, the energy of life, genetics, and evolution.

Course Objectives: At the end of this course you should be able to:

1. Demonstrate an understanding of the scientific method and apply it to problem solving
2. Demonstrate an understanding of the basic molecules that are the building blocks of life
3. Identify and understand the functions of cellular structures
4. Demonstrate an understanding of the processes of cell reproduction
5. Summarize the processes of cellular respiration and photosynthesis
6. Solve genetics problems
7. Describe the structure of the DNA molecule and understand how it serves as the carrier of genetic information
8. Demonstrate an understanding of the processes of protein synthesis and gene regulation
9. State several applications of genetic engineering
10. Give a brief overview of the theory of evolution, evidence for evolution, and the theory of natural selection
11. Demonstrate effective use of the microscope

<u>Evaluation:</u>	5 Lecture Exams (80 points each)	400 (40%)
	Final exam	100 (10%)
	Online Participation	100 (10%)
	Class Attendance and Participation	200 (20%)
	Lab Participation	<u>200</u> (20%)
	TOTAL =	1000

<u>Final Grade Assignment:</u>	90 - 100%	A
	80 - 89%	B
	70 - 79%	C
	60 - 69%	D
	Less than 60%	F

- **Lecture Exams:** Exams will be composed of multiple choice, matching, true/false, and short answer questions. They will include questions pertaining to appropriate laboratory material.
- **Final Exam:** The exam will be comprehensive and will include questions about material from the most recent chapters covered in class (i.e. concepts that may not have been on a test before).
- **Online Participation:** Each chapter will be broken down into short modules. Each module will consist of a couple of videos to accompany that portion of the book. An online quiz will assess students' comprehension of the material.
- **Class Attendance and Participation:** You are expected to be present in class and knowledgeable about the subject matter BEFORE you come, by reading the assigned sections in your textbook. Your participation grade is based on attendance, iClicker quizzes, and, of course, your participation in class.
- **Lab Participation:** You must be present and prepared for each lab meeting. Your grade will be based on active participation, and performance on a weekly lab quiz that tests your understanding of the material covered.

#### Attendance Policy:

**Class:** Attendance is required for quizzes given in class. No make-ups are available. You are responsible for keeping up with any material you missed.

**Lab:** Attendance in labs is mandatory, and there will be no make-ups available. Failure to attend will result in the loss of participatory points. Please notify me prior to class if you will not be able to attend.

**Exams:** You must be present for exams. No make-up exams will be given. If you are absent for one exam, the score you earn on the final exam will be used in place of the missing exam grade. If you do not miss any exams, the percent correct you earn on the final exam will be used to replace your lowest exam score (assuming the final exam score is higher). All exam papers must be returned to the instructor after they are reviewed in class.

#### Academic Honesty:

Cheating and plagiarism are a part of the Dalton State Code of Student Conduct, which can be found in its most updated form at <http://daltoncampuslife.com/student-conduct/>. ANY assistance provided or given in any way toward work in a class constitutes cheating, unless such behavior is authorized by your instructor. Additionally, any use of the ideas or words of others should be noted, or this will constitute plagiarism. For more details on what Dalton State considers to be Academic Dishonesty, please review the Code of Student Conduct. Instructors will assign grades based on classroom performance. Additional sanctions may be provided as a learning experience from the Student Conduct process.

Classroom Behavior:

Dalton State is committed to respect via the Roadrunner Respect pledge. To learn more, please visit <http://daltoncampuslife.com/roadrunner-respect/>.

“I pledge to show my fellow Roadrunner students, faculty, staff, and administration respect by treating others the way they want to be treated and by thinking about others first before making decisions that might affect them.”

Emergency Statement:

Inclement Weather/College Closure Emergency Instructional Plan

In the event the college is closed due to inclement weather or another unforeseen event, students will consult the schedule provided at the beginning of the semester to determine which chapters would be covered during the time the college is closed. Students will be responsible for anything in that chapter. Any homework assignments due during the closed interval will be due the first day class meets after the college reopens. Labs that are missed will either be made up at a later date or removed from the class schedule and not counted at the end of the semester in the final grade. Exams will be moved in the class schedule to accommodate the curtailed schedule. I may be available via e-mail on a limited basis when the college is closed.

