



Biology for Non-Science Majors I

The LeCroy Center / DCCCD

Pilot Assessment Report

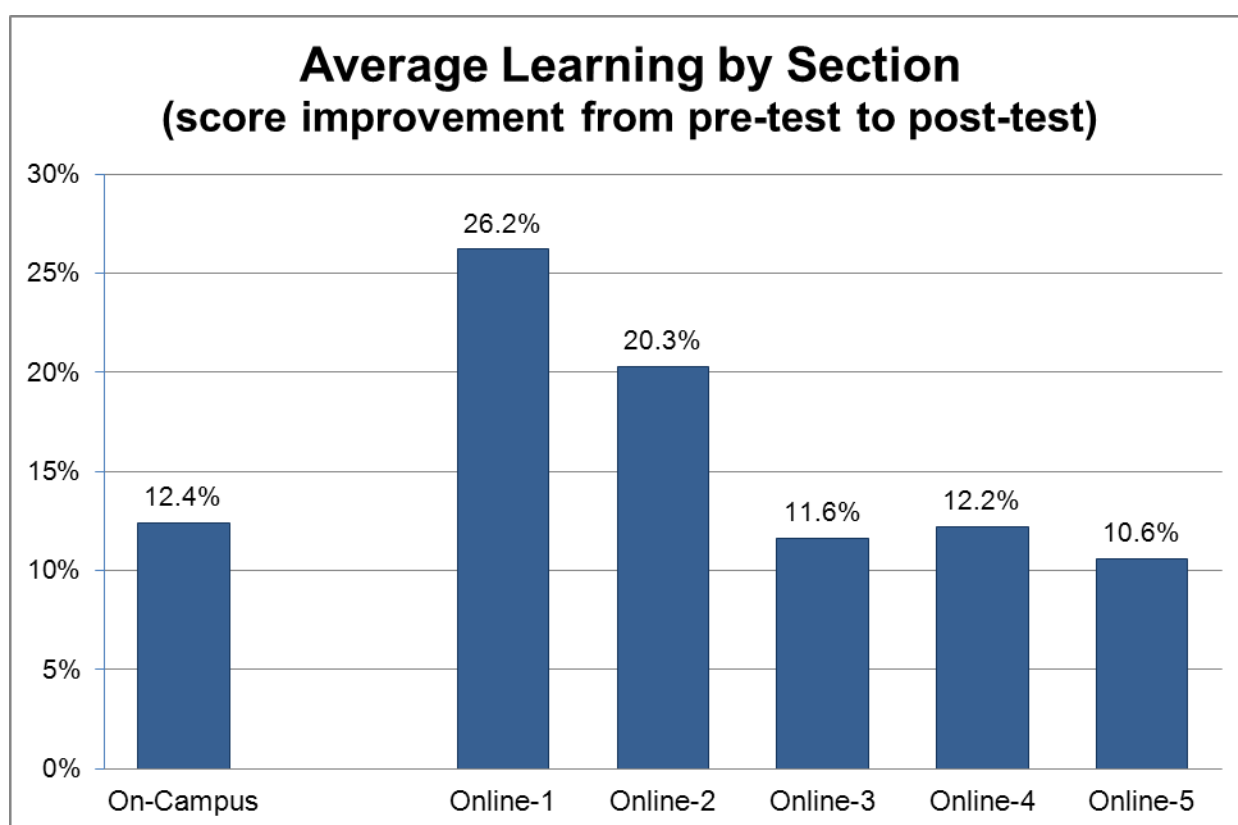
Spring 2012

Table of Contents

Summary of Results	3
Project Overview.....	4
Project Background.....	4
Personnel	5
Pilot.....	7
Assessment of Student Learning.....	8
Student Feedback and Usage.....	11
Appendices.....	41

Summary of Results

During the spring semester of 2012, a total of five biology faculty from three colleges in the Dallas County Community College District (DCCCD) agreed to participate in a pilot using the completed Biology for Non-Science Majors I course material. To assess student learning, pilot instructors administered the same set of 30 questions as a pre- and post-test assessment. One section of on-campus students were assessed for comparison of on-campus versus online learning. The on-campus students (n=15) improved by an average of 12.4% by the end of the semester, while online students (n=75) improved by an average of 15.2%. Over the five online sections reporting, individual section gains ranged from 10.6% to 26.2%. Detailed student learning results are reported in the [Assessment of Student Learning](#) section, including comparison of performance based on gender and ethnicity.



During the 16-week pilot semester, two anonymous surveys were conducted, an early survey around week 3 and a late survey around week 11, to assess student perceptions about the course materials and their understanding of the concepts. Over 95% of students felt expectations were made clear, with more than one-third happy with their class performance both early and late in the semester. Additionally, greater than 90% reported that the online course materials helped them to better understand the concepts, with more than three-quarters also reporting that the labs were beneficial. Detailed survey results are reported in the [Student Feedback and Usage](#) section.

Project Overview

Project Background

Biology for Non-Science Majors I is an online course developed by the LeCroy Center for Educational Telecommunications in collaboration with the Virtual College of Texas and the Texas Community College Teachers Association. Designed to meet the need for effective, highly-mediated, fully online science courses, this course provides students with engaging and challenging biology content that focuses on the scientific method and connects biology to real-life situations for students.

By integrating text, interactive activities, animations, videos, and self-assessments with a hands-on lab kit and demonstration videos, the course simulates the classroom experience, while allowing students the flexibility and freedom offered by online courses. During development, establishing partnerships with McGraw-Hill Higher Education and eScience Labs, Inc. provided key resources, including lesson-by-lesson reading assignments for two selected textbook options and a custom-designed lab kit.

To ensure the highest quality and accuracy in content, the LeCroy Center assembled a statewide committee of biology faculty from each of the seven colleges in the Dallas County Community College District, Tarrant County Community College, Tyler Junior College, Lone Star College, and South Texas College. Coordinated by a full-time biology subject matter expert on the LeCroy Center development team, the committee provided guidance in determining lesson topics, learning objectives, and appropriate hands-on lab activities. The faculty on the statewide committee also worked with the subject matter expert to write the biology content for each lesson, which was then edited and programmed to create a complete interactive lesson by the production team. Members of the committee then independently reviewed each lesson for design and accuracy.

Using the SoftChalk platform provided to all Texas community colleges by the Virtual College of Texas, the development team and statewide committee collaborated to create a comprehensive online course, while allowing individual instructors to customize the course to their unique needs. The course structure consists of fifteen lessons and fifteen labs. Each lesson contains a combination of text elements, interactive exercises, animations, self-assessments, progress checks, glossary, and of course, a textbook reading assignment. Along with extensive faculty resources and information, a test bank is provided, formatted for easy integration with a learning management system and easily appended to a publisher's test bank.

High-quality, professional videos introduce each lab lesson, carefully illustrating and demonstrating for students every step of the experiments included in the lab lessons. Utilizing a lab kit and lab manual customized for this course, students actually experience the scientific method by formulating questions, performing hands-on experiments, making observations, recording data, and drawing conclusions.

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Pilot

During the spring semester of 2012, a total of five biology faculty from three colleges in the Dallas County Community College District (DCCCD) agreed to participate in a pilot using the completed Biology for Non-Science Majors I course material. All five instructors taught the course inside the DCCCD BlackBoard v9.1 learning management system (called eCampus) using the second edition of the textbook *Biology: Concepts and Investigations*, by Mariëlle Hoefnagels.

To assess student learning, pilot instructors administered the same set of 30 questions as a pre- and post-test assessment. To reduce the likelihood of cheating, students were informed that the pre-test and post-test scores would be used for course evaluation only. To encourage students to take these ungraded assessments, students were given a few points for completing each test, regardless of score.

For comparison of student learning and performance in on-campus lecture and lab versus the online course, pre- and post-test data were collected from one traditional on-campus section of Biology for Non-Science Majors I taught by one of the pilot instructors. Students in this on-campus class completed the assessments in eCampus, outside of regular class time, to create as similar a testing environment as possible. Results for students who completed both the pre-test and post-test are reported in the [Assessment of Student Learning](#) section.

During the 16-week pilot semester, two anonymous surveys were conducted, an early survey around week 3 and a late survey around week 11, to assess student perceptions about the course materials and their understanding of the concepts. Survey results are reported in the [Student Feedback and Usage](#) section.

Pilot Participants

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*Not enough data for inclusion in report.

Assessment of Student Learning

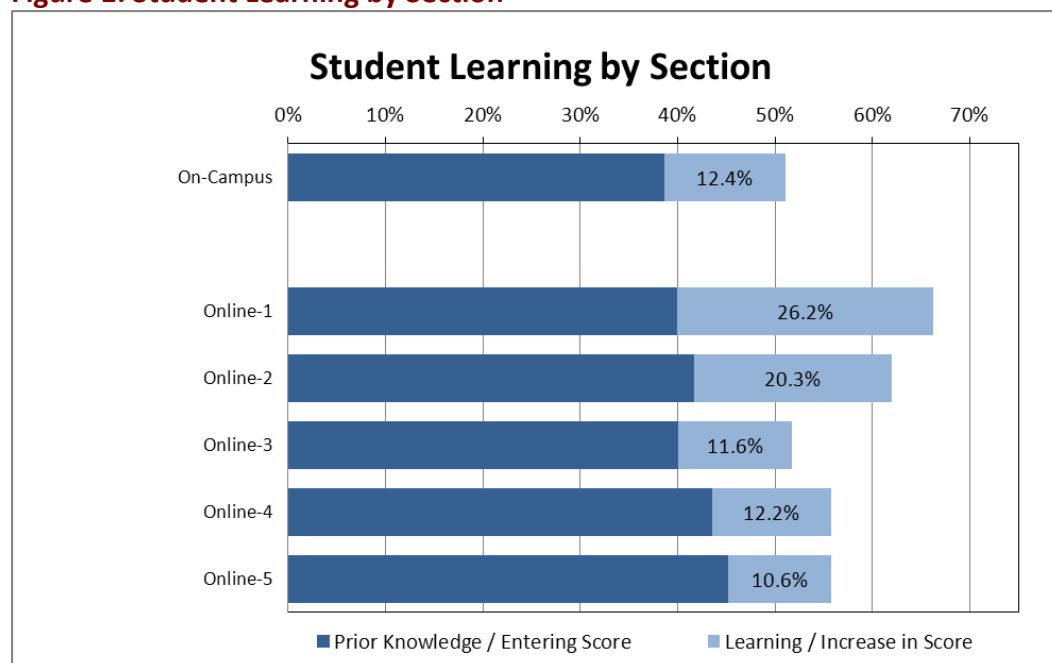
To assess student learning, two questions were written to address the primary learning objectives for each of the 15 lessons in the Biology for Non-Science Majors I course. Questions used in the assessment are provided in the [Appendix](#) section of this report. To measure the gain in knowledge and comprehension, only students who completed both the pre-test and post-test (“completers”) were included in the data analysis. Therefore, students who formally withdrew or otherwise did not complete the course are not represented in this report.

The 30-question pre-test was administered during Week 1 of the 16-week semester in all sections. The same 30 questions were administered as a post-test during either the last week of classes or the final exam period. For both assessments, students were shown their score, but were not able to see the questions or answers after completion. To reduce the likelihood of cheating, students were informed that the pre- and post-test scores would be used for course evaluation only. To encourage students to attempt the ungraded assessments, students earned a few points towards their course grade for completing each test, regardless of score.

On-campus completers (n=15) earned an average pre-test score of 38.7%. Online completers in all sections combined (n=75) earned an average score of 42%, with individual sections ranging from 40.0% to 45.2%. About 1/4 of both on-campus and online students showed either no change or a decrease in score on the post-test, indicating a score of 38-42% represents the performance expected for a student with little to no biology knowledge.

