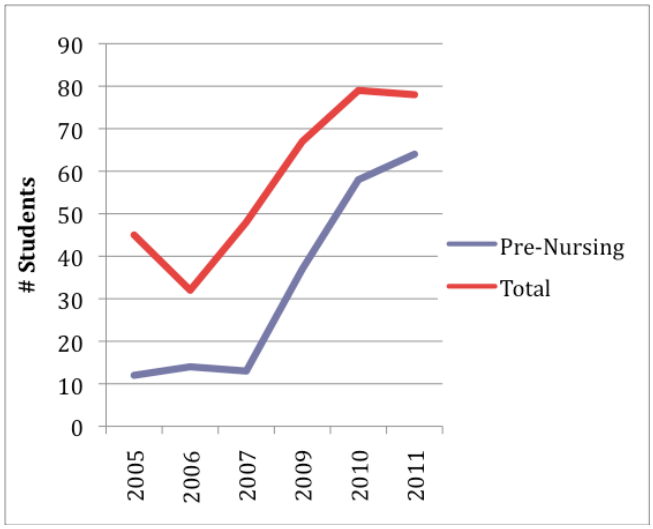
Biology 318 – Current Reporting & Assessment, Comparative Trends and Projections

Prepared by Boomer



Course Background and Underlying Question:
Enrollment in non-majors Microbiology (Biology 318, 4 credits) remains an ongoing challenge, owing to immense growth in pre-nursing and a "moving target" of Health/PE majors – many of whom pursue the Human Biology minor (which requires Biology 318). Currently on the table are questions regarding whether this course should remain 300-level, and whether it should remain a Human Biology Minor requirement.

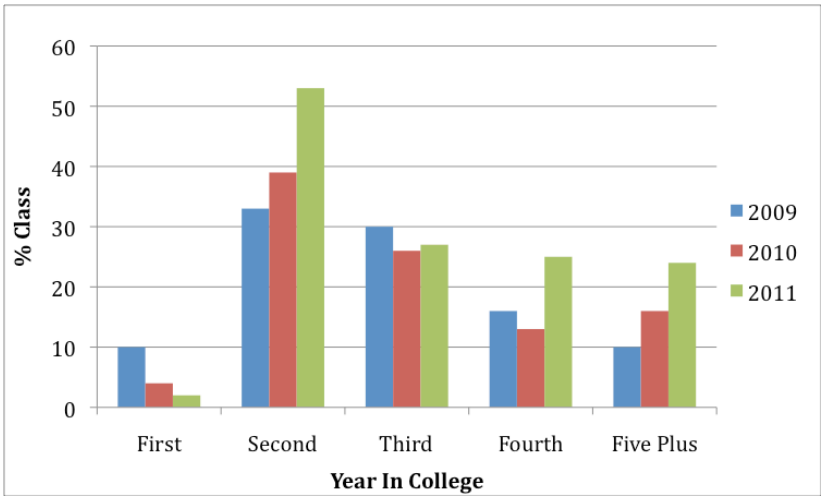
Prior to 2005, this course was designated Biology 218, 3 credits. In 2005-6, Lonnie Guralnick requested the 200-to-300 level/3-to-4 credit hour change to forward his perceptions about promoting a nursing program on the WOU campus. In fact, however: NO nursing program in Oregon requires Microbiology above the 200 level. Although I performed some curriculum changes as a result of this change, the level of difficulty was hardly advanced; rather, the additional lecture hour was primarily filled with active learning (e.g. more videos, quizzes) - to the point that I would argue that the course actually became easier. Even though active learning has improved exam performance by about 12.5%, there was never a serious learning or retention problem with this course to begin with – begging the additional question: should we go back to a 2-hour/week lecture, a move that would open the door to my teaching more majors/Biology 331 sections?

Overview of Assessment and Tracking:
Since 2005, I have been tracking or assessing the following: (1) Between 2005-7, I worked with Mike to retrospectively sort all Biology 318 students according to whether they were pre-nursing or not; (2) Between 2009-10, I formally assessed (using new materials developed during my 2008 sabbatical) some background, all content, and post-course attitudinal responses (resulting in a national presentation about the active learning component, as reported above); and (3) This year (and for the foreseeable future), I have scaled up my background survey but eliminated my content and post-course assessment. These enhanced background surveys have been aligned to other tracking surveys being used in our department, and contain additional questions aimed at teasing out questions about advising and degree planning that have – to date - remained muddy/insufficiently addressed.

Comparative Trends – Common Data 2009-Present:
(1) Increasing numbers since 2007, with a strong emphasis on pre-nursing (who have gone from 30% to about 70-80% of every given class). As shown in the first graph (above), student numbers in Biology 318 increased between 2007-10 (when the OHSU Nursing Program first began running WOU cohorts). It should also be noted that we began offering Biology 318 twice a year in 2009 for the first time in my history at WOU, increasing non-majors microbiology capacity from about 50 to 80 students per year. Contrary to Mike's projections, pre-nursing students continue to flood beyond winter term – representing the consistent majority EVEN in spring. Additionally, 3-5 Health/PE-Human Biology Minors have been turned away each term (winter and spring); course substitution forms were filled out such that these students took 300-level Psychology or Health/PE instead. This is a somewhat acceptable substitution so long as the students are not interested in epidemiology or health lab-oriented careers.