### A Few Odds and Ends:

- Please turn off cell phones in lecture and lab. This means NO TEXTING!
- Please don't leave class or lab early unless you have notified me of your need to do so. Leaving lab early may result in a loss of participatory points.
- Questions and discussion in class and lab are encouraged – this is *your* class and I want you to participate! On the other hand, private conversations are distracting to others, so please refrain.
- The last day to drop this class without penalty is **October 27, 2015**. You will be assigned a grade of W. After this date, withdrawal without penalty is permitted only in cases of extreme hardship as determined by the Vice President for Academic Affairs; otherwise a grade of WF will be issued. The proper form for withdrawing from all classes at the college after the official drop/add period but before the published withdrawal date is the Schedule Adjustment Form. Students who are assigned to the Academic Advising Center for advisement must meet with an advisor or staff member at the Academic Advising Center (107 Liberal Arts Building) to initiate the withdrawal process. All other students must meet with a staff member or advisor at the Office of Academic Resources in the Pope Student Center to initiate the withdrawal process. After meeting with the staff member or advisor, all students will then finalize the withdrawal process in the Financial Aid Office. Students who fail to complete the official drop/withdrawal procedure will receive the grade of F. Withdrawal from class is a student responsibility. The grade of W counts as hours attempted for the purposes of financial aid.
- If a student receiving aid administered by the DSC Workforce Development Department drops this class or completely withdraws from the College, the Schedule Adjustment Form must be taken to the Workforce Development Office located in Room 112 of the Technical Education Building. The Office is open on the following schedule: Monday/Tuesday/Thursday: 9:00 a.m.- 12:15 p.m. and 1:30 p.m. - 5:00 p.m. The office phone number is 272-2635.
- **IMPORTANT NOTICE:**  
Students with disabilities or special needs are encouraged to contact Disability Support Services. In order to make an appointment or to obtain information on the process for qualifying for accommodations, the student should visit the Disability Support Services Library Guide at <http://www.libguides.daltonstate.edu/Disability> or contact the Coordinator of Disability Support Services: Andrea Roberson, Coordinator, Pope Student Center, lower level. 706/272-2524, [aroberson@daltonstate.edu](mailto:aroberson@daltonstate.edu)
- Use of proper grammar and correct spelling is expected for all written assignments.
- Let's try to be "green" by recycling all paper, plastic, and aluminum – at least while on campus (and hopefully away from campus as well!).



## **Tips for Succeeding in Biology 1107**

1) **Keep up!!** One of the challenging aspects of the course is the sheer volume of material to be covered. If you fall behind, it will be difficult to catch up.

### 2) **Study Hints**

**A) Always think big picture.** Don't sit down to memorize facts as if the material is just a random list of items. Fit each detail into a larger frame work. You will remember things much better if they are placed in a "web" of associations rather than isolated tidbits.

**B) Before Class:** Read the chapter to be covered! Don't get bogged down in detail – just get the big picture, cover major points and become familiar with the terminology (the chapter summary at the end of the chapter will be helpful here). Carefully review notes from the previous lecture. What is unclear? What don't you understand? Ask a classmate for help, check the relevant section in the book, or ask me. Take care of problems as they arise or they may pile up and ambush you the night before an exam.

**C) In Class:** Be awake and aware! Many students become automatic writing machines during class - "I've got to get it down so I can learn it later." Don't fall into this trap – let your mind be as active as your pen. If you are falling asleep - get up and do some jumping jacks next to your seat. If you snooze, you lose.

**D) Exams:** My questions are designed to test three levels of learning. The most elemental kind of learning is **memorization**. In science, memory is important, not as an end in itself, but primarily in the sense that knowing vocabulary is important for learning a foreign language. A second level of learning is **comprehension**. Do you really understand the material and can you take information in one form and restate it in another form. Test your comprehension by trying to explain concepts to another person. A third level of learning is **application**. Can you solve problems using required skills or knowledge? Keep these levels of learning in mind as you study.