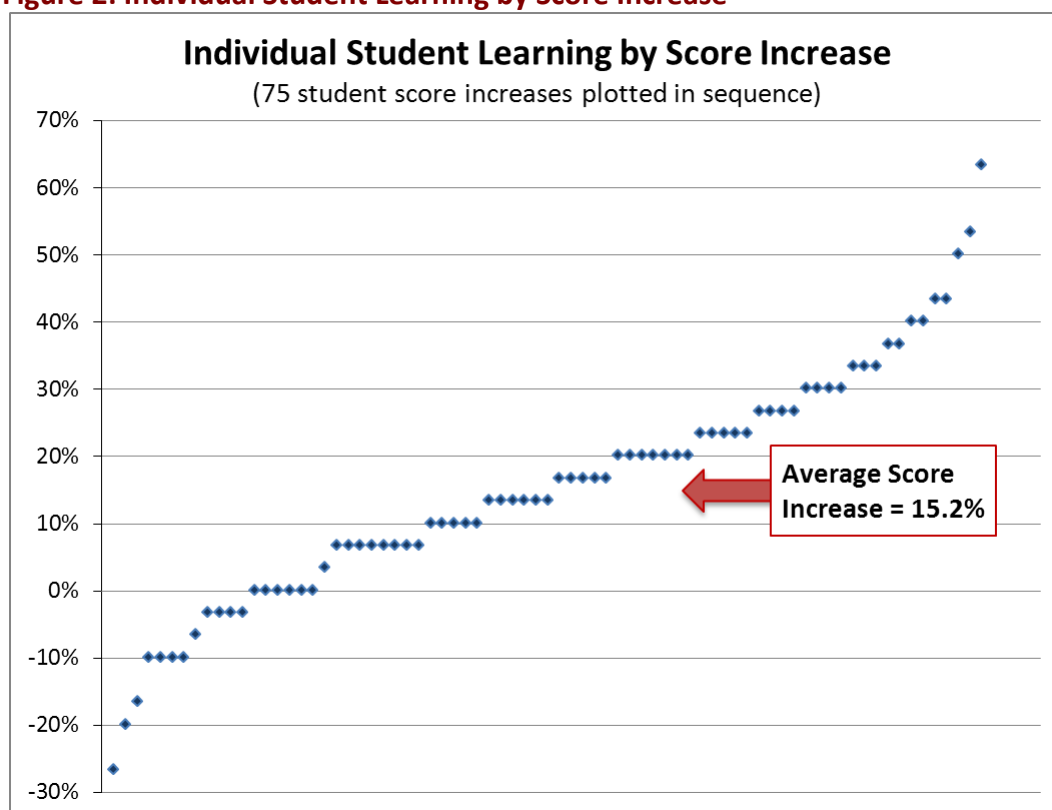
Upon completion of the course, the same set of on-campus students earned an average post-test score of 51.1%, a 12.4% increase in learning, while the same set of online students earned an average post-test score of 57.1%, a 15.2% increase in learning. Over the five online sections reporting, individual section gains ranged from 10.6% to 26.2%.

Figure 1: Student Learning by Section



Community college classes frequently exhibit a bimodal learning and grading distribution, in which the populations of low performing and high performing students are large, while few students populate the middle-performing range. The following figure demonstrates that student learning gains in the online biology course were not bimodal. Of the 75 online completers, nearly one-third demonstrated a score increase within 5% above or below the average (15.2% +/- 5%).

Figure 2: Individual Student Learning by Score Increase



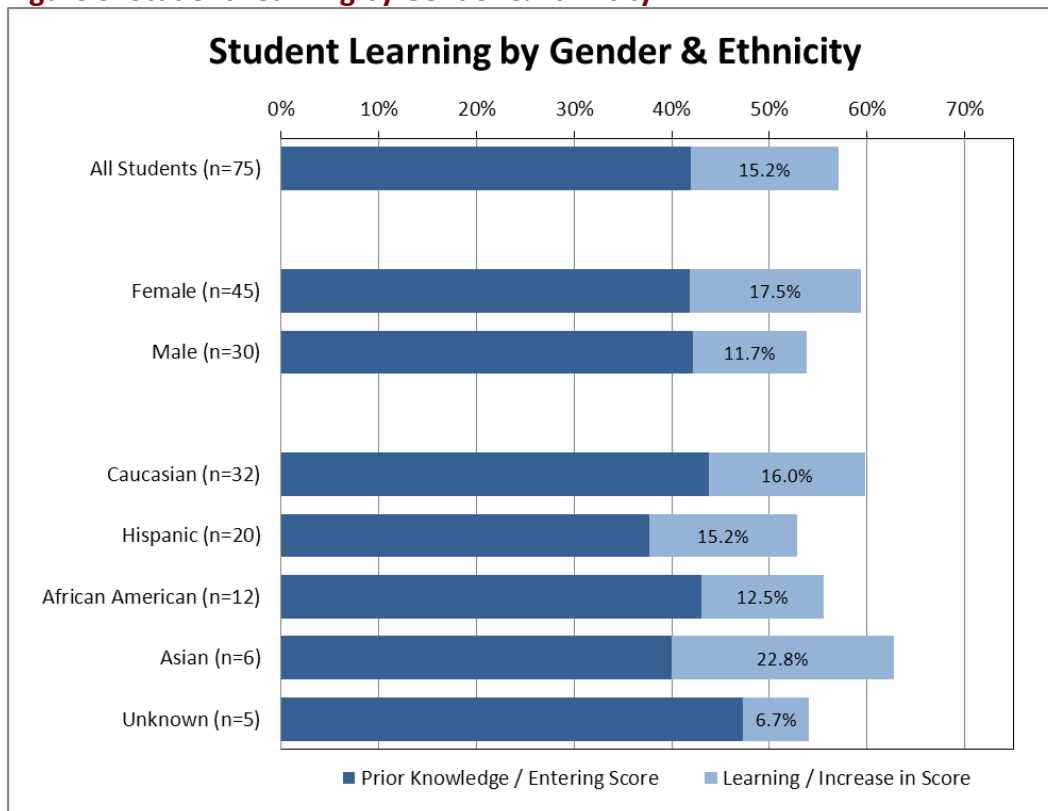
To determine whether the online biology course material is free from cultural or gender bias, we analyzed assessment data by gender and ethnicity. However, with only minimal student data from on-campus and/or other online sections not using this course package, we cannot draw conclusions about whether the results we report here are due to differences in how individual pilot students interacted with the online biology course or due to differences in the students' motivation or other external factors.

Female and male completers earned similar pre-test scores, with 41.9% and 42.1% respectively. However, females (n=45) outperformed males significantly by the end of the semester, showing an average increase of 17.5%, while males (n=30) improved by only 11.7%.

More than 40% of students in the five pilot sections were Caucasian (n=32). This group earned slightly higher than average entering scores and learning, with an average pre-test score of 43.8% and average increase of 16.0%. The next largest group, Hispanic students (n=20), earned lower than average entering scores, with an average pre-test score of 37.7%, but showed average improvement, with scores increasing by 15.2%. In contrast, African American

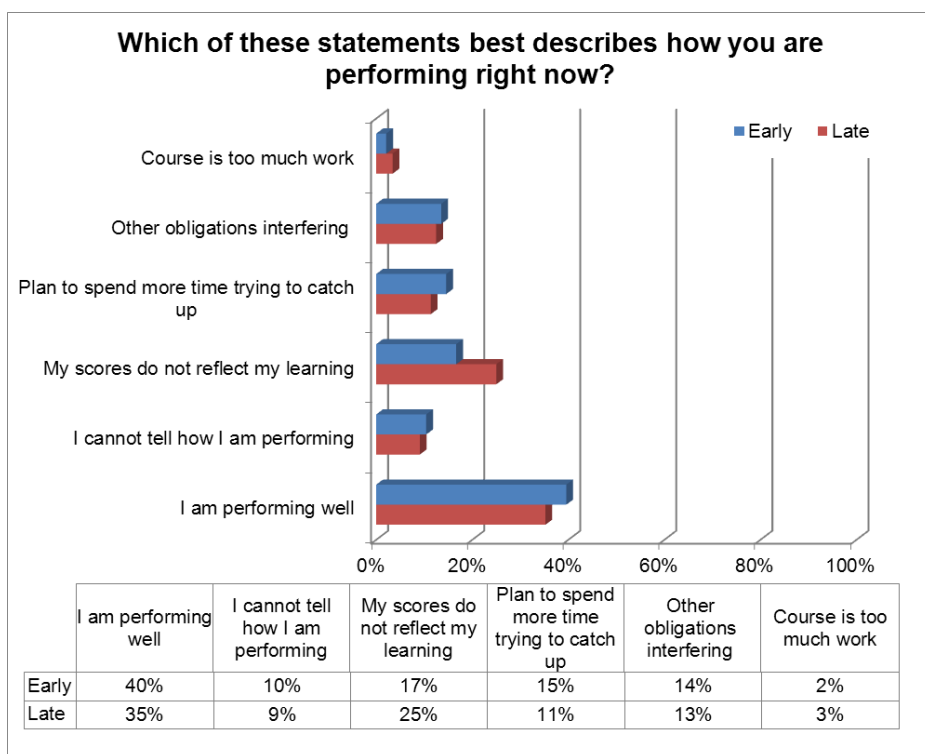
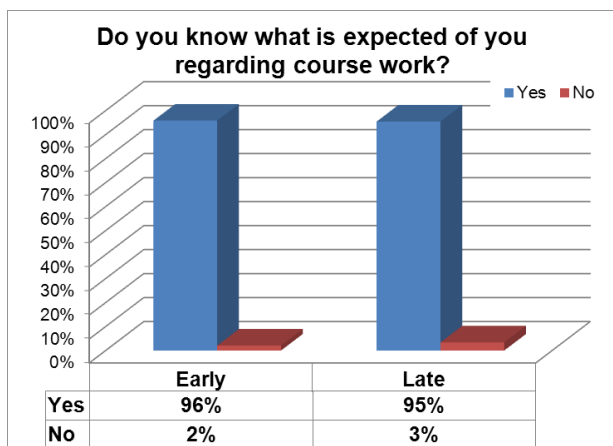
students (n=12) entered with slightly higher pre-test scores (43.1%), but improved much less than the average, with only a 12.5% increase by the post-test. Finally, Asian students entered with slightly lower than average scores, but increased much more than the average, with post-test scores that were 22.8% higher.

Figure 3: Student Learning by Gender & Ethnicity

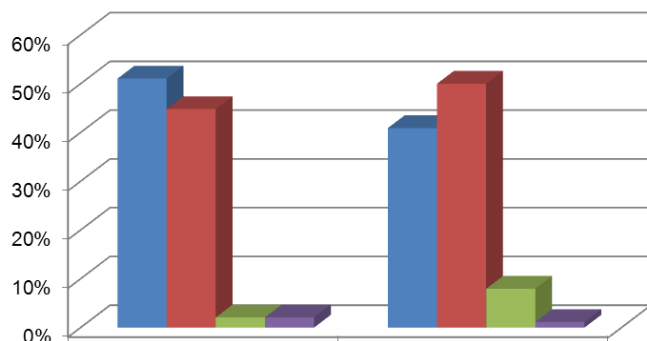


Student Feedback and Usage

During the 16-week pilot semester, two anonymous surveys were conducted, an early survey around week 3 and a late survey around week 11. The surveys were intended to assess student perceptions about the course materials and their understanding of the concepts after the first couple weeks, then again after students had worked through more than half of the course material. Because surveys were anonymous, data is reported in overall percentages using the combined responses from all five reporting sections. The figures shown below represent 96 students completing the early survey and 88 completing the late survey. Over 95% of students felt expectations were made clear, with more than one-third happy with their class performance both early and late in the semester. Additionally, more than 90% reported in both the early and late surveys that the online course materials helped them to better understand the concepts. Three-fourths of students reported the lab activities improved understanding. The following figures summarize the results.

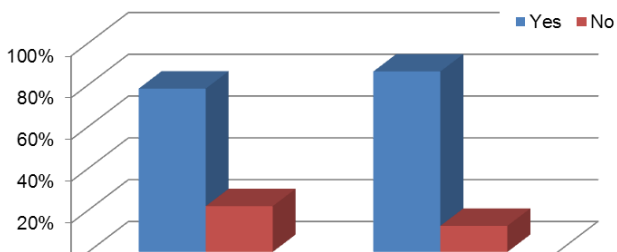


Did the online course materials help you understand the topics better?