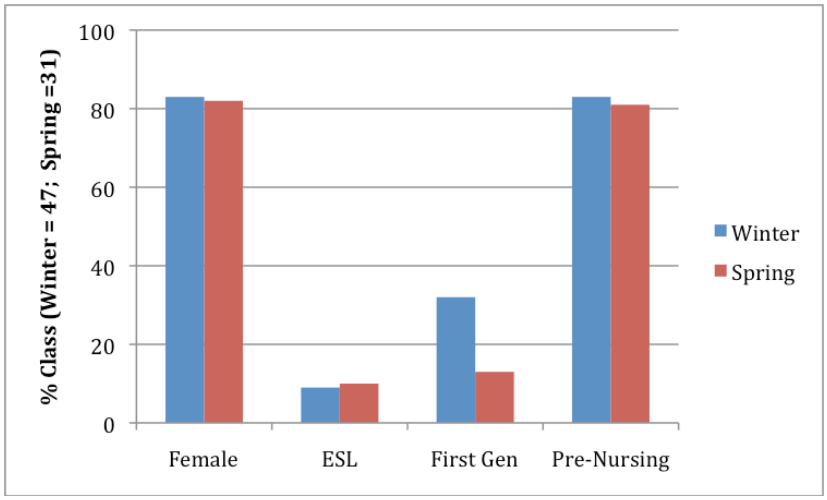
(2) Although most students take Biology 318 in their second year (as per pre-nursing advising by Mike), there have been increases in "beyond fifth year" students taking Biology 318 since 2009. Anecdotally, the

winter 2011 class contained three notable students (2 returning vets and 1 student with a masters in evolutionary biology) that represent unique non-traditional students – ALL pre-nursing.



New Survey Data for 2011:
As stated, background surveys were expanded = to align with other departmental instruments being used for tracking, and to attempt to tease out issues related to advising and long-term program planning.

1. In the following two figures, I have detailed new questions that better align with other departmental background survey instruments. These include questions about gender, ESL, first generation college status, and provide students with an expanded/open-ended way to reply to questions about career goals.



Non-Pre-Nursing (n=14)

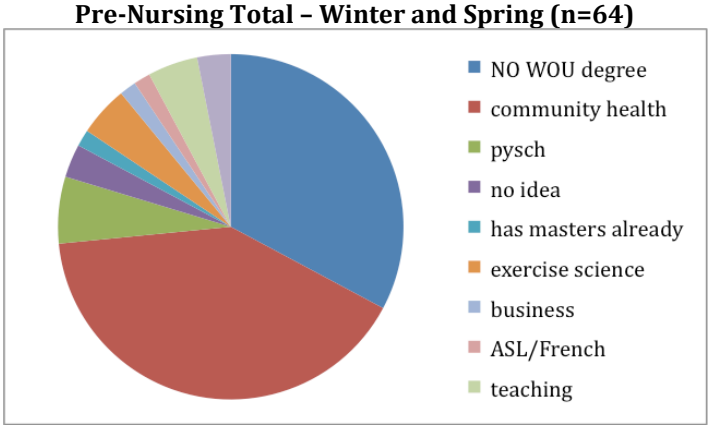
#	Career Goals
5	physical therapy/therapy
3	dental hygiene
2	personal trainer
1	Pharmacy sales rep
1	combat medic
1	epidemiology
1	sports med/physician

Comments

- Gender: Although distributions are consistent with other Biology 318 classes, they are unlike those in majors-level Biology 211 (which tends to be 50-60% female, assessed in 2009-10).
- ESL: I have not asked this question before so there are no previous data; Biology 318 data are consistent with distributions in majors-level Biology 211.
- First Generation Status: I have not asked this question before so there are no previous data; Biology 318 data are slightly higher than in majors-level Biology 211 (which tends to be ~25%).
- Career – Emphasizing Non-Pre-Nursing: Previous background surveys have only provided the following options: nursing, teaching, dental hygiene, lab scientist, public health, or other. This year (given a fair number of "other" in the past), I provided an open-ended area to explain "other."

2. In the following two figures, I have detailed responses to a new question that attempts to tease out issues regarding degree-planning. For these analyses, I have parsed the data according to pre-nursing vs. non-pre-nursing – the underlying goal being to determine whether pre-nursing students have a back-up plan and what that plan is. To date, no one has reported specifics about these issues and, given intense enrollment management issues with these students, this survey seems like a useful starting point.

Pre-Nursing Total – Winter and Spring (n=64)



Non-Pre-Nursing (n=14)

#	Alternate Degree Plans
6	community health
5	exercise science
1	NO WOU degree
1	teaching
1	no idea

Comments

- Pre-Nursing – WITH Back-Up Plan (n = 42): Most are pursuing community health degrees and in their third year or beyond. Based on conversations with Mike, it sounds like he doesn't talk "back-up" options until after their second year (i.e. after they have applied and not made it in).
- Pre-Nursing – WITHOUT a Back-Up Plan (n = 22): these students state that they will not be pursuing a WOU degree and most (68%) are in their second year.
- Non-Pre-Nursing (n = 14): These students are more variable, with a bias towards HPE degree options. Only one (who wants to be a personal trainer) does not plan to pursue a WOU degree.

3. In the following table, I have detailed responses to a new question that attempts to tease out issues regarding Human Biology Minor interest. The underlying goals for this question are two-fold: (a) same as last question; and (b) to address questions about the future of non-majors Microbiology in this minor.

	100% Certain	50% Certain	No Chance	Blank
Pre-Nursing (n=64)	31	16	17	0
Non-Pre-Nursing (n=14)	10	2	1	1

Comments

- Pre-Nursing: 48% are entirely certain they will pursue a Human Biology minor, with the rest split between 50% certain and NO CHANCE. These data seem at odds with responses to the previous question about degrees. Not sure what that means, other than possibly the students are confused.
- Non-Pre-Nursing: 71% are entirely certain they will pursue a Human Biology minor, with the rest split between 50% certain, no chance, and blank. These numbers seem more consistent with the previous question –with students who are consciously planning their degrees and minors.