#### **E) General advice on multiple choice questions:**

- 1) Read the problem, read all answers.
- 2) The correct answer is both true and relevant.
- 3) Don't make mechanical mistakes. Check to see that if you chose answer A, answer A is what you marked.
- 4) Don't read more into the question than what is there. Some questions are easy, some are harder; you'll have to decide which is which. Feel free to ask questions about questions.

### Sex Discrimination, Harassment, & Assault

Sexual harassment is unwelcome, gender-based verbal or physical conduct that is sufficiently severe, persistent or pervasive that it has the effect of interfering with, denying or limiting someone's ability to participate in or benefit from the college's educational program and/or activities, and is based on power differential (quid pro quo), the creation of a hostile environment, or retaliation.

Sexual misconduct is a form of sexual harassment prohibited by Title IX. Sexual misconduct refers to "physical sexual acts perpetrated against a person's will or where a person is incapable of giving consent due to the victim's use of drugs or alcohol. An individual also may be unable to give consent due to an intellectual or other disability." Sexual misconduct includes dating violence, domestic violence, rape, sexual assault, sexual battery, stalking, and sexual coercion.

### Reporting Options

***Call 911 if you are in an emergency situation***

### **Dalton State Public Safety (this report is not confidential)**

Tech Building- Upper Level - 706-272-4461

Online Sexual Assault Report -

<https://dynamicforms.ngwebsolutions.com/ShowForm.aspx?RequestedDynamicFormTemplate=3fe5724c-a8bd-4a31-9c25-1a3d35110a51>

### **If you would like to report to Dalton State Administration: (this report is not confidential)**

Report Title IX complaint online - [http://daltonstate.edu/campus\\_life/student-conduct-about.cms](http://daltonstate.edu/campus_life/student-conduct-about.cms)

### Report Student-on-Student Title IX complaint in person:

Brittnie Lee, Office of Student Life

Coordinator for Student Responsibility & Service/ Deputy Title IX Coordinator

Pope 113

[balee@daltonstate.edu](mailto:balee@daltonstate.edu), 706-272-2999

### Report Title IX complaint involving Faculty or Staff in person:

Faith Miller, Human Resources

Director of Human Resource/ Title IX Coordinator

Memorial 122

[fmiller@daltonstate.edu](mailto:fmiller@daltonstate.edu) 706-272-2034

### **If you would like to talk with someone confidentially:**

Dalton State Counseling & Career Services, Academic Resources

Lower Pope

706-272-4429

[counseling@daltonstate.edu](mailto:counseling@daltonstate.edu)

<http://libguides.daltonstate.edu/Counseling>

**Principles of Biology I (BIOL 1107)**

**Lecture M/W 10:50-12:05**

**Fall 2015 Tentative Lecture Schedule**

<b>Week</b>	<b>Topics Covered</b>	<b>Exam</b>
8/17-8/21	<a href="#">Course Intro, Chapter 1: Intro</a>	
8/24-8/28	<a href="#">Chapter 2: Chemistry</a>	
8/31-9/4	<a href="#">Chapter 3 : Macromolecules</a>	
9/7-9/11	9/7 IS LABOR DAY <a href="#">Chapter 4: Cells</a>	1: Chapters 1-3
9/14-9/18	Chapter 4: Cells	
9/21-9/25	<a href="#">Chapter 5: Membranes</a>	
9/28-10/2	<a href="#">Chapter 6: Metabolism</a>	
10/5-10/9	<a href="#">Chapter 7: Cell Respiration</a>	2: Chapters 4-6
10/12-10/16	<b>10/12 IS FALL BREAK</b> Chapter 7: Cell Respiration	
10/19-10/23	<a href="#">Chapter 8: Photosynthesis</a>	
10/26-10/30	<a href="#">Chapter 10: Mitosis, Chapter 11: Meiosis</a>	3: Chapters 7-8
11/2-11/6	Chapter 10: Mitosis, Chapter 11: Meiosis	
11/9-11/13	<a href="#">Chapter 12: Heredity</a>	
11/16-11/20	<a href="#">Chapter 14: DNA</a>	4: Chapters 10-12
11/23-11/27	<a href="#">Chapter 15, 16.1, 16.3-5: Genes and Gene Expression</a> 11/25 THANKSGIVING HOLIDAY	
11/30-12/4	<a href="#">Chapter 18: Intro to Evolution</a>	5: Chapters 14-16