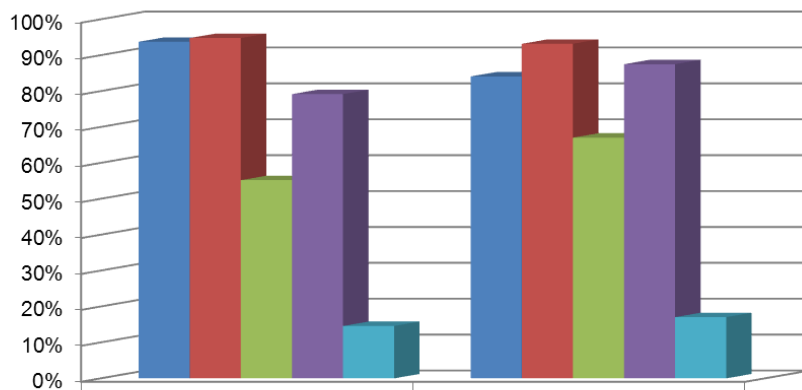
	Early	Late
■ Yes, I understand most	51%	41%
■ Yes, but still confused	45%	50%
■ No, the online material confused me	2%	8%
■ No, did not use the online material.	2%	1%

Did the lab experiment(s) help you understand the topics better?



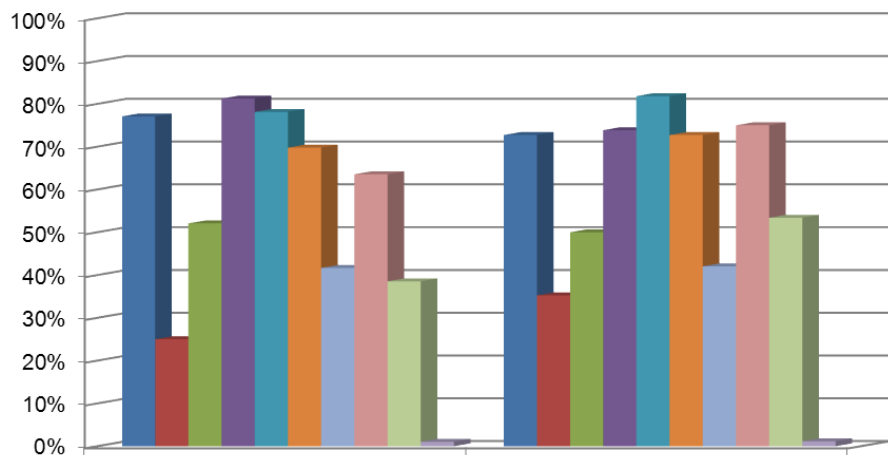
	Early	Late
Yes	78%	86%
No	22%	13%

Which course materials are you using regularly (at least 1x per week)?



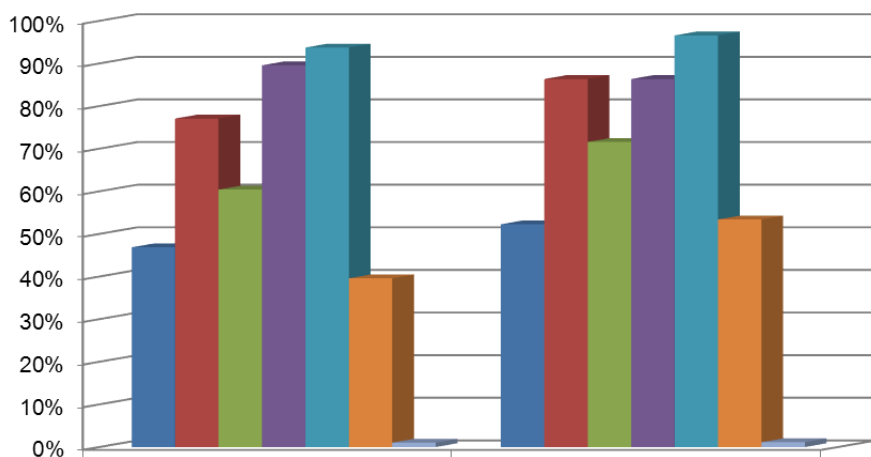
	Early	Late
■ Textbook	94%	84%
■ Online lesson materials	95%	93%
■ eScience lab manual	55%	67%
■ Online lab materials	79%	88%
■ Other	15%	17%

Which ONLINE course materials are you using regularly (at least 1x per week)?



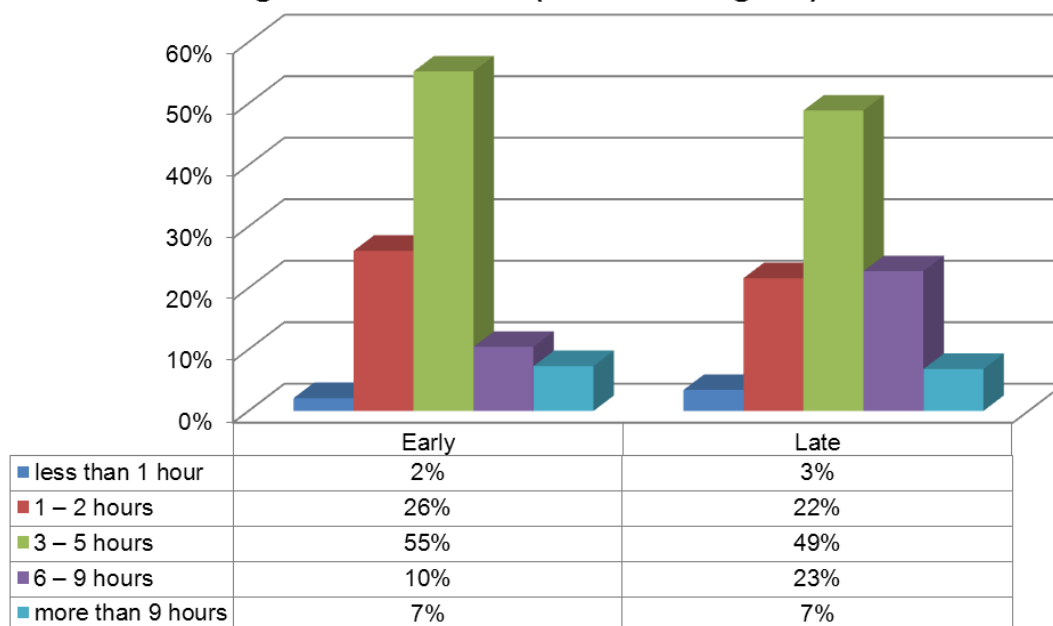
	Early	Late
■ in-lesson text elements	77%	73%
■ printable lesson text elements	25%	35%
■ glossary / rollover definitions	52%	50%
■ narrated videos and animations	81%	74%
■ multiple choice / multi-check questions	78%	82%
■ matching and drag-and-drop activities	70%	73%
■ other interactive activities	42%	42%
■ progress check	64%	75%
■ biology in real life	39%	53%
■ none of these	1%	1%

Which online lab materials are you using regularly (at least 1x per week)?

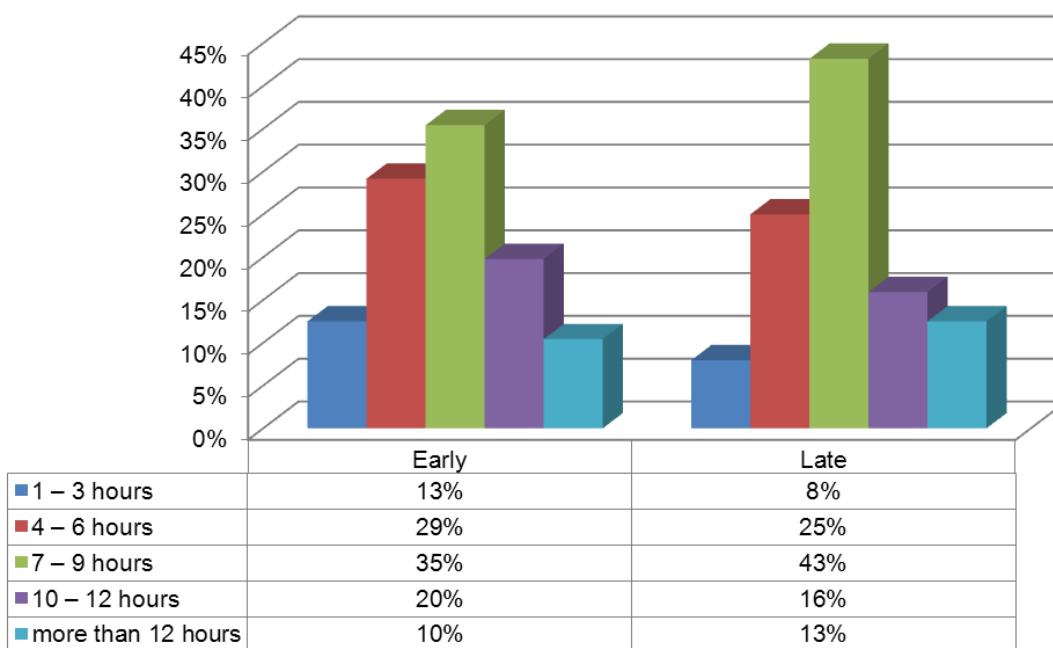


	Early	Late
■ in-lesson lab reminders	47%	52%
■ online lab materials lists	77%	86%
■ online lab time estimates	60%	72%
■ lab introduction videos	90%	86%
■ lab demonstration videos	94%	97%
■ interactive activities	40%	53%
■ none of these	1%	1%

On average, how many hours do you spend working in a single online lesson (not including lab)?



On average, how many hours do you spend working on ALL elements of the course each week?



Student responses to Open-ended Survey Questions

Although the biology course materials were consistent between pilot sections, the course organization (BlackBoard layout), graded assignments, and other relevant factors varied between instructors. Therefore, the open-ended survey responses are listed below for each

instructor separately. Responses have been grouped into positive, neutral, and negative comments. Responses stating only “no,” “none,” or “n/a” were not included.

Question #3: What difficulties have you encountered, if any, with course navigation?

Responses for Professor Baggett (2 sections):

Positive Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ The course Navigation is not a problem, one of the best I have had at Richland. ○ The course is laid out easily enough. Navigation has not been an issue for me. ○ So far I am not obtaining any difficulties trying to navigate through the course. I am finding everything just fine. ○ I haven't run into any difficulties, everything is explained well in our weekly emails, and everything is labeled appropriately on blackboard. ○ I have not encounter any difficulties, this is my 4th semester online and I am very familiar with the curse navigation. ○ I have not ran into any difficulties with the course navigation so far! ○ I have not encountered any difficulty with course navigation, I always know where to find exactly what information I need. ○ As of right now, I have none. I am very familiar with ecampus and how things work on here, but this is my first online class so we will see as we get further into the course. ○ Navigating through the course has not been a problem. ○ I have found that the navigation of the course has thus far been extremely easy to understand. ○ I have not encountered any difficulties with course navigation. ○ I have not yet experienced any difficulties in navigating the course, but I would like to say that everything is put together beautifully! ○ I have not encountered difficulties thus far due with navigation. ○ No, the course is very simple to catch the instructions are simple and direct. ○ So far I have had no troubles navigating the course. ○ At this time I have not encountered any problems. ○ The course is very well planned so I haven't experienced any issues as far as navigation is concerned. • Week 11 <ul style="list-style-type: none"> ○ I have not experienced any problems. I like how there is a link for each week with everything that is due. ○ As far as course navigation, I haven't experienced any difficulties. Everything is laid out very well and very easy to access. ○ I do not have any difficulties with course navigation. ○ I have not encountered any difficulties with the course navigation so far. ○ Course navigation wasn't difficult to begin with and now in week 11, it's a breeze. ○ none at all, I can get around just fine. ○ I haven't encountered any difficulties with course navigation. Everything is easy to find, and well worded. ○ In all actuality this course has just been amazingly easy in regard sot
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	<p>navigation, what is expected, where to find all the information needed, lab instructions, etc. There have been no challenges for me where this is concerned.</p> <ul style="list-style-type: none"> ○ I have not encountered any difficulties with course navigation. To the contrary, I have very much enjoyed the layout and such of the course. ○ No difficulties have been encountered. Weekly emails help keep me informed and on track to make sure I do not miss assignments. ○ As far as navigating this course I haven't encountered any problems, everything is layed out very well. ○ I have not encountered any. This on-line class is very easy to navigate and you always know what is expect every week. ○ I have not had any difficulties with course navigation. ○ The course is easy to navigate.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ The only problem that I have had is time management, even with planning out my week I am still spending a few extra hours completing assignments. ○ The only challenge I am facing now is that I haven't received my Lab Kit yet but once I do I know I will be able to progress in my Biology online class! ○ it was hard to navigate at first but now it is easy. • Week 11 <ul style="list-style-type: none"> ○ I haven't encountered any difficulties with the course, just getting things done in a timely manner with the change in my job has been really hard. ○ The course navigation is fine. The subject matter is the problem. ○ The course navigation has not been difficult. If anything has been difficult, it has been me absorbing the material. I must read the chapters at least twice to even getting a basic understanding of the material.
Negative Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ When taking the quizzes after submission it pops up with a screen saying I'm not logged in when I click submit. The grade does show up though when I got to "my grades" ○ Difficulties are always in the submission of the assignments. This process is way too complicated to do in all the complexities of Adobe. I have had to restart several times on submission.. It is very frustrating. ○ Not knowing how to post the picture the right size to fit for the lab picture to prove I did my lab experiment. • Week 11 <ul style="list-style-type: none"> ○ The only problem I have with these course is the amount of reading, you are required to read a chapter or two and then read online which doesnt seem long but it takes up a great deal of time. The problem I have with this is that it is hard for me to retain all of the information that is coverd, it just feels like i am spread too far and too thin. ○ the labs can be unclear sometimes ○ The class overall is okay.. I feel like it just takes up quite of bit of