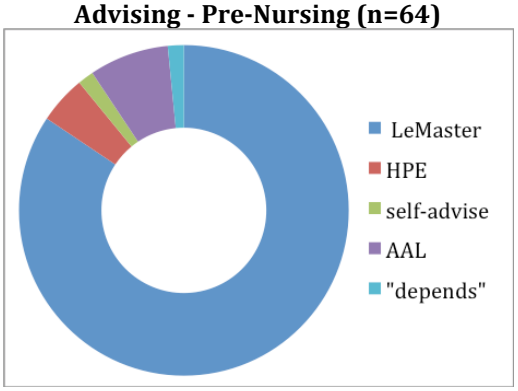
4. In the following two figures, I have detailed responses to a new question that attempts to tease out issues regarding advising. For these analyses, I have parsed the data according to pre-nursing vs. non-pre-nursing. The underlying goal of this question is to get a better handle on advising for Pre-Nursing, which remains poorly tracked.

Comments

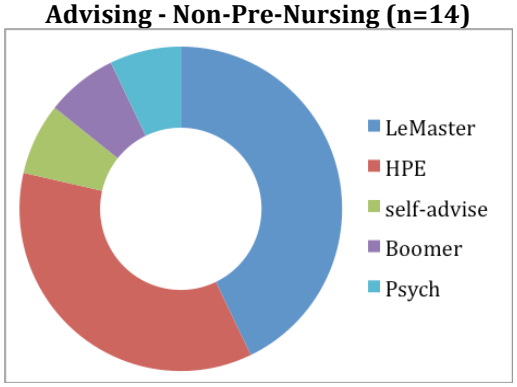
- Pre-Nursing: 87% of these students are being advised by Mike (who provides early registration for this course). The rest are advised by AAL, HPE, or no one (of concern).

- Non-Pre-Nursing: 62% of these students are also being advised (all or in part) by Mike, including students interested in Exercise Science, epidemiology, and PT. The rest are being advised in HPE, including students interested in pharmacy sales, personal trainer, and combat medicine.
- Mike's Advising Load: Given that it is clear Mike is advising the majority of BOTH groups (77% of ALL students), I decided to parse data into the more detailed tables that follow.

Advising - Pre-Nursing (n=64)



Advising - Non-Pre-Nursing (n=14)



LeMaster's Advisees (n=61), Pre-Nursing = Yellow

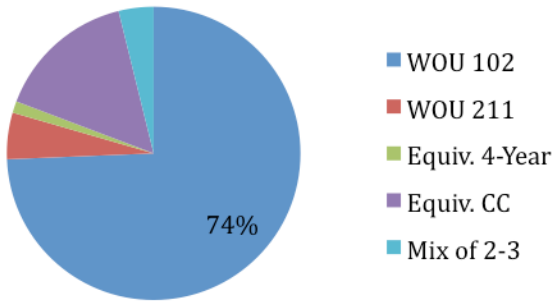
50	Pre-Nursing
1	Pre-Nursing or lab/public health
1	Pre-Nursing or Psych
1	Pre-Nursing or Psych (advising w/Psych)
1	Pre-Nursing (advising w/AAL)
1	Pre-Nursing or Pre-PT
2	Pre-Dent Hyg
1	Pre-PT
1	Pre-Ed or Personal Trainer
1	Pre-PT (advising w/AAL)
1	Public Health (advising w/Hammermeister-HPE)

OTHER Advisee's (n=17), Pre-Nursing = Yellow

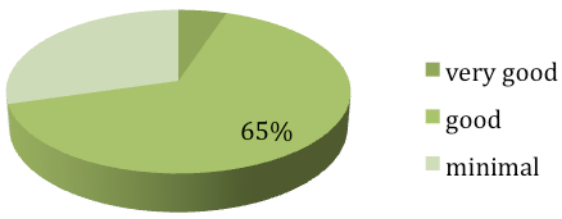
1	Pre-Nursing - Hammermeister/HPE advising
1	Pre-Nursing - Thomas/HPE advising
1	Pre-Nursing - Martella/HPE advising
5	Pre-Nursing - AAL
1	self-advising Pre-Nursing
1	Pre-PT - Farrel/HPE
1	Pre-Med/Sports - Armstrong/HPE advising
1	Combat Medic - Strander/HPE advising
1	Pharm Sales Rep - Thomas/HPE advising
1	self-advising Pre-Dent Hyg
1	Pre-Dent Hyg - Boomer advising
1	"therapy" - Psych advising
1	Personal Trainer - Caster/HPE advising

5. In the following two figures, I have detailed responses to a new question that attempts to tease out issues regarding where students are taking Biology 102 (introductory cell/genetics equivalent), the only pre-requisite for Biology 318, and how they self-assess/rate their knowledge of this material. The underlying goal of this question is to make sure students understand that they have to understand basic cell biology and genetics for this course. In a separate question (that did not warrant a graph), I also asked what additional Biology coursework they had taken.

All – Cell/Genetics Pre-Req. (n=78)



All – Cell/Genetics Self-Assessment (n=78)



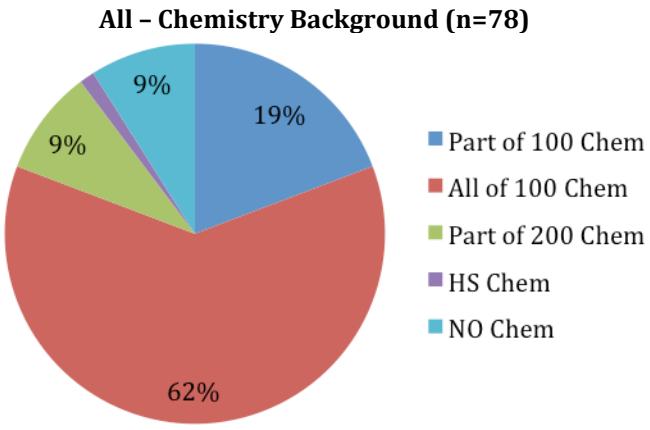
Comments

- The majority (74%) of students take the Biology 102 pre-requisite at WOU. Many (16%) take equivalent coursework at community colleges. A few (5%) come in with Biology 211 from WOU,

suggesting they began as Biology Majors and left the program within their first year (this number is down from previous years, which tended to run ~10%).