Principles of Biology I (BIOL 1107)

Lab M 8:30-10:20

Fall 2015 Lab Schedule

Exercise #	Date	Topics
Exercise 1	8/17/2015	<a href="#">Scientific Method</a>
Exercise 2	8/24/2015	<a href="#">Taxonomy: Classification &amp; Naming Organisms</a>
Exercise 3	8/31/2015	<a href="#">Macromolecules &amp; You</a>
	9/7/2015	<b>LABOR DAY!</b>
Exercise 4	9/14/2015	<a href="#">Microscopy</a>
Exercise 5	9/21/2015	<a href="#">Structure &amp; Function of Living Cells</a>
Exercise 6	9/28/2015	<a href="#">Diffusion, Osmosis, &amp; Membranes</a>
Exercise 7	10/5/2015	<a href="#">Cell Respiration &amp; Photosynthesis</a>
	10/12/2015	<b>FALL BREAK!</b>
Exercise 8	10/19/2015	<a href="#">Enzymes</a>
Exercise 9	10/26/2015	<a href="#">Mitosis &amp; Cytokinesis</a>
Exercise 10	11/2/2015	<a href="#">Heredity</a>
Exercise 11	11/9/2015	<a href="#">Nucleic Acids: Blueprints for Life</a>
Exercise 12	11/16/2015	<a href="#">Biotechnology</a>
	11/23/2015	<b>THANKSGIVING!</b>
Exercise 13	11/30/2015	Evidence of Evolution

# Initial Proposal

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**Affordable Learning Georgia Textbook Transformation Grants  
Round 2  
Summer 2015, Fall 2015, Spring 2016  
Proposal Form and Narrative**

<b>Institution Name(s)</b>	Dalton State College				
<b>Team Members</b> (Name, Title, Department, Institutions if different, and email address for each)	Susan Burran, Assistant Professor of Biology and David DesRochers, Assistant Professor of Biology Department of Natural Sciences, School of Science, Technology, and Mathematics				
<b>Sponsor, Title, Department, Institution</b>	Dr. Andrew Meyer, Associate Vice President for Academic Affairs & Professor of Biology, Dalton State College				
<b>Course Names, Course Numbers and Semesters Offered</b> (Summer 2015, Fall 2015, or Spring 2016)	Principles of Biology I (BIOL 1107) and Principles of Biology II (BIOL 1108) Fall 2015 for implementation				
<b>Average Number of Students Per Course Section</b>	32	<b>Number of Course Sections Affected by Implementation in Academic Year 2015</b>	46	<b>Total Number of Students Affected by Implementation in Academic Year 2015</b>	1300
<b>Award Category</b> (pick one)	<input checked="" type="checkbox"/> No-Cost-to-Students Learning Materials <input type="checkbox"/> OpenStax Textbooks <input type="checkbox"/> Course Pack Pilots <input type="checkbox"/> Transformations-at-Scale				

<p>List the original course materials for students (including title, whether optional or required, &amp; cost for each item)</p>	<p>DSC Biology Lab Manual, <i>required</i></p>		<p><b>Total Cost</b> \$84.25</p>
<p>Plan for Hosting Materials</p>	<p><input type="checkbox"/> <a href="#">OpenStax CNX</a>  <input checked="" type="checkbox"/> D2L  <input checked="" type="checkbox"/> <a href="#">LibGuides</a>  <input type="checkbox"/> Other _____</p>		
<p>Projected Per Student Cost</p>	<p><b>\$0.00</b></p>	<p>Projected Per Student Savings (%)</p>	<p><b>100%</b></p>

## 1. PROJECT GOALS

Provide cost-effective course resources for economically disadvantaged students enrolled in the Principles of Biology course sequence.