	<p>time and not for learning purposes but more so meticulous purposes. You never really know what to expect in quizzes or tests so my grades have been all over the place.</p> <ul style="list-style-type: none"> ○ Some of the weekly assignments were difficult to navigate at first, but I got used to it fairly quickly. ○ At first time, i get in touch with biology the academic words makes me confuse. Also, i felt i am kind of slow when i learn a new chapter. ○ I have not done well planning my own time the last few weeks. ○ It has some labs hards that might need some help to be performed
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Responses for Professor Barbero:

Positive Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ Nothing, everything is stated clearly in the instructions. ○ I haven't encountered any difficulty. ○ no difficulties instructor is great with directions ○ I have not had any trouble with the course navigation. ○ Navigation has been easy. I actually took the 2nd part of biology already and it had a different format - I find this format to be easier. • Week 11 <ul style="list-style-type: none"> ○ None. I like that the course is repetitive each week or she spells out what we need to do to a tee. ○ No difficulties at all. ○ As with any online course, you find the difficulty to feel as you would if you attended a lecture course, however the mixture of discussion board and teacher emails help with this course. Our professor is always available to help better understand material and provides feedback on our test and assignments. ○ I encountered no difficulties with the course navigation, this course was well organized and the structure of the material was easy to follow. ○ None with course navigation. ○ I found the navigation of this course quite easy. ○ No difficulties navigating the corse. ○ Navigation is fairly easy. ○ I have not found any difficulties finding my way around the course, everything is explained well. ○ I had no problems with navigating this course. Everything was well explained and layout perfectly for a student to succeed. ○ The course is fairly simple to navigate through. I have had very little trouble find where assignments and other materials are located. ○ I have had no problems with the course navigation. It all was really simple and I did not get lost.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ At first my problem was learning all the steps it took for the labs such as, the lab report and the lessons but, now I know where everything is and it was easy to figure out if I was confused. • Week 11
Negative Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ This is a much more difficult class to navigate through than any otheres I have had on e-campus. The information involved in vast and a huge help once I can find the correct area to be in.

	<ul style="list-style-type: none"> ○ It was a little confusing at first, because it was so much to take in regarding procedures and how the information was presented, such as the assignment layouts and the lab layouts. Once I actually looked at the assignments and labs, the information was a little bit easier to understand. So unless you actually do these things it does seem confusing at first. ○ Submitting material is very confusing. I am having trouble locating all of the course tools, such as the lab guide and other printable material. ○ Sometimes there are assignments that are hidden within another subject. ○ what i have a hard time so far is learning everything in a week and not getting the grade i wish. im trying to see if there is other methods i can do to obtain the information. i have other classes to study and this course has so far taken most of my time. ○ A lot of work. A lot of assignments ○ I cannot get my PDF files for the lab work to save. I have to complete them multiple times before i can actually get them to save. Their is a large course load to struggle with and to many places to navigate. I struggle with grasping everything within the course itself. it is hard to knjow what its expected from us on the tests and check ups. ○ A great difficulty is understanding what I'm reading. I read the first book assigned pages 4 times before I could understand somewhat. I haven't been to school in over 15 years so biology is a little difficult to understand for me. ○ pdf files did not open at first. Had to delete and re download adobe reader. • Week 11 <ul style="list-style-type: none"> ○ I had a lot of problems with the course materials working. It was also very confusing and hard to remeber what all was due each week because there was so many things but I couldn't always figure out how to turn it in. ○ The course assignment board is okay but it is not enough study material to support the learning. There needs to be more assistence offered by the instructor. This course seems to be too detailed to be offered as a online course and only should be presented in a classroom setting. ○ Course navigation was simple, it was just getting used to the names of assignments due. I remember at the beginning I wasn't sure what was due. ○ The only problem I had is with the progress check i have failed it many times and it does not tell me where or how to find the correct answer all it says is review the lesson agian. ○ Getting full credit on some of my assignment. I guess I over think the question and don't get a high grade.
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Responses for Professor Benton:

Positive Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ As far as course navigation goes it is one of the easiest and simplest layouts I've used while taking classes online. ○ Course navigation has been fine.
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	<ul style="list-style-type: none"> ○ I havent had any difficulties with the navigation of this course, everything is laid out very easy to follow. ○ Nothing really, it's all pretty much self explanatory! ○ No difficulties so far with navigating through blackboard or assignments ○ I have had no trouble with course navigation. There's a lot to navigate through, but it's all clearly labeled and makes sense to me. ○ None. Every lesson is concise. • Week 11 <ul style="list-style-type: none"> ○ There were no navigational difficulties with this course. The weekly assignments are well-organized and with clear objectives every week. ○ The navigation of this course is quite simple. I have no problems. ○ None with course navigation, everything has been pretty clear. ○ Not so far. ○ No problems navigating the course.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ Just learning my basic way around, how to easily attach pictures and such, its getting easier. ○ Very little navigation problems but its because im not very computer literate. • Week 11 <ul style="list-style-type: none"> ○ None really, it's pretty much easy to navigate. I had some troubles the 1st couple of weeks, but I found out what I was messing up on, and my grades have gotten better because of it.
Negative Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ I need to find out how to look at the problems I have missed on the quizzes. I haven't figured out how to do that yet. ○ I have managed to turn in all of my work but feel like the lab submission is a bit cumbersome... maybe because of my level of computer skills. ○ I have a Mac, for some reason I still have difficulties uploading pictures in the Adobe files that I have to turn in every week. I did try many things, it is maybe because of the Mac. ○ some of my pictures on experiments are denied by the computer, due to extra large sizes. But reducing it, will hide the main experimental image for the the professor to see. but for that , i am getting on well. • Week 11 <ul style="list-style-type: none"> ○ If you mean being able to view online materials and submit things online, I don't have any problems. I did encounter problems in the beginning with submitting photos with the labs but have it figured out now. ○ Difficulties with the course navigation is not being able to return to the course's page after entering a lesson. ○ The course does not run on my tablet computer. ○ It is too much reading and it's hard to memoraise all the material.

Responses for Professor Hinson:

Positive Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ No navigation issues are present at the time. Everything is clearly
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	<p>explained with a detailed description. Professor Hinson is very, very good at making sure that everyone knows what's going on. This class would not be easy to take if the professor wasn't informative.</p> <ul style="list-style-type: none"> ○ None. The instructor explained how to navigate. ○ I am understanding the course navigation. ○ Not any ○ None, course navigation has been easy so far. ○ I have not encountered difficulties with course navigation. ○ The course system has been great for me so far. I have not had any problems. ○ I haven't had any difficulty with the course navigation. All the material is clear and understandable. <ul style="list-style-type: none"> • Week 11 <ul style="list-style-type: none"> ○ Course navigation has not been an issue. Announcements are made at the beginning of every week and the information provided in the announcement can be verified by looking at the syllabus. All course assignments are in the correct sections. ○ I have not really encountered any trouble with the course navigation. ○ The course is easy to navigate through. ○ I have not encountered difficulties with course navigation. ○ I have not encountered any problems with the course navigation.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ I haven't had much trouble with any course navigation, sometimes the videos lag but I think thats due to my internet connection. • Week 11
Negative Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ From my understanding, this is a fairly new course layout so the navigation, at times can be difficult with so many scrolling windows within scrolling windows. ○ windows within windows are annoying ○ It is a bit confusing. The last two weeks I have been certain that I did all the assigned work, But then I see zeros because I did not attempt the work. It is aggravating because i double check to see if I completed everything. And since this class is really difficult for me, It really is bringing my grade down. ○ I saw a pretest in one of the folders but never saw a due date, now the test has disappeared. ○ The only difficulty is having to preform the experiments at home by yourself. ○ Sometimes when i take a test and I try to submit the next screen will pop up and say access denied. ○ In the first week maybe the connectivity problems or any other problems, while submitting "Save and Submit", the results showed error messages. But, when I looked the grade status, it showed that the quiz has already been attempted, although there was no grade shown. As far as I know, that was the one problem which I faced. ○ links not working properly, not being able to type a response in a field where one is requested. (like question 13 in of this survey) ○ I try to submit my lab work, and for a class requirement, I need to

	<p>attach a lab in pdf. format. I attach the file and click submit, and it does not submit. I have to keep pressing submit before it finally submits 5 - 8 minutes later.</p> <ul style="list-style-type: none"> ○ Submitting the labs is difficult. ○ Being that there is no actual teaching going on, not even brief videos explaining the more complex material, I suggest classes like this not be taught. This is not real teaching; it is reading a book. Why is there a professor getting paid for nothing? This is a sad example of the downfall of the educational system. ○ one my biggest complaint about this course is we all not allowed to go to the lab on campus to try to get help although I paid lab fees. The instructor have only certain hours and days that she is at the school which does not reflect well with my schedule. She's usually there during the day and I and most of the other students also work during the day. She does not have any hours where she would be on campus after 5. <ul style="list-style-type: none"> • Week 11 <ul style="list-style-type: none"> ○ It is too much reading and it's hard to memoraise all the material. ○ There were some minor technical problems as well as ISBN# issues at the initial stage; but now I am familiar with this system. ○ Other than the initial navigation learning curve of dealing with frame within frame, for example, it has been relatively easy. The printable lesson text for Lesson 10 (if I remember correctly) was not complete. ○ There is no point in calling this higher education. I can give a third grader a book and have him read it then take little quizzes over them. This is a sad excuse for a class. ○ I have encountered links not working. I have encounter documents added by the instructor not working, (i.e. large documents taking forever to load and not opening with numerous attempts to open it)
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Question #4: What difficulties have you encountered, if any, with understanding and meeting course expectations?