- The majority (65%) of students rate their knowledge of basic cell/genetics as "good" – with 30% rating this knowledge as "minimal."
- Half (52%) of all students had finished a portion of the 200-level A&P series; 31% had completed the whole thing. A few students mentioned taking other Biology 100 or 200 courses but 3 (all from spring) stated they had taken ZERO other biology courses.

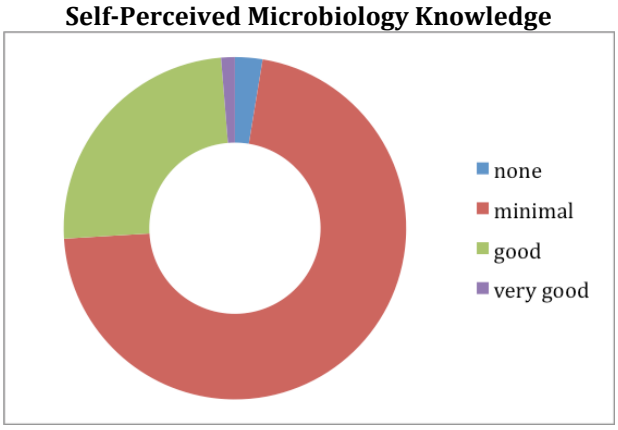
6. In the adjacent figure, I have detailed responses regarding Chemistry background. Although I tried to survey math background, bad wording makes responses pretty meaningless.

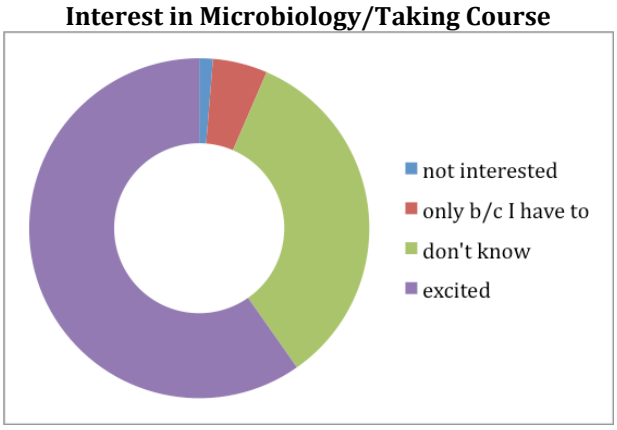


Comments

MOST (81%) of students have taken part of all 100-level chemistry, which is higher than observed in 2009 (data = 50-60%). Those who report taking 200-level chemistry (9%) may have begun as Biology Majors – although this is double the number reporting Biology 200 series background in previous section.

7. And, lastly: I have detailed responses regarding students' perceived pre-course microbiology knowledge and interest, a longstanding question on all my surveys.





Comments

- The majority (55%) of students report knowing minimal microbiology.
- The majority (46%) of students report being very excited to take microbiology.

2011 Biology 331 – Tracking Report, Trends and Projections – Boomer

Introduction

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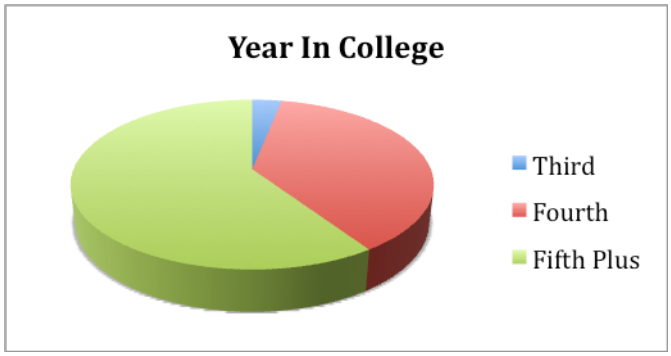
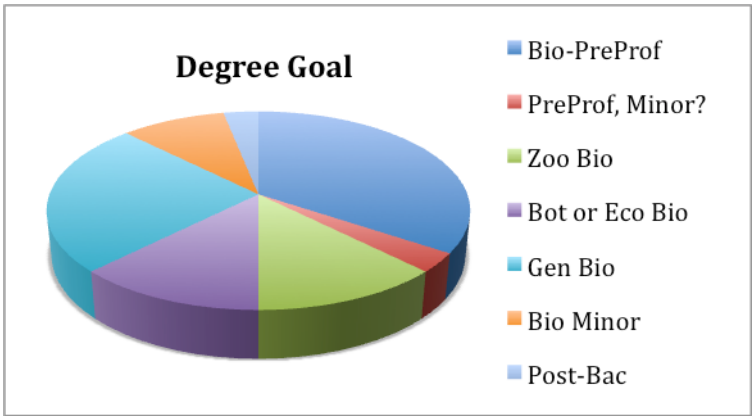
1. There are more males (56%) than females. This is slightly higher than ongoing 211 data.
2. All but one are non-ESL. This is DOWN from ongoing 211 data.
3. Almost a third (28%) are first generation. This is UP from ongoing 211 data.
4. Most (95%) are in their fourth or fifth(+) year.



Goals of BI 331 Students in 2011

Stated Degree Plans

Most (33%) are PreProf (plus 1 confused!). This is WAY DOWN from ongoing 211 data! The next biggest blocks are GenBio (25%), Bot or Eco (12.5%) and Zoo (12.5%). Finally and notably, 10% are Biology Minors; in my opinion, advisors need to discourage BI 331 for minors because of the ongoing space crunch!