### 1.1 STATEMENT OF TRANSFORMATION

- Dalton State College serves many economically disadvantaged students in Northwest Georgia. Course materials for the Principles of Biology sequence (BIOL 1107 and BIOL 1108) are cost-prohibitive for many of our students. As a result, many students refrain from purchasing some or all of the necessary materials. To mitigate this, the instructors of these courses have consistently committed to reducing costs to students, and have already implemented the OpenStax textbook for 1107/1108 (a cost reduction of \$194.50 per student). The next step to further improve resource availability for students is to adopt Open Educational Resources (OER) for lab activities as a substitution for a traditional lab manual.
- Faculty within the Natural Sciences Department have unanimously voted in support of pursuing OER for lab activities for these courses.
- Using OER would improve both student access to course materials, as well as greatly reduce the economic burden on students. Additionally, Individual lab activities could be easily interchanged or updated as faculty see fit, an advantage not currently available using a traditional lab manual. This allows for greater insurance that the labs used closely align with topics taught in the course, which could improve student success.



## 1.2 TRANSFORMATION ACTION PLAN

- All instructors for the 1107/1108 courses will be polled on which lab activities need to be greatly revised. An *ad hoc* committee of faculty members will work with the faculty team to provide collaborative input on revision and/or creation of new lab activities. The faculty team will use this input to decide which new/revised labs to use. Once new labs have been identified, the faculty team will work with the committee to create individual lab assignments.
- If new labs are selected, then the faculty team will advise and instruct faculty who teach the course how to effectively teach the new labs.
- Faculty team members include Susan Burran to function as the coordinator for the 1107 course and David DesRochers as the coordinator for the 1108 course.
- All lab materials will be made available to students as downloadable PDF files on individual faculty members' D2L websites.
- The faculty team will pursue Creative Commons licensure for newly created instructional materials. Open access will be provided via a publicly-accessible LibGuide generated by the Dalton State College library; additionally, materials will be submitted to an open educational resource database (such as the Georgia Knowledge Repository or MERLOT).

## 1.3 QUANTITATIVE AND QUALITATIVE MEASURES

- Student feedback surveys will be conducted twice per semester (at midterm and at the semester conclusion) to evaluate student experience using the lab materials. These will be performed during the Spring 2015 semester (using the current lab manual), as well as the Fall 2015 semester (using the online lab manual). Both courses (1107 and 1108) will be included in the surveys.
- Faculty surveys will be conducted during the Fall 2015 semester to assess instructor experience and opinions of the new 1107/1108 labs.
- Learning Objective assessment (WEAVE data and Pre/Post Tests) will be evaluated as a quantitative measure of student success. Data from Spring 2015 (pre-implementation) will be compared with data from Fall 2015 (post-implementation). We hypothesize that student success will improve as a result of implementation of the online lab manual.

## 1.4 TIMELINE

- Jan. 12, 2015
  - Poll biology faculty teaching 1107/1108 to determine which labs they want to replace, revise, and retain
- Jan. 19, 2015
  - Evaluate poll responses to determine which labs need to be replaced, revised, and retained
  - Plan successful replacement and revision of labs with committee.
  - Assign committee members to identify new labs or techniques to determine if they will be practical to adopt.
- February 2, 2015
  - Attend kick-off training/implementation meeting
- February 16, 2015
  - Discuss as a committee selected labs and achieve consensus on which labs to adopt/revise
- February 17 – May 9, 2015
  - Faculty team will conduct new/revised labs to determine feasibility
  - Administer initial student experience survey at mid-term (Late February)
  - Administer final student experience survey at close of semester (Early May)
- May 10
  - Contact course instructors with revised lab activities with detailed instructions on how to complete adopted/revise lab activities.
- Summer 2015
  - Faculty team will offer instructional meetings on how to conduct new labs.
  - Lab activities will be uploaded to 1107/1108 faculty D2L websites.
- August – November 2015
  - Faculty will carry out new and revised labs in 1107 and 1108.
  - Administer initial student experience survey at mid-term (Mid October)
  - Administer final student experience survey at close of semester (Late November)
  - Administer faculty surveys
- October 15, 2015
  - Submit midterm report
- December 2015
  - Analyze data comparing student experience
  - Analyze quantitative data to assess impact on student success
- February 15, 2016
  - Submit final report