Responses for Professor Baggett (2 sections):

Positive Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ None, everything is directed to you in your weekly assignments. ○ All the course expectations have thus far been made very clear. ○ I know exactly what I am expected to do in this class and I know what my deadlines are. I am not having any trouble remembering any deadlines or expectations. ○ I haven't run into any difficulties, the teacher makes her expectations very clear. ○ I have not encounter any difficulties with the course understanding or expectations. ○ none, very easy to know whats due and when its due. ○ I have not encounter any difficulties with this either, I know exactly what is expected of me at all times. ○ I have understood all of the expectations. For me I have been out of the 'learning' world for a while so I am doing as much as possible as well as working full time. ○ I have not encountered any difficulties with course navigation.
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	<ul style="list-style-type: none"> ○ I have not encountered any difficulties with meeting course expectations. ○ At this time I have not had any problems understanding and meeting course expectations. • Week 11 <ul style="list-style-type: none"> ○ I think that the course expectations are reasonable. ○ I have not had any problems understanding or meeting expectations ○ I think the course expectations are laid out in an understandable fashion. Biology is a very specific and very memory intensive science so the subject itself is difficult but the expectations are very clear. ○ None. I understand expectations, but my fault to not adhere better. ○ No questions at all in regards to understanding what is expected, deadlines, etc. Not only is the email at the beginning of the week stating the tasks for the week a great guide but all of the information is also stated clearly in the syllabus. With so many places to refer to for information it would almost be impossible to NOT know what is expected from me. ○ I have not encountered any difficulties with understanding and meeting course expectations. ○ I have had no difficulties understanding course expectations.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ At first it was navigating through the information but with the Navigation video and playing with all the tabs I feel comfortable to get there the assignments. ○ This week's lesson was a bit difficult to grasp but that was expected. It just required a bit more time. ○ Compared to other on-line courses, typically a test consists of only one chapter. Not a bad thing, just different. ○ I haven't had any issues with understanding course expectations. However, this course is more involved than other online courses, and I'm not used to having to deal with so many ongoing activities for a single class. • Week 11 <ul style="list-style-type: none"> ○ I have encountered a few difficulties at the beginning of the course, but now the lessons are much more interesting and I am feeling more confident. ○ Besides the reading, I dont have any problems with the course. At the begining of the class everything was stated as to what her expectations were for her students. ○ Not any real difficulties per se. At first, it was a bit daunting because I hadn't figured out a workable schedule to complete the requirements and expectations of this course, plus getting quality study time for my other courses, work and family obligations. Once I got a consistent study schedule down, I felt like I was able to understand the very basic concepts. There have been times when I've felt rushed either because the chapter was long or because I procrastinated and had to rush to finish the assignments. ○ I have full understanding with the expectations of the course. The only difficulty in meeting them, is understanding the material. ○ i like the way we can work the lab in our house. But sometimes it

	<p>take longer than the regular lab class. However, i do like the way teacher help me with all my questions. Also, she replies my email pretty soon.</p> <ul style="list-style-type: none"> ○ The section I am having the most problems with is the DNA section, not because it isn't explained well enough but because I am just not understanding it.
Negative Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ I'm honestly just not into science so no matter how hard or much I study and read...it doesn't reflect in my grades because there's so many concepts to remember. It's a lot of work and I'm just not getting it. I honestly want to give up. ○ The criteria to learn is pretty immense. ○ The difficulties right now are that the time frames to get the work done is kind of short. Taking other classes and working 40 hours a week is rough. ○ The only difficulties I have had so far is how much time it takes to get everythign read, studied, and completed. I feel I am doing okay so far, but I am also taking other classes, have an internship at a bakery, and am coaching a volleyball team, so any of my free time goes to reading and trying to understand the material of this class. ○ I have encounter difficulties such as the delivery of my lab kit and I like the course but the material is kind of long. It is to much work for the lab part. ○ I read the material for the chapter, however I felt I didn't understand very well how to get the right answer for the lesson quiz. • Week 11 <ul style="list-style-type: none"> ○ Some of the reading is hard to understand unless I am completely alone to focus for a long period of time, but being a mother and full time worker it's been hard juggling my recent changes. ○ Some of the content is just confusing ○ The course expectations are a little more difficult than I anticipated. I won't say I took an online class because I thought It'd be easier (actually it was the only way to fit it into my schedule) but it is a lot more work than I expected, and I almost feel like I should've just taken it on campus because the online seems way more harder. Science concepts aren't easy for me to get, I'm not interested in it, so I knew from the beginning I wouldn't get an A, I would just like to pass and make it through to get my credits and move on. I still think that a lecture,lecture quiz, lab and lab quiz every week is entirely too much. I think a lab every two weeks would be more reasonable or maybe an online lab every other week and physical lab every other week would be more conducive. ○ Because of taking other classes and working, the only difficulty I've had with meeting the expectations would be time. A lot of the labs are lengthy, and require a lot of other materials to complete. ○ In how much details I have to learn the material. Sometimes, I see that I have to know exactly every enzyme or protein described, but at other time I see that it is not required. When I'm studying the material, I am sure that I have to know the sequence of biological processes but memorizing small specific details is complicated as it is

	<p>not possible to relate them to anything I am familiar in my life. If I cannot find any connections between those details, I feel that I am lost in proteins, ERCs, and so on. I know for sure that we are expected to understand the online lessons materials, but time to time I met questions from the textbook which were not covered in online lesson. Other than this issue with numerous details, I do know what I am expected to study.</p> <ul style="list-style-type: none"> ○ Like the above answer, the material is not well defined on what should be covered and what should not, ○ None, other than the speed and intensity of the class. Finishing a lab and lab report, a lab quiz, a lesson, a reading assignment, and a lesson quiz every week has been difficult. ○ The book and the online reading do not seem to meet up sometimes. Also, course work is difficult to keep up with if you work more than 35 hours a week. ○ Nothing really, the only thing is sometimes it requires more time than is expected.
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Responses for Professor Barbero:

Positive Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ All course expectations are well understood. The professor even goes out of her way to give us our weekly reminder of assignments and deadlines. ○ none be easy to acces course so far. ○ No difficulties ○ i have not had trouble with understanding the course expectations. ○ I have no misunderstanding about what is to be expected of the class. The emails that I receive are very informational and helped me out a lot. If I had any questions the emails most likely answered them for me. ○ none yet • Week 11 <ul style="list-style-type: none"> ○ There is no misunderstanding with the course expectations. We have a calendar with all of the due dates and every week everything is due on a Sunday so there is no confusion what so ever. She also Emails the material each week for that specific week which is so helpful. I really like the fact that I am reminded every week. ○ None, our professor keeps us very informed of expectations ○ i did not encountered any difficulties understanding and meeting course expectations. ○ I had no significant difficulty understanding or meeting course expectations. ○ None that I can think of. ○ I understand and feel that I have tried my best with meeting course expectations. ○ I have not encountered any problem understanding the course expectations.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ The only difficulty is the workload that goes with the labs just because of my schedule and having to take pictures at times which can easily be forgotten.

	<ul style="list-style-type: none"> ○ I feel like i just need to refresh my mind again to remember everything again. • Week 11 <ul style="list-style-type: none"> ○ my schedule with work did interfere with the time i needed to study. by the time i got an understanding of the information it was to late the week already passed. reading the material in the book i had a hard time understanding the information in the book
Negative Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ My biggest difficulty is just navigation. ○ I guess i have a little hard time knowing what is actually asked. It has been years since i had a science course so everything is overwhelming. ○ Submitting the lab reports is still puzzling me. I tried the suggestions given as best I could understand, but still have a bit of trouble getting it in. ○ Lab report, I'm not sure what is expected of me as far as the answers I submit. ○ I did have a hard time at the beginning. If I'm not mistaken lesson assignment 1 was also referred to as something else. I was a little confused on what work was due since it wasn't on the calendar that I printed out. • Week 11 <ul style="list-style-type: none"> ○ More support and study materials need to be offered. ○ No difficulties encountered with understanding course expectations. Meeting the course expectations, I think it would have been a lot easier if I had taken this course on campus. Many times I read, but it just didn't stick. I think if I had attended a class I would have scored a lot better, but it was more convenient. I think professors have a better way of teaching material on campus because it can be compared to something that students can relate to in order to understand material. ○ some of the lab report questions are hard to understand. please take that into consideration for future classes. ○ There is too much busy work. We should have taken more time to better understand the topic has more discussions to see where we stand in each topic and had more access to the teacher and help with assignments ○ Only some of the labs were confusing at first but after a while they got easier. ○ I really feel that this class for a freshman class is WAY to hard. The material we use comapred to our lab and lesson quizzes are difficult to understand if this is not your major. Even using your book to look up answers, it is very difficult to figure out. ○ Some of my test did not meet my requirements. I studied for hours and still struggled on some test. ○ Seemed to have a bunch of information to learn in this class. ○ The hardest thing for me was completing the labs. There isn't anyone with you to answer any question you may have while conducting the lab. ○ Being an online course, I can not collaborate with the students in my

	<p>class. I wish there was a way to communicate via email with the other students in the class and maybe set up a group lab and study session.</p> <ul style="list-style-type: none"> ○ I have had a few difficulties with the course content simply because some of the terminology. I am not a science major and some of the material seemed as though it was more suited for biology majors. I enjoyed the material but did find some of it a little confusing.
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Responses for Professor Benton:

Positive Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ Course expectations have been outlined quite well. ○ I have had no difficulties understanding or meeting the course expectations. It's all clearly and thoroughly laid out. ○ Announcements and Syllabus are very clear, as well as course expectations. ○ None thus far. ○ None. I think all the assignments are in logical order with the course. • Week 11 <ul style="list-style-type: none"> ○ None have been encountered.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ I am following along fairly well so far, i have to read and re-read multiple times sometimes to get a grip on the info but i am getting it. ○ Have yet to buy a lab kit due to other obligations outside of class • Week 11 <ul style="list-style-type: none"> ○ First, I would like to say that I LOVE the labs. They are extremely helpful for cementing ideas into my head. Our teacher, Dr. B is excellent in her interaction with us. She always answers emails promptly and grades all work quickly which helps us to know how we are doing. I think there is the right balance of grade work as well. Including some extra credit is helpful for students who want to make a good grade but are struggling with tests. In my opinion, the online lesson plans and the major tests are way to detailed for a non-science major class. I believe that it is okay for the textbook to go into detail but that the questions need to be scaled back some for testing. We are not aspiring to be doctors. ○ The only misunderstanding I had was with the first Discussion Board activity. After I realized my misunderstanding I completed the second Discussion board activity successfully.
Negative Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ I have had some difficulties understanding the course materials when reading the textbook. It is a little difficult to understand and follow just because there is a lot of information. I do appreciate having the whole week to finish the entire chapter and lab assignments, it really does help. ○ The main difficulties im having is understanding concepts of certain information and even after reading it over several times i dont understand the concepts fully but i am trying. I write several pages of notes to try to help me. ○ The course work is pretty complex. I didn't realize it would take as long to go over it. I am spending about 10-12 hours without the lab at this point. The terms chemical bond, covalent bond, ionic bond,

	<p>and hydrogen bond are still confusing to me.</p> <ul style="list-style-type: none"> • Week 11 <ul style="list-style-type: none"> ○ Sometimes there are weeks with many assignments, and other weeks there are very few. I wish each week had mostly the same amount of work and time required. ○ Sometimes I dont see the connections that is supposed to be there with the lecture and the lab. ○ What the main points are that i would need to study. I think all of it is very important so maybe i study to much of it and get confused. ○ The labs can be a pain, but if you don't give yourself the proper time, you will not get a good grade. Also the lecture quizzes, the answers are there, you just have to study the online material, the biology book doesn't really help at all. The book is the main difficulty for this course. And having good time management. ○ I have encountered that the course is more work than I anticipated. I'm keeping up but I find myself becoming alittle confused on some of the work. ○ Some difficulties would be what the teacher wanted and what I thought the teacher wants. Its a very bit difficult but will find the answer and pass the class. ○ This class is a lot more work than I was expecting. I planned to spend about 12-15 hours a week on it, and I typically spend more than 20. The labs are much more work than I was expecting. ○ To meet the course expectations, I found that it is to much work in the course. Also the vocabulary is hard to undestand the first time, because I have to read the material several times to undestand better the topic.
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Responses for Professor Hinson:

Positive Responses	<ul style="list-style-type: none"> • Week 3 • Week 11 <ul style="list-style-type: none"> ○ I have not had any issues not understanding the course expectations. ○ I have understood course expectations. ○ No, I am familiar with this system. ○ None really so far.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ Just the initial learning curve of navigation and professor expectation, which is completely normal for me. ○ The first and second week were a little difficult but now I believe I am getting the hang of it. ○ My career and other unexpected circumstances have taken valuable study time away, but I intend on staying the course. ○ The course is a bit difficult for me due to the content being new to me. I am trying to increase my study time, but my schedule and personal matters have gotten in the way. But I plan to continue to try my best. ○ The material is somewhat confusing but biology has never been one of my strong subjects, so it's not because of the course it has more to due with my interest in biology. I have been working tirelessly to better myself in biology and so far I believe that there has been