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For this, I presented tables – separated in terms of Health (56%) vs. Non-Health Science folks. Of note, there is a BIG discrepancy between students seeking PreProf degrees and students stating they want advanced Health Science careers. This is a worrisome advising situation – particularly because MANY of these folks did not specify a target Health Science career.

10% students reported changing plans in last year

Health Science

#	Specific Career
5	NOT specified
3	Dentist
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5	PA
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1	PT

Non-Health Science

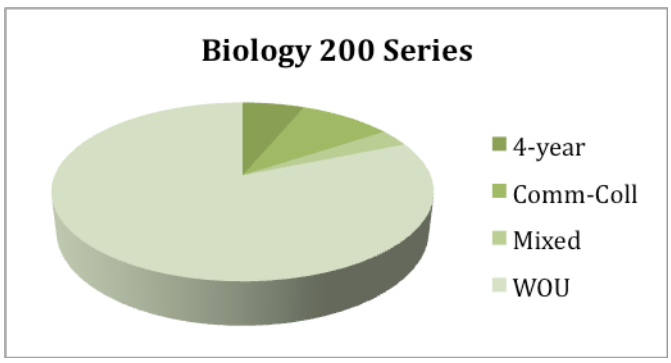
#	Specific Career
4	Science Teacher
5	Research Biology
1	Computer Science
1	Wildlife Biology
1	Math Teacher
1	Writing - no idea?

**one student left this question BLANK*

Preparation and/or Pre-Req Background

Biology

Most (82%) students took BI 211-2-3 at WOU. All self-rated their knowledge of BI 211 as good to very good. Next year, BI 331 WILL require Genetics. Most (94%) students had taken Genetics (84% also took Cell). Notably, 2 students (both minors) had taken NEITHER Genetics or Cell. This new pre-req should solve part of the aforementioned minor problem.



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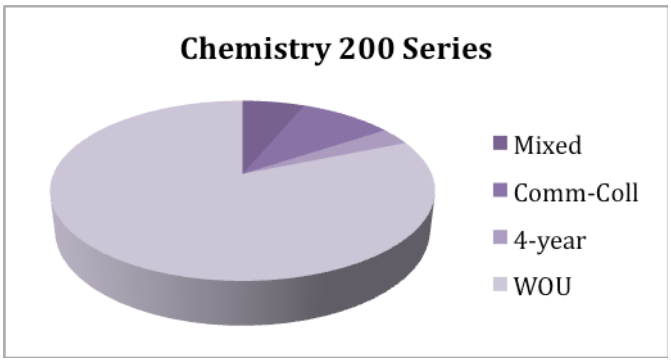
Same distribution as BI 211-2-3. Although I attempted to ask about additional chemistry coursework, I got a weird diversity of answers that suggests I need to change my question/expand my options. Having said that, I can report that 34% have taken NO additional chemistry, and 38% have finished Organic and Biochem. Several others appear to have started either series but left.



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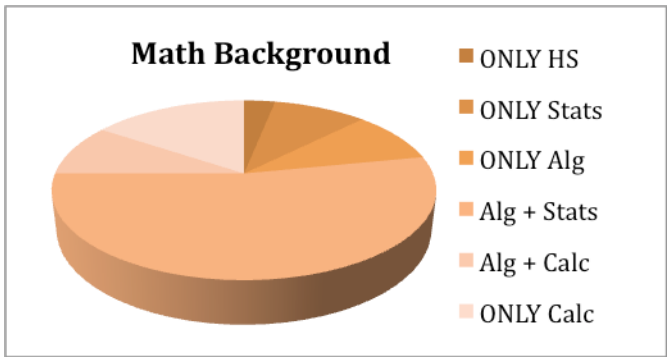
Although no Math pre-req's exist (or will exist) for BI 331, we are adding a College Algebra (Mth 111) pre-req to Genetics and Ecology. Based on these data, 72% of BI 331 students have taken College Algebra. Of the remaining students, most have taken more advanced college math – but 1 had NO college math.



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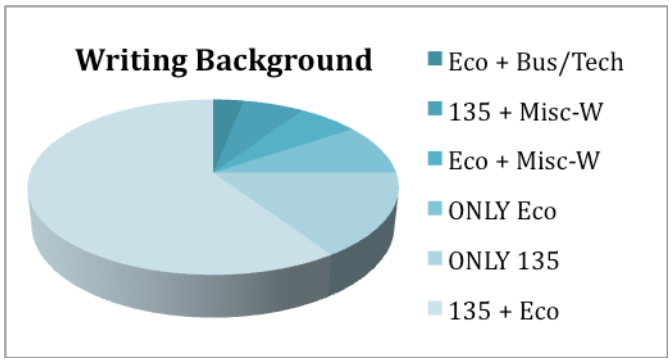

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Despite several major or minor concerns, the planned remodel – in conjunction with new pre-req's in Genetics/Math and Writing – should solve most of the current enrollment/space problems. Although it might be interesting to analyze final grades against many of these survey data, I'm not sure it will be informative given pending changes on the horizon.