## 1.5 BUDGET

- \$5,000 for Susan Burran, salary for adoption of new lab activities for 1107 that include chairing an *ad hoc* committee that will select the new activities. Additional responsibilities include preparing surveys for faculty feedback about the redesign and surveys for students, as well as providing the final report for 1107.
- \$5,000 for David DesRochers, salary for the same activities previously listed for Burran. However, DesRochers will be focusing on 1108.
- \$800 for project expenses including travel to a grant kick-off meeting.

## 1.6 SUSTAINABILITY PLAN

- On average, 12% of the student body enrolled each semester takes either 1107 or 1108. Non-biology majors make up 85% and 70 % of the students enrolled in 1107 and 1108, respectively. This means that the two courses are vitally important to students at Dalton State College.
- Adoption of the OER for the 1107/1108 lab series would result in a campus-wide savings of over \$43,000 per semester.
- The faculty will meet annually to review the effectiveness of labs, and will replace and revise lab activities as needed to continue improving these courses.

## 1.7 REFERENCES & ATTACHMENTS

Please see attached letter of support.

**PROPOSAL SUBMISSION: ALL PROPOSAL DOCUMENTS, REFERENCES, AND ATTACHMENTS MUST BE SUBMITTED IN A SINGLE EMAIL TO [ALG@GATECH.EDU](mailto:ALG@GATECH.EDU).**

**DEADLINE FOR CATEGORIES 1-3: 5:00 PM, NOVEMBER 30, 2014**



DALTON STATE COLLEGE

650 College Drive

Dalton, GA 30720

706-272-4436

800-829-4436

[www.daltonstate.edu](http://www.daltonstate.edu)

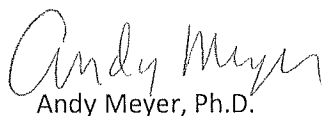
Dear ALG Committee

Dr. David DesRochers and Susan Burran have asked me to write a letter of support on their behalf with regards to the Affordable Learning Grants and I am happy to support their efforts. They plan to build on the fact that our biology faculty have already adopted the OpenStax Biology Textbook for Biology 1107 and 1108 by developing no cost to student lab materials. By their efforts we would be able to offer a two semester lab sequence without requiring students to purchase either a textbook or a lab manual.

Their plan will involve all of the biology faculty currently teaching courses in the Biology 1107/1108 sequence. They will begin by assessing current labs and redesigning the labs as needed to meet course requirements and to better align lab and class sequencing. Once these lab manuals are created, they will be made available to students for download as PDF. The effectiveness of the lab manuals will be assessed for both student satisfaction and student outcomes. Faculty will also be consulted as to their experience with the lab manuals.

I am excited about this proposal – it is a nice compliment to the initiative that the general biology faculty have already taken in adopting the OpenStax textbook for Biology 1107 and Biology 1108. I think that creation of the no cost to student lab manual is a great opportunity to demonstrate that it is possible to take a highly enrolled course with high textbook costs and make it affordable for all.

Sincerely,



Andy Meyer, Ph.D.

Interim Vice President for Academic Affairs

Dalton State College

[ameyer@daltonstate.edu](mailto:ameyer@daltonstate.edu)

706 272-2491

# Final Report

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# Affordable Learning Georgia Textbook Transformation Grants

## Final Report

**Date:** December 18, 2015

**Grant Number:** 76

**Institution Name(s):** Dalton State College

**Team Members (Name, Title, Department, Institutions if different, and email address for each):** Susan Burran, Assistant Professor of Biology (sburran@daltonstate.edu) and David DesRochers, Associate Professor of Biology (ddesrochers@daltonstate.edu), Department of Natural Sciences, School of Science, Technology, and Mathematics