	<p>improvement and I will continue to put in the effort to surpass the class.</p> <ul style="list-style-type: none"> • Week 11 <ul style="list-style-type: none"> ○ I've turned in the material on time, but I have not been able to devote as much time as I'd prefer in understanding the material 100% due to work-related tasks. I'm a Network Engineer and we're in the process of migrating data centers, so I've been called upon during random hours to assist with transferring equipment over to our new facility. This has taken a majority of my time. ○ No difficulties understanding expectations; meeting expectations is a matter of time management because the curriculum is packed full of information.
Negative Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ It a lot of info and I have to read and reread over and over. It is very hard. Some weeks are overwhelming. ○ If I say frankly, of course it is a four hours credit course, and according to those demands there should be of course many activities as well. But, if the activities are reduced, rather than number of activities in a single week, one has to do other courses as well as his or her job, I think that would be more convenient for people like me. ○ At first I had difficulty but once I figured out how to turn in labs and when to do quizzes and exams I began to understand the flow of the class within a week or 2. ○ I am reading and re-reading the course material but I can't seem to understand the information. I have tried reading it silently, out loud, and everything else, but I do not think it is sinking in. I would like a little more one on one help and am not sure how to go about getting the help I need. ○ links not working or getting credit for assignments I have done, being told I haven't done them, then having to do them over, while having other obligations, links not working properly, has made this course very aggravatting ○ I have a job and classes at college, and the time it takes me to keep up with those previous engagements takes away from the time I have to work on this online course. It is dfficult to have such a small amount of time to do the tests and quizzes. ○ The course is just card for me in general. My vocabulary is not broad, and most biology terms are new to me, si it is hard to remember what means what. ○ I have a difficult time knowing what to study for on the tests and quizzes. There is so much information in the books and I don't know what to concentrate on for the tests. ○ I understand the material I am just having a hard time meeting xourse expectations regarding due dates because I feel it is too much for one week. I am also taking three other classess, work full time and have two children so sometimes it does get kind of hard to meet due dates. ○ I feel that there is a lot of material to read and remember prior to a test. Some of it flows together and gets a bit confusing.

	<ul style="list-style-type: none"> ○ This course is a lot of work; more work than I expected there to be in a non-majors class. A lot of time is asked of the student. The work itself isn't very hard, the material is very tedious to go over because I believe there is a lot of "fluff" in the lessons rather than straight facts, which takes time away. ○ There is no one teaching the material. What is the point of school if no one teaches; I am just reading. ○ For someone who have not had a science course in over 20 years the information is way too complex and the assignments are also complex, I find myself just trying to make sure I get everything done my the time allotted and really is not understanding anything that I'm reading, I'm failing my my other class just trying to keep up with the workload in this class. Also once a quiz is taken there is no way you can go back over to look over what you miss in order to use as a study guide for the exams. ○ I have encountered difficulties expressing the things I learned during the experiment on my lab report. ○ The course is hard considering it is online and you do have to teach yourself all of the material, plus set up and complete labs each week. If you stay on track you can do well in this class, but the material is not easy and the test can be a little too tricky when it comes to wording. <ul style="list-style-type: none"> • Week 11 <ul style="list-style-type: none"> ○ I don't feel the information was laid out from the beginning of this course where it could be understood. I think with instructions being in multiple locations and links is multiple locations for one particular assignments made for unnecessary confusion. ○ To meet the course expectations, I found that it is to much work in the course. Also the vocabulary is hard to undestand the first time, because I have to read the material several times to undestand better the topic. ○ I'm having a lot of trouble understanding the course material, I feel rushed because I'm trying to make sure everything is done by the deadline and I'm not really understanding anything I read, I'm just remembering enough to barely pass my quizzes and exams. I'm spending so much of my time trying to understand biology that I'm not doing well in my other classes because I spend more time trying to comprehend what I'm reading. ○ Biology is course that needs to be explained it cannot simply be read about. ○ I have a hard time remembering all of the concepts. I have never been so overwhelmed in an online class before. I am exhausted from studying morning and night. It is a highly difficult class. ○ I have not encountered any difficulties with the course expectations. ○ Labs
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Question #13: Are there any changes you would make to the course layout, online course materials, or graded assessments? If yes, please provide a description of what would you change and how it would improve your learning experience.

Responses for Professor Baggett (2 sections):

Positive Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ I would not change anything. ○ No, I am beyond satisfied with the layout, materials, and graded assessments. ○ So far, I don't believe anything should be changed. ○ To be quite honest this is one of the most organized and properly explained courses I have taken. Dr. Baggett is fabulous about staying in touch with us and reminding us of our work which is due. ○ Nothing. ○ I honestly think this class is good the way it is. I know there is a lot to do each week, but I also know that I have a whole week to do all of it. It isn't that hard to get three assignments in each week. I wouldn't change anything. ○ No, everything is fine. ○ No, I think it is set up very well. ○ I don't think there is anything that I would change at this point and time of my experience with the course. ○ I wouldn't make any right now. ○ So far, I am enjoying what I have learned and the way the material is presented. • Week 11 <ul style="list-style-type: none"> ○ I think the course is laid out very well and the labs give me a very tangible experience of a particular lesson which really ties each unit up for me. Honestly, I can't think of much I'd change. ○ No, I consider this class the best ever I took! Very interactive, informative, and useful. It is well designed, with plenty of tutorials within the lesson itself. Definitely, no changes are needed. Thank you from all students for such great work over this course! ○ There are no changes that I would make to the course layout, online materials, or graded assessments. By far, this is the least frustrating online learning experience I have had (in all my 1+ years). Every so often, I find myself wondering if something from Biology I for Majors slipped in, but I tend to discover later that these more complex pieces provide a nice foundation for when topics are revisited and/or expanded upon further along in study. Awesome course; great job! ○ This course is well-prepared. I do not have any recommendation. ○ I have had no complaints about the course. I think the layout is well organized and it helps me stay organized. ○ I think the professor is using the course layout, online course materials, and graded assessments very well. ○ i think that the course is structured perfectly to help me learn ○ The course layout is just fine. As far as time goes, it is very flexible, at least for me because of all the other activities that I have. I could and should devote more time to try and understand the material better. All in all, this has been a great course. ○ I must say that my grades do reflect the amount of time (or lack thereof) I have put into the class quite fairly. There is also no doubt that if I were to spend a bit more time studying on the weekly topic I would do better in my scores. However, the online materials
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	<p>coupled with the text and labs is a fabulous combination and works well.</p> <ul style="list-style-type: none"> ○ No I believe that everything has been fairly laid out. This is actually probably one of the most organized classes I have ever taken. ○ None! Everything's Grrrrrrrrreat! Like Tony the Tiger! Har har! ○ No there aren't any changes I would make.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ I would prefer to not have a lab every week, but I understand that for the full material of the class to be taught and for credit to be received that they are necessary. • Week 11 <ul style="list-style-type: none"> ○ I think the course layout was fine. Of course, there were times when I felt like there was "too much" to do within the week--particularly when I had other assignments from other courses that were due. It's also a little difficult for me to really judge it since this is my first online class and my first biology course. If I'd taken a traditional classroom lecture/lab course, it'd be a little easier for me to compare as far as time studying and performing labs go.< I thought everything was presented very well--particularly the videos within the lessons. They helped a lot with a several of the concepts that are a little difficult to grasp. ○ Not to the course layout, rather to my own study/learning habits.
Negative Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ The only thing I might consider changing is the policy towards dropping a certain amount of quiz, lab and lab quiz grades. By dropping as many as 3 from each section, I could see a lack of effort, if 10 satisfactory grades had already been achieved, on the remaining activities. ○ There aren't any changes I would specifically make, I understand that my Professor has made the course as easy as possible, it's the material that's complicated, not the class. Actually now that I think about it, I think a lab due every week is tedious along with having to complete a lecture,lecture quiz,lab and lab quiz...I honestly think it'd be better if we had a lab due every TWO weeks. It's already hard enough to read the lesson, understand it, study and take a quiz, the lab and lab quiz following just makes it overwhelming. ○ I would like to add instead of change, more extra credit assignments not as difficult as the lessons. I think that by adding mini lessons will help me to improve my learning and would help me with my grades. ○ The course is just complicated and not as easy to navigate through like former online courses. It is very cumbersome. ○ As a student and taking online Biology, I know there is a deadline to get the work done, but the time frames to get the work done are short. Many kids are going to school and also working, which makes it hard on them to get all the work done not only on time, but a good piece of work. ○ I would change the lab reports because they are too long and it is a lot of work done all together. The labs are fin but the activities for the lab are way too much. I think the lab quiz may be with photos might work almost the same. Still this course is amazing so far!

	<ul style="list-style-type: none"> ○ I would appreciate it very much, if there were other ways to get extra credit points, so that even when we study and submit the labs, if our grade was not the one we wanted, then we could still achieve a higher grade with extra credit. ○ I would make the quizzes viewable after completion so we can see which questions were missed and have a better idea of what to study. ○ With the provided interactive activities online, I find that these tools help in understanding concepts enough to where additional lab activities are sometimes overkill. I would limit the lab activities. • Week 11 <ul style="list-style-type: none"> ○ I would include more interactives such as video because it is sometimes difficult getting a big picture of how everything connects. ○ I would change the time length on the lecture and lab quizzes, for the lecture quiz 40 minutes and for the lab quiz 30 minutes, and for the midterm at least 1 hour and 40 minutes. ○ I will like the online reading portion to be shortened and more to the point on what exactly we are covering. It seems that there are several sections in the lab that could be cut out and you would be able to understand the lesson better. ○ The course layout is fine as are the course materials. The graded assessments (lab reports & discussions) would help if they were available to review a lot faster than they are. Right now, we go for weeks not knowing what we did wrong and we move on thinking all is well only to get several lab reports & discussion comments well after we have passed that topic and we really do not have time to go back and review the comments made and/or correct them. Once we do a lab report, there is pretty much nothing that can be done to better our chances of understanding as time has lapsed. ○ As I said earlier in the question, a lab, lab quiz, lecture and lecture quiz EVERY SINGLE WEEK is very overwhelming, especially considering the large amount of material there is to learn, if I were the course instructor I would be a little more understanding to the fact that a student is taking more than just my class, and possibly make it a lab and lab quiz every other week or something along those lines. Biology isn't easy either way you cut it, and there are a lot of concepts to learn, it's just plain overwhelming... because as soon as you finish one lesson and all of its assignments, it's time for another assignment it just never ends, also it makes it easier to forget what you've learned previously (which is why the midterms are so hard) by the way the midterms are EXTREMELY hard, which is why I can never complete them in the time frame given, because I have to read and reread a question to know what it's asking then read and reread each answer choice carefully, it doesn't give me the time to do that. ○ I think the only change I would make, because of students taking other classes and working, is trimming down the lab's time estimates, or number of experiments in each lab. For me, after doing these labs for so long, I start to get a little headache, and have to take a break. ○ Provide proper study guides for tests and quizzes. Also including a
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	<p>more flexible time schedule for assignments.</p> <ul style="list-style-type: none"> ○ I would have the assessments more closely follow the material in the book. I often find that the book is nearly irrelevant after using the online lessons and would rather have not spent that \$120 if I didn't need to. ○ if i can do the change, i would like to change to focus on the online-text materials. that could have e-practices and it go with a solution. i will try to use the online text instead of the book. because the online0 text have the multi choice and video to explain how cell move etc. i could watch more videos and combine the reading materials to do the test. ○ There are a lot of work for each work I would simplify the labs or because there are too many exams per week is tired.
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Responses for Professor Barbero:

Positive Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ I just want to thank you for the material you provide online because the book would not be enough to understand lesson. ○ No changes. The instructor is clear and posts assignments very clearly. It's up to the student to complete the assignments. ○ No, for me everything seems fine. I have figured out everything. Once I understood it it was easy to navigate and know when things were due and how to do assignments and where to turn them in. ○ I do not think I would change anything with the way the course is set up. If I am not successful it would not be because of course design, it would be because of lack of effort. ○ none enjoying class so far. ○ everything seems fine. ○ No changes ○ so far I do not have any suggestions. • Week 11 <ul style="list-style-type: none"> ○ No i wouldn't changed anything, everything was in order and very well explained. ○ None. While I did not turn in several of the assignments, this course has been both informative and doable. Great class, with a wonderful instructor. ○ There is nothing that I see that needs to be improved. It was all very simple to understand. ○ There are no changes that I would make to the course layout, online course materials or graded assessments. ○ No, I believe this was a good class that was easy to excel in. Science is just not my forte. ○ No all the information needed is given to the student.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 • Week 11 <ul style="list-style-type: none"> ○ I do not feel that changes are needed to the class. I feel that for the most part it is easy to navigate through and provides you with numerous ways to get information. For myself personally I fell that this class may have been to advanced. Not having a strong knowledge or background with sciences I probably would have benifited more from a slower paced class.