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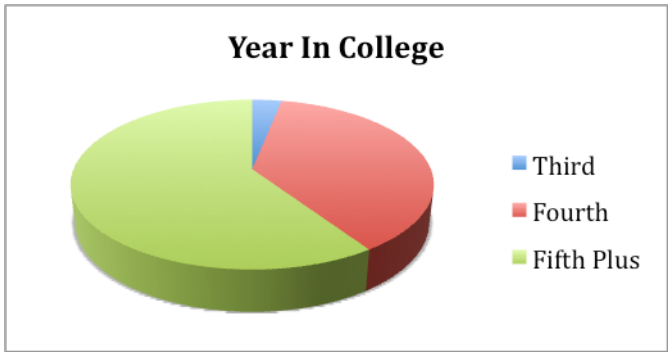

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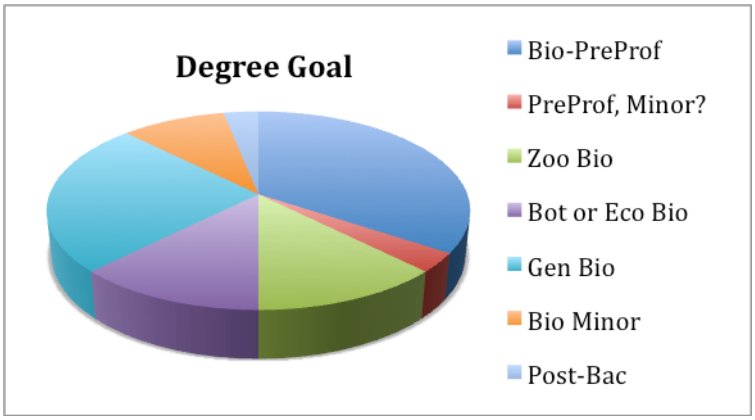

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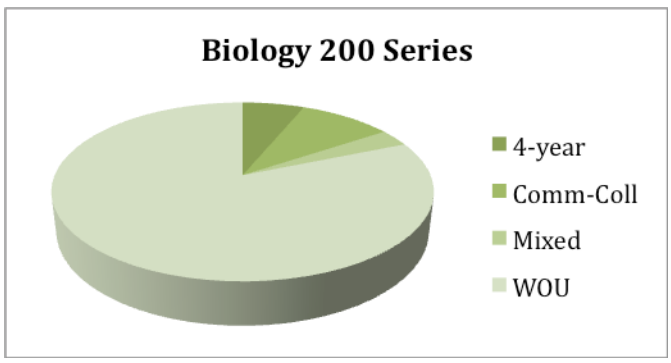

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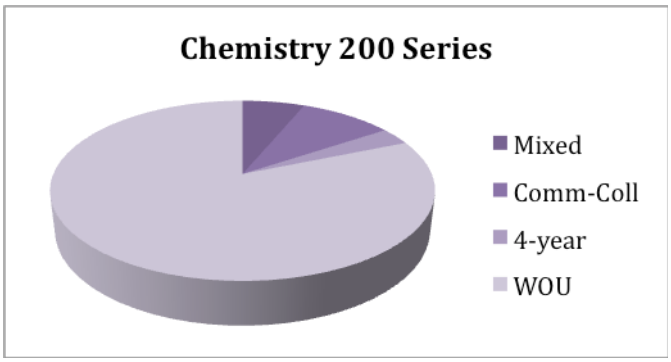

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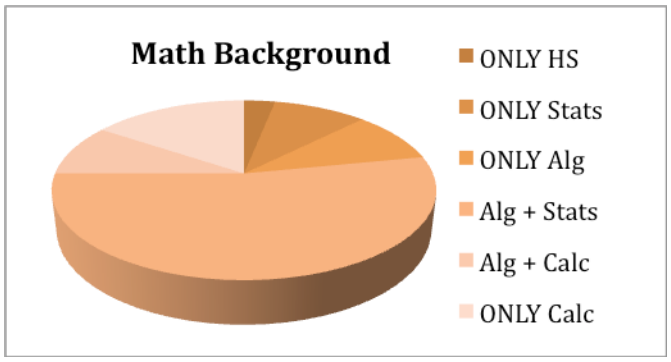

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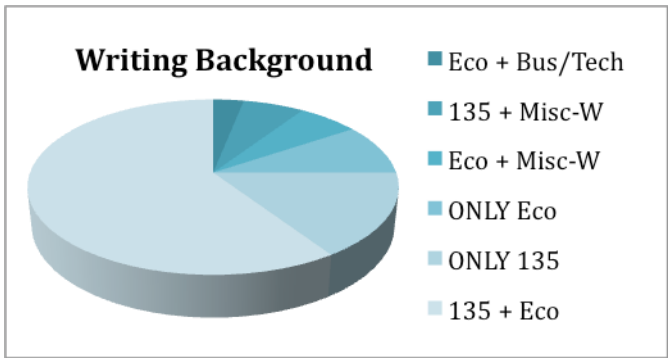

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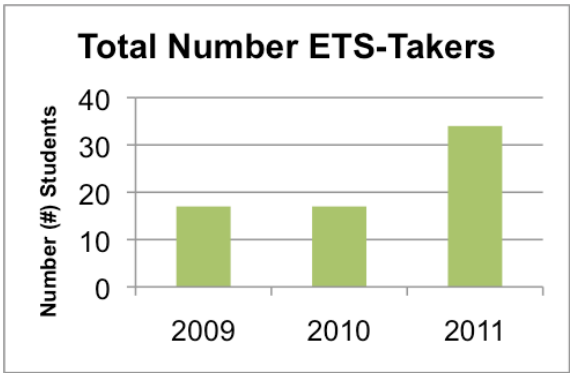
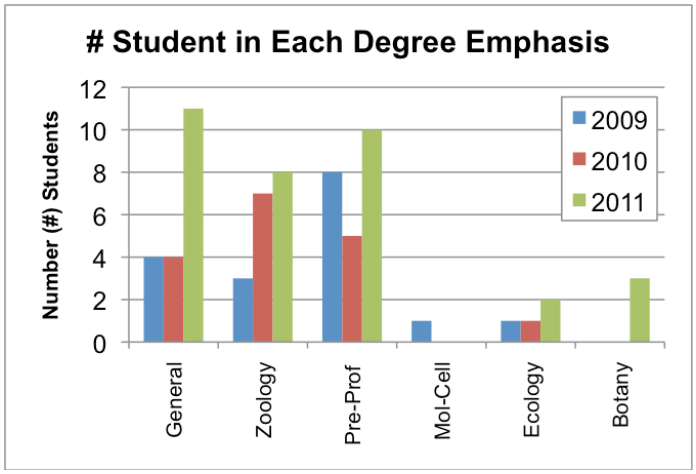
Biology Exit Exam Survey – Comprehensive Comparison 2009-2011
Administered by Dutton, Baumgartner, Boomer, Latham, Haberman
Compiled By Boomer (maintaining database, raw data)