**Project Lead:** Susan Burran

**Course Name(s) and Course Numbers:** Principles of Biology I (BIOL 1107) and Principles of Biology II (BIOL 1108)

**Semester Project Began:** Spring 2015

**Semester(s) of Implementation:** Fall 2015

**Average Number of Students Per Course Section:** 32

**Number of Course Sections Affected by Implementation:** BIOL 1107 = 16, BIOL 1108 = 4

**Total Number of Students Affected by Implementation:** 640

## 1. Narrative

A. Describe the key outcomes, whether positive, negative, or interesting, of your project.

- We successfully offered our introductory biology students low-cost lab activities that were authored by ourselves and colleagues in order to replace the more costly lab manual that we previously had used. Challenges included reaching agreement between faculty about the topics covered, the degree of depth and breadth for each topic and the level of challenge of each lab. Challenges also included communicating specific needs to the lab staff for each new lab activity. The first time that a new procedure is conducted can be difficult due to unforeseen events. Overall, the semester went well for both sets of courses. Now with some evidence of which labs work well and which ones do not run smoothly, we can begin to revise the problematic labs.
- With new material and labs, there was a lot of enthusiasm among our colleagues. There is no shortage of ideas for new lab activities. The experience was largely positive for the instructors of these courses, because we have compassion for our students and are sympathetic to the financial strain buying multiple textbooks can be.
- Students were informed of the project; they knew it was the pilot semester for the new lab manual. Many students were able to give reflective feedback about whether or not the labs had an effect on their grasp of core concepts of each course. This information (mostly collected as comments within the student satisfaction surveys) will be invaluable moving forward.

B. Describe lessons learned, including any things you would do differently next time.

- It is difficult to embark on a project that involves collaboration. During the semester, everyone is very busy, making it hard to accomplish project objectives. During semester breaks, fewer instructors are on-campus, which makes it difficult to communicate. Because cooperation and collaboration are highly valued, in the future, changes would be made to the method additional faculty are able to participate in projects undertaken. For example, deadlines will be more clearly stated, reliance on open-ended questions on surveys will be reduced, and individuals who express interest in participation will be given more guidelines.

## 2. Quotes

- "I like that the lab packets for each lab are mine. For [BIOL] 1107 I had to buy a used lab manual and a lot of the pages were already written in and it was confusing and annoying."
- "I love this lab manual approach! You save money and it's so much easier to keep up with."
- "It's inexpensive and easy to access."
- "The activities were so helpful for my understanding of the class."
- "I liked printing off the labs because I feel like it made me more organized."

### 3. Quantitative and Qualitative Measures

#### 3a. Overall Measurements

##### Student Opinion of Materials

**Was the overall student opinion about the materials used in the course positive, neutral, or negative? Positive**

Total number of students affected in this project: 640

- Positive: 67.4 % of 68 number of respondents
- Neutral: 22.1 % of 68 number of respondents
- Negative: 23.1 % of 68 number of respondents

##### Student Learning Outcomes and Grades

**Was the overall comparative impact on student performance in terms of learning outcomes and grades in the semester(s) of implementation over previous semesters positive, neutral, or negative? Positive.**

- ❖ Weave data is not currently available for the semester of implementation (Fall 2015), however there are slight improvements in grades for Fall 2015 compared to previous semesters.

Choose One:

- Positive: Higher performance outcomes measured over previous semester(s)
- Neutral: Same performance outcomes over previous semester(s)
- Negative: Lower performance outcomes over previous semester(s)

##### Student Drop/Fail/Withdraw (DFW) Rates

**Was the overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester(s) of implementation over previous semesters positive, neutral, or negative? Positive.**

**Drop/Fail/Withdraw Rate:** 14.84 % of students, out of a total 640 students affected, dropped/failed/withdrew from the course in the final semester of implementation.