<p>Negative Responses</p>	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ Navigation around the site is the only thing I would alter. ○ Have clearer step by step instructions for where to find materials and how to get work submitted. It was especially hard for me to get the lockdown browser started. ○ This is a very expensive class to take online. I believe the lab kits should be replaced with videos of the lab that you can watch, understand, and then write a lab report from. ○ I would get rid of the labs, and require that we watch a video of someone else do it while asking questions about the results to make sure it was watched and learned. The lessons and readings are alright. ○ less course assignments and better elaboration of the lessons for a better understanding of the concepts. I also think more open ended questions would give a better idea where each student is on the material instead of yes and no answers ○ I would allow more time for test or multiple times to take test. As a student I get nervous having to take a test and the time limit makes it even worst. ○ The only thing i would change is grading on some concepts that are a little harder to understand. Ive had several wrong questions with concepts i dont understand and get graded for not understanding correctly. My lab ,my slime didnt make an imprint on the correct materials but yet im getting counted off with what my experiments outcome were. If i follow the instructions and the outcome is incorrect and dont know what else i can do to make it better. Im trying hard to understand and do my labs correctly but yet i feel as if my grades dont show my effort. What can i do to make it better? • Week 11 <ul style="list-style-type: none"> ○ More study and support materials should be presented. ○ One thing I would change would be the graded assignments, it would be very helpful to be able to view the lesson test and know what answers were correct or incorrect after taking the lesson test. This would help with taking the unit exams, it was a little difficult because I kept going with what I thought was correct and now after reviewing answers to exams it's a little difficult for brain to accept correct answers. ○ i personally am a hands on person, the lab experiments did help but if the lesson used illustrations that paralleled to something i was more familiar with i think i would understand better. ○ I know that it's hard to do, but I would have like the lab reports to have been graded sooner so I could have known where I stood in the class at all times. Also as I said earlier some of the lab report questions were very hard to understand. Especially on the last four to five labs. ○ Maybe make some of the assignments due toward the end of the semester. Like labs for example, in case people were a little late in ordering their lab kit. ○ more in depth learing of the subjects instead of spending so much time of long labs. and had more room to ask for help from the
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	<p>teacher instead of her just telling us to study more. studying more wont help if you don't understand what you are studying</p> <ul style="list-style-type: none"> ○ Maybe make less discussion boards so each week we can put all the time on studying each lesson. ○ I would change how some of the multiple choice answers are worded. You really have to understand everything to a point that if not you will fail! ○ I realize online classes need to be challenging, but the content was confusing. Switching back and forth from book to online material only made it harder to learn. Questions on tests and lessons seemed very tricky. However, I love online classes and have taken several and will continue to take many more. Thanks. ○ way too hard and confusing ○ I actually depended on YouTub a lot when I was stuck on a lesson that was difficult to understand. Helpful videos would be great. ○ Just to try and have a little more time during test, most of the time I felt rushed and pressured and I think I little more time could be very beneficial. ○ I would make the labs shorter and replace lab time with more study hours.
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Responses for Professor Benton:

Positive Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ I would not change the layout of this course. I think it is very straight forward and easy to follow. I enjoy having the textbook and the online text/ activities, it helps me understand the materials better. I also enjoy having an online lab partner to do the experiments with, I didnt expect to have that so that was nice. :) ○ I like the layout, and the ability to work completely independently without going to campus. The material is a bit harder than I expected, but I don't think there is any way to change that. ○ I think the course layout is great and easy to understand. There are lots of components, and the subject matter is difficult for me to grasp - but the presentation of it is thorough and well done. ○ I am satisfied with the class so far, I am learning and you have been very accessible for any trouble that i have had. I appreciate that and your help and am enjoying the class so far. Thank you. ○ I think it's fine like it is. ○ None. I just need to apply myself more. • Week 11 <ul style="list-style-type: none"> ○ None at all, you just have to have good time management and learn how to navigate the course material and tabs and spend proper time doing it. ○ It's all fine ○ Nothing I can think of.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ None at all, just have to be more aware of requirement and procedures of certain assignments. • Week 11 <ul style="list-style-type: none"> ○ NO, but There's just one thing of my concern. To be more specific in the lab assignments. I really don't have any problems overall.

<p>Negative Responses</p>	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ The labs were due quite suddenly after the course began. After registering I did not know the price of the lab kit and was unable to purchase it immediately. I am not know if anyone else had this issue, so I do not know if it something worth changing, but it is a problem that I encountered. ○ I believe that the course work is organized well and your emails each week make it very easy to understand what is expected in the course. I do not understand why a Biology course for NON- Biology majors is so in depth and complicated. For instance, I can see why learning about biomolecules is useful information. I do not understand why we need to know about covalent bonds, monomers and polymers. ect. In other words, the course goes into a depth that is way beyond anything that I want or need to know in my life if I am not going into the field... I do enjoy the labs so far and the tutorials for the labs are excellent. Overall, I feel like I am spending a LOT of time for a course that I am taking to satisfy core requirements. ○ Why Adobe? I have taken several, several courses on line where Office and Excel where good enough to work. This is the first on line course that I am taking where I have to turn in files using Adobe. ○ With the understanding that I might not be utilizing it properly, but I use the progress quiz at the end of the lesson to make and ready myself for the graded quiz. The only thing I struggle with is that the progress check covers different details in the lesson than does the quiz. I'm not suggesting it be exactly the same but maybe similar in the details it covers. • Week 11 <ul style="list-style-type: none"> ○ I think that more emphasis on the labs with the grade points for labs being higher would help with the overall grading. (less emphasis on the details of the chapters). A general course that is for NON-Science majors should be more general. Or, perhaps more extra credit since it is something that can be done to help a student improve their grade by doing EXTRA work. .. but that they would ONLY be able to do the extra credit if they were completing all course work. It should not be an opportunity for students to not do the regular work and then make up for it with extra credit. ○ Maybe more interaction with fellow students during an online course. ○ Yes a review for the test becuase i feel like study all the information is to much. More activities that are on the online reading, it helps me more to see it then read about it. ○ The only change I would make to the course would be a slightly more relaxed submission time as people who take online courses are doing so because of an inconsistent schedule. ○ I have learned from each of the exercises in this class, but if I had to choose which part was least helpful it would be the discussion questions. I wish there was an option to take the lab on campus and the lecture portion at home. The labs take a great deal of time to perform at home. ○ I would like to have more time to complete the Midterm Exams,
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	and maybe two chances to complete them could be better than just one time.
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Responses for Professor Hinson:

Positive Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ As far as I understand, the way the course layout as well as the course materials and graded assessments are placed in the proper way. ○ No I believe that the layout and material is very good. I am trying my best but I think that the material is very good, I just think I am having difficulty understanding the material. ○ No. I believe the material provided preps one for taking the quizzes and exams. My own issue personally is that up to now, outside issues have kept me from properly preparing for the quizzes and exam. I hope to change that going forward in this class. ○ I don't see a problem with the course layout, material, or graded assessment therefore I would not make any changes. ○ I don't think so. • Week 11 <ul style="list-style-type: none"> ○ The course layout and online course materials are a good fit in my opinion. You're provided material, can study the material, then are presented with a practice test, then you can take the actual test. ○ As far as I understand, so far it is great. All the technicalities, video presentations, animations, online lesson materials, online lab materials, especially the progress check are highly appreciated. ○ Nothing I can think of.
Neutral Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ The instructor is great at giving direction to understand how to navigate the online courses. The quizzes that I didnt take, I still have no idea how that happened. More online videos and demos would be helpful. ○ The class is organized well, however I do think some of the tests have tricky questions that can easily be misunderstood. • Week 11
Negative Responses	<ul style="list-style-type: none"> • Week 3 <ul style="list-style-type: none"> ○ As mentioned previously, the scrolling window navigation is difficult at first. The lab quiz results are not available as far as reviewing what was missed. ○ I love the short videos in the lessons lab and I can stay focused and remember the material better when I watch the videos. I just wish that there could be less online text and more visual representation. ○ If the work load could be spread evenly throughout the weeks. Sometimes it is a ton of work and other times it is manageable. I work sometimes up to 50 hours a week and spend almost all of the rest of my time studying. And the studying is for one class only. I realize that teaching to yourself can be more time consuming than attending class. I am getting through it. The online lessons and interaction activities help tremendously. The formulas are mind boggling. The instructor is on top of everything. My other online instructors, not so much. ○ I would like to have the option of going to lab on campus instead of

	<ul style="list-style-type: none"> ○ purchasing a whole lab kit. ○ get rid of windows within windows ○ I would like more time to work on tests and quizzes. When I see the timer ticking down, I get stressed out and start to panic and when that happens, I have a difficult time remembering what I had just studied. ○ I would rather a virtual lab like I had in Biology 1409 than the at home lab in this class. There is too much room for error with all the lab materials in the house (including: wasting or losing materials and getting exposed to dangerous chemicals the may cause allergic reactions). ○ I think I would change the amount of work or maybe give more time to work on each lesson, as I think one week is too little to work on all the lesson. ○ I spend A LOT of time taking notes during the lessons so I can have a great understanding of the big picture of how things work. When it comes to the lesson quizzes, I feel like I have wasted by time because some of the questions are very detailed oriented and I haven't been able to absorb all of the details because there is so much information. ○ Too much course work and lab for a week. I work a full-time job and trying to perform 4.5 hour labs. Also, there should be a list provided at the beginning of the semester showing the lab materials needed that are not in the lab kit. I live on a buget and was not expecting to have to go to grocery store every week to buy things for the lab. ○ I think since this is a course for non-science major and pretty much just a requirement that many students are needing to get their degree the assignments and labs can be scaled down just a bit. ○ I would not include an overall test because we already take enough quizzes. I think one quiz for the lesson and one quiz for the lab is enough; furthermore, it is exhausting taking so many exams. <ul style="list-style-type: none"> • Week 11 <ul style="list-style-type: none"> ○ I would like to have more time to complete the Midterm Exams, and maybe two chances to complete them could be better than just one time. ○ Make quizzes occur less often with lab reports being weighed more heavily on. ○ There should be virtual labs, because there is too much room for error doing the labs the way we are doing them now. ○ I would suggest limiting labs to one per week instead of some weeks containing two because it can get hectic especially when you have other classes to take care of. Furthermore, I would suggest cutting back on the quizzes/tests. For example, maybe a quiz once in a while and two tests or keep all tests and no quizzes. I have learned many things, but sometimes it can get overwhelming. ○ Better announcements about discussion board deadlines... seems that even though the material for each week is due at the end of the week that when it comes to the weekend you're already screwed on the discussion board if there was one because part 1 was due earlier in the week when the reason i take online classes is because i can
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	<p>only do work on weekends due to work. So the discussion board deadlines were not posted anywhere except in the actual discussion board.</p> <ul style="list-style-type: none"> ○ Some lessons (chemistry lesson was especially difficult for me) would have been greatly enhanced by a video lecture. (found some online that helped, but would be nice to have one recommended and linked by the professor) ○ Videos from the teacher explaining the material. ○ Yes, I would revamp the whole layout of this course. This course is not laid out for an online student, this course is laid out for a lecture class. I feel most students take online classes simply because their life obligations will not allow for them to attend a classroom setting. I would remove the timed assignments. Making sure you save your answers takes time away from test time. I think ALOT of changes should be made to this class. ○ I understand material better answering chapters questions as assignments, rather than testing every week. I have test anxiety and with the ticking time clock moving down the screen, it makes it hard to concentrate on the questions. I feel like I am frantically cramming for the quizzes every week. The book has enough information in it to have to remember and adding more to it in the online lessons is overwhelming. I wish the online lessons only covered what was in our book chapter and was put in place only to help us understand its' material. The additional online material makes each week a serious challenge. I think less tests and more questions answering from the chapter material or questions that you have for us to answer as graded material would be better in helping understand the material. I am so busy just trying to learn the concepts, that I do not have time to answer questions that you put in place on line and from the chapter material. By the time I read the chapter, read the online lessons, do the interactions, lab, lab report, lab quiz, study for the lesson quiz or quizzes, and/or study for an exam, possibly write out vocabulary terms, there is not much time left. Please make a list of vocabulary terms that we can print off. It takes a long time to write out terms and is a huge pain. I probably spend anywhere from 15-20 hours a week on learning the material and work 50 hours a week. It is a lot. The material is clear cut, the instructor is super nice, prompt, and helpful. I am retaining some things at least. ○ I would not give more than one lesson or lab a week. It is very difficult sometimes to complete all the assignments with other things such as work. I can't speak for everyone, but I am taking the course online because it was the only way I could take it while working a full time job. Other than the time issue, the course is well organized. ○ I wish that it had been made clearer that this was NOT a self paced course before I signed up for it. I think most people work and some of us very long hours so when we get a break we could work ahead past one week. ○ Labs should not be done at home. This is one area that was hard for me. Can't ask questions (you can, but by the time you hear back
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	from the teacher its too late)
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Appendices