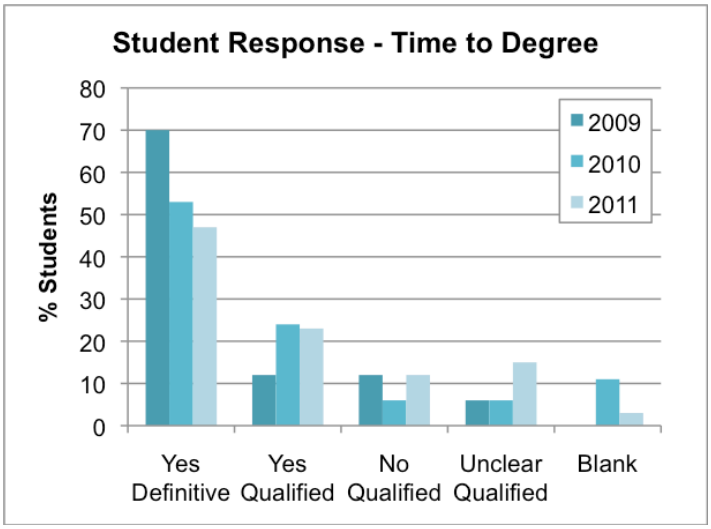
General Description:
To assess soon-to-be graduating Biology Majors, we developed an exit survey (appendix 1) and administered it to all students immediately following completion of the ETS biology content exam.

Total Numbers of ETS-Takers/Emphasis Distribution:
Although 2009-10 numbers were typical of previous years (n=17, 59% female), our numbers in 2011 DOUBLED (n = 34, 65% female) – supporting observed enrollment trends in 200 and 300 series courses for the past three years. The most popular emphases remain General, Zoology, and Pre-Professional (each averaging 6-7 per year) – but students also pursue Ecology, Botany, and Molecular-Cell.





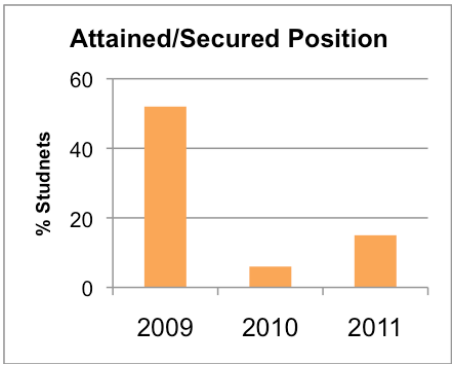
Time to Degree – Changes, Attitudes
The reported time to complete a degree has incrementally dropped from 4.8 years to 4.5 years. Likewise, the number of students who change their plans has also dropped (from 53% to 41%). Despite these seeming improvements, however, the number of students describing this time as "reasonable" has also incrementally decreased, dropping from 70% to 47% (2010). Meanwhile, the number of students providing qualifications/feedback has increased:



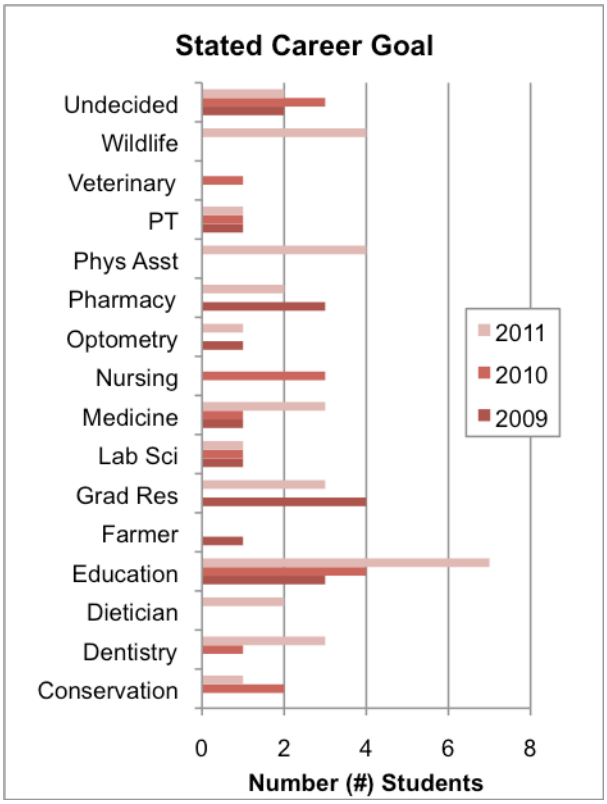
2009	2010	2011
1 - more offerings*	3 - too many classes***	5 - indecisive
1 - transfer	1 - indecisive	3 - started too late
1 - CC too long**	1 - football	6 - more offerings*
2 - indecisive	1 - CC too long**	1 - kids, work
		1 - "being smarter"
5 total	*5 total*	*16 total*

*more offerings = students felt Biology was not offering necessary coursework frequently enough
**CC too long = Community College added too much time and too inappropriate coursework
***too many classes = students could not cope with taking more than two science courses at once

Goals – Attaining, Securing, Attitudes
Generally speaking, the degree to which students expressed satisfaction about the time to degree (or advising – see last section) was inversely related to whether students reported attaining/securing a position in line with their post-graduation goals. Likely reflecting the poor economy, there has been a dramatic drop (53% to 6%) in the number of students attaining/securing a position related to their post-graduation goals between 2009 and 2010 – with some improvement (15%) in 2011.