Choose One:

- Positive: This is a lower percentage of students with D/F/W than previous semester(s)
- Neutral: This is the same percentage of students with D/F/W than previous semester(s)
- Negative: This is a higher percentage of students with D/F/W than previous semester(s)



### 3b. Narrative

- Student Grades

Grades for 1107 and 1108 from Spring 2014, Fall 2014, and Spring 2015 were compared to grades for those courses from Fall 2015. The percentage of students who received acceptable grades (grade A, B, or C) was higher for 1107 during the Fall 2015 semester (81%) than for any of the other semesters included in the analysis. There are, of course, far too many variables to determine exactly why this is the case. These courses are taught on multiple campuses by varied instructors at many different times of day. One of the possibilities is that students are able to access course materials without financial burden, as all the course materials are now open educational resources. This may help students maintain higher grades. For 1108, the percentage of students with acceptable grades has not changed since adoption of the open-access lab manual (84%).

- Student Learning Outcomes

WEAVE data and data from pre/post tests for 1107 and 1108 are not currently available for the Fall 2015 semester; these data and corresponding analysis will be provided once they are available. We intend to analyze these data to determine what impact the new open-educational resources has on students' ability to succeed in the learning outcomes outlined for each course.

- DFW rates and comparison

DFW rates for Spring 2014, Fall 2014, and Spring 2015 were compared to DFW rates for Fall 2015. For the Fall 2015 semester, the DFW rate dropped to 14.8%, from a previous rate of 21.3%. Again, there are many variables contributing to students receiving lower grades or withdrawing from a course, but it is possible that simply using free materials contributes towards students' comprehension of materials, confidence in their abilities, and likelihood to score better on assessments and remain enrolled in the course.

- Student satisfaction surveys

Student surveys were conducted at the end of the semester for 1107. Based on student responses, most students (over 90%) felt that positively or were neutral about the open-access lab materials. For 1108, students were given surveys twice during the semester: at mid-term and at the end of the semester. Both surveys indicated that students felt positively or neutrally about the open-access lab materials (89% and 87%, respectively).

Students related that the strong points of the labs themselves were the hands-on activities and group work. Students' least favorite lab activities were those that had very lengthy instruction and/or did not include group work. The majority of positive comments were about the low-cost and ease-of-access to the lab materials. Negative comments were largely due to errors in lab set-up, which is not surprising considering this is the first semester these protocols have been implemented.

- Instructor satisfaction surveys

Faculty who regularly are instructors for 1107 and 1108 were surveyed during the Spring 2015 about which labs they felt were most problematic and what suggestions they could offer on replacement labs. Whenever possible, the team implemented new protocols and changes according to faculty recommendations. During Fall 2015, instructors of these courses were surveyed to measure their satisfaction with the new lab materials. The response rate was much lower than hoped (3 instructors out of 9 polled) but useful feedback was given. The majority of instructors were concerned with the clarity of student instructions and the lack of hands-on activities in certain labs, as well as the shortage of rigorous questions to assess student understanding in multiple labs. Below are a few comments collected from faculty:

*Overall, the labs have gone very well. Several labs need more hands-on activities to keep students focused and to maximize their time.*

*These labs are very good, and I like how we can revise them as we see fit!*

*I really enjoyed writing the labs!*

#### **4. Sustainability Plan**

- The Natural Sciences Department has adopted the lab materials that we implemented this semester for our Principles of Biology sequences. The project team will continue to work with faculty who teach each course to gather additional feedback about the success of each lab activity, and the team will work to revise the labs as needed.
- Due to the modular nature of the labs, revision of individual activities will be straightforward. Any needed updating of the material will be done on an annual basis after faculty group meetings and discussions about the efficacy of the lab activities. Maintenance of the LibGuide will be in collaboration with our campus library staff, and the development team will retain editing capabilities of the LibGuide.

#### **5. Future Plans**

- We agree that seeking high-quality, affordable learning material is essential for a student body that lives from a low socio-economic region. We wish to continue exploration of open-access and no/low-cost-to-students course materials for other courses, as the reduction of cost of course materials appears to be impactful to student experience and grades.

#### **6. Description of Photograph**

- (left-right) Dr. David DesRochers, lab manual author and editor; Prof. Susan Burran, team lead and lab manual author and editor.