Associated Files:

Data and Charts for Pre-Test / Post-Test Results (BIOL1408_pilot_student_learning_data.xlsx)

Data and Charts for Student Surveys (BIOL1408_pilot_survey_data.xlsx)

Open-Ended Feedback from Student Surveys (BIOL1408_pilot_survey_feedback.xlsx)

Pre-Test / Post-Test Questions

1. A bird species exhibits variation in feather color, ranging from bright blue to a very dull gray-blue. A climate change causes a population of these birds to move to a new habitat farther south of their previous home. Another animal species in the new habitat begins to catch and eat the brightly-colored birds, reducing the bird population significantly. About 10 years later, feather color has become fairly uniform in the population, with almost all birds exhibiting gray-blue feathers. The change in feather color variation in this bird population is an example of _____.
 - a. mutation
 - b. sexual selection
 - c. evolution
 - d. pleiotropy
2. To ensure that conclusions can be drawn about the data collected during a scientific investigation, the investigator should try to _____.
 - a. keep all variables constant between conditions except the independent and dependent variables
 - b. follow the steps of the scientific method exactly as written
 - c. design an experiment that ensures the results will support the hypothesis
 - d. design an experiment that proves the hypothesis right or wrong
3. Carbon is a versatile element that forms the backbone of most organic molecules due to the ability of a single carbon atom to form four different _____.
 - a. phosphate bonds
 - b. ionic bonds
 - c. hydrogen bonds
 - d. covalent bonds
4. What chemical characteristic of a water molecule's structure enables water to function as the solvent that supports all cellular activity?
 - a. the presence of strong ionic bonds
 - b. the presence of polar covalent bonds
 - c. the presence of weak covalent bonds
 - d. the presence of nonpolar hydrogen bonds
5. The groups of organic molecules whose PRIMARY function is to store energy in living organisms are:
 - a. proteins and nucleic acids
 - b. carbohydrates and proteins
 - c. lipids and carbohydrates
 - d. nucleic acids and lipids
6. A protein's function is determined primarily by _____.
 - a. the sequence of amino acids in the polymer
 - b. the pattern of covalent bonding between monomers
 - c. the number and type of fatty acids in the polymer
 - d. the level of branching in the polymer chain
7. Eukaryotic cells store DNA inside _____.

- a. one or more densely staining nucleoli
 - b. the innermost layer of the Golgi complex
 - c. a double membrane-enclosed nucleus
 - d. a concentrated area of the cytoplasm called a nucleoid
8. A eukaryotic cell moves proteins and lipids from the endoplasmic reticulum to the Golgi complex through _____.
- a. endocytosis
 - b. vesicular transport
 - c. diffusion
 - d. protein channels
9. Unlike exergonic reactions, endergonic reactions require an input of energy to proceed. In living cells, many endergonic reactions are able to proceed because enzymes couple each reaction to _____.
- a. breakdown of ATP
 - b. degradation of glucose
 - c. photosynthesis
 - d. hydrolysis
10. Which of the following types of molecules are directly responsible for regulating the location and reaction rate for all the chemical reactions that occur in living cells?
- a. protein channels
 - b. enzymes
 - c. DNA
 - d. ribosomes
11. One function of the plasma membrane in eukaryotic cells is to _____.
- a. limit the diffusion of solutes out of the cell
 - b. synthesize transmembrane protein channels
 - c. prevent water from entering the cell
 - d. block entry of small gas molecules such as oxygen
12. A man places a bouquet of flowers into a vase containing water. The flowers and stems straighten and stiffen because the cells of these plants _____.
- a. lost solvent by osmosis
 - b. lost solutes by diffusion
 - c. gained solvent by osmosis
 - d. gained solutes by diffusion
13. The original source of energy for most living organisms is _____.
- a. sunlight
 - b. heat
 - c. glucose
 - d. protein
14. Plants perform photosynthesis to _____.
- a. produce oxygen for animals to breathe in
 - b. split carbon dioxide into organic carbon and oxygen gas
 - c. absorb light energy to warm the Earth's surface
 - d. transform light energy into chemical energy
15. The primary role of cellular respiration is to _____.
- a. reduce the atmospheric concentration of oxygen gas
 - b. transform chemical energy into mechanical energy
 - c. transfer chemical energy from various biomolecules to ATP
 - d. reduce oxygen gas into carbon dioxide
16. Compared to organisms that rely on aerobic respiration, organisms that rely on fermentation _____.
- a. do not use oxygen and produce fewer ATP molecules per reactant

- b. use oxygen and produce fewer ATP molecules per reactant
 - c. do not use oxygen and produce more ATP molecules per reactant
 - d. use oxygen and produce more ATP molecules per reactant
17. Imagine you scraped the inside of your cheek to obtain a sample of your own cells and stained the DNA with a special dye. If you viewed these cheek cells under a microscope, what stage of the cell cycle would you expect to see?
- a. anaphase
 - b. cytokinesis
 - c. prophase
 - d. interphase
18. The cell cycle of eukaryotic cells pauses at a checkpoint in metaphase of mitosis. The primary function of this checkpoint is to determine whether _____.
- a. every pair of homologous chromosomes has completed crossing over
 - b. every duplicated chromosome is attached to both spindles
 - c. the cell has successfully replicated its DNA
 - d. the cell is large enough to separate the chromosomes into two cells
19. What element of DNA structure allows it to easily transmit hereditary information to offspring?
- a. The exact sequence of nucleotides determines the unique 3D structure of each DNA molecule.
 - b. A DNA molecule is composed of two complementary strands.
 - c. A DNA molecule can be cut into fragments that regenerate the missing pieces.
 - d. DNA self-replicates without the need for an input of energy by the cell.
20. DNA polymerase recognizes mistakes during replication because _____.
- a. an incorrect nucleotide does not form a complementary base-pair with the template strand
 - b. an incorrect nucleotide cannot form a covalent bond with the previous nucleotide
 - c. the original DNA double helix is held nearby for comparison to the new molecule
 - d. DNA polymerase is an RNA enzyme with its own built-in template
21. Ribosomes contain an RNA enzyme that catalyzes an important reaction during which of the following processes?
- a. replication
 - b. mitosis
 - c. translation
 - d. exocytosis
22. Biotechnology has allowed scientists to isolate genes from human cells and create recombinant DNA vectors that produce high concentrations of the protein product in bacterial cells. Which of the following statements explains why it is possible for a bacterial cell to express a human gene and produce the correct protein product?
- a. The genetic code is nearly universal, allowing the codons in a human gene to be correctly read by a bacterial cell.
 - b. Laboratory strains of bacteria have been modified by addition of the required eukaryotic ribosomes and amino acids.
 - c. Scientists are able to use recombinant DNA technology to change the human gene sequence into bacterial codons.
 - d. Scientists transform the bacteria with a complete set of human tRNA molecules at the same time as the human gene.
23. Unlike mitosis, meiosis serves to _____.
- a. reduce the number of chromosomes by half
 - b. double the number of chromosomes
 - c. produce two identical sets of DNA
 - d. produce four identical sets of DNA

24. Which of the following is NOT a process that introduces genetic variation during sexual reproduction?
- crossing over
 - random fusion of two gametes
 - random alignment of chromosomes
 - cleavage
25. A normal woman gives birth to a son with an autosomal recessive disorder called PKU. The woman's husband declares that the baby must have a different father because he does not have PKU. The husband is _____.
- correct because an autosomal recessive disorder is only inherited when one or more parents displayed the trait
 - correct because an autosomal recessive disorder is only inherited from father to son
 - incorrect because autosomal recessive disorders can arise when both parents carry a single hidden allele
 - incorrect because PKU is frequently caused by the appearance of a new mutation during development
26. Why do individuals in the same species exhibit different phenotypes for many different inherited traits?
- Many genes are present in different forms, or alleles, within the same species.
 - Members of the same species inherit different chromosomes with different gene loci.
 - All phenotypes are affected by both genes and the environment.
 - Individuals change phenotype in response to selective pressure from the environment.
27. In humans, most of the known X-linked traits are caused by recessive alleles and are _____.
- only exhibited by females
 - more commonly exhibited by females
 - more commonly exhibited by males
 - equally exhibited by males and females
28. Aneuploidy results in birth defects and developmental delays such as those found in infants born with Down syndrome. Aneuploidy is _____.
- a collective name for the birth defects associated with exposure to teratogens during early development
 - an abnormal number of chromosomes that occurs when chromosomes fail to segregate properly during gamete production
 - an autosomal dominant disorder that occurs when offspring inherit a dominant allele from either parent
 - an autosomal recessive disorder that only occurs when offspring inherit a recessive allele from both parents
29. Which of the following correctly describes the relationship between seeds and fruit in flowering plants?
- Fruits are specialized structures that attract animals to enhance cross-pollination.
 - Fruits are specialized seeds containing nutrients that support development of a new plant.
 - Fruits are specialized structures produced when a seed begins to germinate.
 - Fruits are specialized structures that surround seeds and enhance distribution to new habitats.
30. Animals in a wide range of species appear structurally similar during the early stages of development. However, over time, the cells of an embryo begin to differentiate into tissues and organs specific to only one species. What controls this unique differentiation of cells?
- hormone signals sent by the mother
 - the organism's genome
 - the organelles contributed by the egg during fertilization
 - environmental cues during development

Survey Questions (*open-ended questions are starred*)

1. Do you know what is expected of you regarding course work?
2. Which of these statements best describes how you are performing in this class right now?
3. What difficulties have you encountered, if any, with course navigation?*
4. What difficulties have you encountered, if any, with understanding and meeting course expectations?*
5. Which course materials are you using regularly (at least once per week) to help you prepare for the graded quizzes, assignments, and exams in this course? Select all that apply.
6. Within the online LESSONS are several elements. Which online course materials are you using regularly (at least once per week)? Select all that apply.
7. Did the online course materials help you understand the topics better?
8. Which topics did you have difficulty understanding or learning? Select all that apply.
9. For each assigned LAB, several online elements are provided to help you prepare for the experiments. Which online lab materials are you using regularly (at least once per week)? Select all that apply.
10. Did the lab experiment(s) help you understand the topics better?
11. On average, how many hours do you spend working in a single online lesson (not including lab)?
12. On average, how many hours do you spend working on all elements of the course each week?
13. Are there any changes you would make to the course layout, online course materials, or graded assessments? If yes, please provide a description of what would you change and how it would improve your learning experience.*