The kinds of goals students have reported each year have been diverse and increasing (see adjacent summary graph), represented by 9 choices in 2009 and 2010, and by 13 in 2011. Although most choices are traditional things we advise, some recent additions (e.g. dietician, wildlife, and conservation) are increasingly beyond our areas of expertise. Taken together with increasing student feedback about advising (see last section), some of us are concerned that our advising capabilities are being spread way too thin.



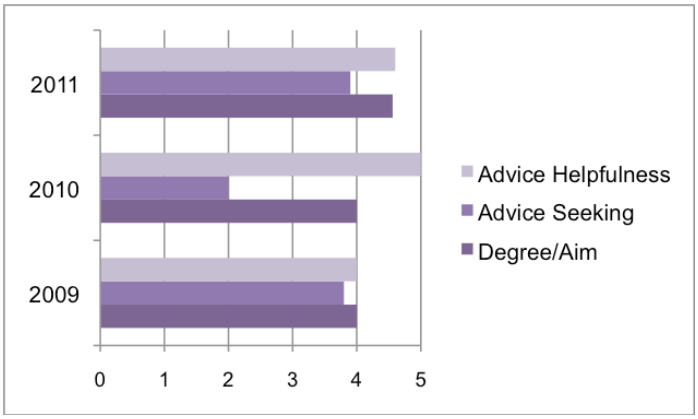
Who Was "Successful?"

2009	2010	2011
1 – Lab Science		
1 – Farmer		
2 – Graduate/Research	1 – Graduate/Research	
1 - Optometry		
2 - Pharmacy		
2 - Education		4 - Education
		1 – Dietician
9 total (52% cohort)	*1 total (6% cohort)**	*5 total (15% cohort)*

*We have learned that 2 more from this cohort have attained/secured goals this year, meaning that their "success" rate went up to 21%. Those students were in Medicine, and Education. We have been unable to track down data about any other former students.

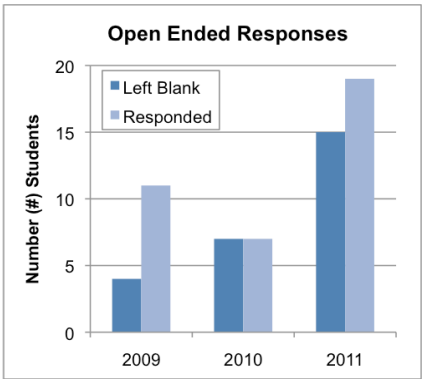
<u>Attitudes About Degrees and Advising</u>

Using a Likert scale (5 = very much/very; 1 = not at all/none), students were asked about the following: (1) most students felt their experience in Biology would impact their career (average = 4.2/5 rating); (2) in terms of seeking advice from Biology Faculty about professional aims, students reported seeking advice to a lesser degree (average = 3.23/5) – but (3) the advice they received was very helpful (average 4.5/5).



<u>Anecdotal Responses, Open-Ended Question</u>:

The final question of this survey was an open-ended question that asked what other things Biology Faculty could do to assist future graduates. As was noted in other sections, the degree to which students expressed feedback was somewhat related to whether students reported attaining/securing a position in line with their post-graduation goals. The most frequent responses (highlighted in green) regarded offering classes more frequently, providing more information about practica, and not changing anything because we're great!



Responses Appearing More Than Twice

	2009	2010	2011
Classes should be offered more often.	2	1	2
More volunteer experiences, practica, etc.	1	1	6
Students need to take more responsibility.	1		1
You're great – keep up good work!	1	2	3
Advisors are too busy; need more advisors.		1	1
More career counseling or job assistance.	1		2
Advise more national programs – not just OR.			2
Emphasize more courses related to career.	1		1

All responses are archived in individual annual Exit Survey Reports.

Department of Biology – Exit Tracking Assessment

In order to better serve our majors and campus accreditation, we are collecting data about professional aims and/or placement of our graduates. Survey data will only be used for assessment purposes. Thank you for your assistance!

1. Name: _____

2. Which Biology Degree track did you complete? _____

3. How many years did you take to complete your degree? _____

4. Do you feel this was a reasonable amount of time? If not, what could have helped you finish more quickly?

5. At this time, what is your intended professional aim? _____
   e.g. medical school, lab technician, secondary education…

6. Did this change during the course of your undergraduate education? If yes, please explain how.

7. Have you secured your current professional aim at this time? _____

   - If **YES**, please describe where you were hired or accepted:
     e.g. OHSU Medical School, Oregon Dept. of Agriculture, Salem Public School…

   - If **NO**, please describe your immediate career plans:

8. If possible, please provide a permanent email (preferred) or snail mail address where we can contact your with follow-up questions regarding your professional development.

9. How much do you believe your undergraduate Biology experience will factor into your long-term professional aims?

(Very Much) 5 4 3 2 1 (Not at All)

10. How much did you seek professional advice or recommendation from Biology Faculty?

(Very Much) 5 4 3 2 1 (Not at All)

11. How helpful did you find the advice from Biology Faculty?

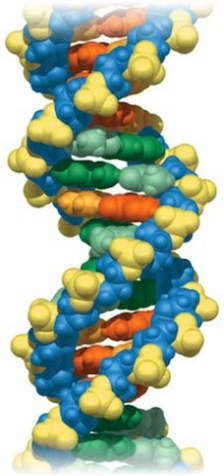
(Very) 5 4 3 2 1 (Not at All)

12. What other things do you believe would be helpful for Biology Faculty to do to assist future graduates in terms of securing professional goals?

13. Would you like to receive future mailings about the Biology Department? _____

Finally, we hope you will consider sending us updates about your professional development in the future – specifically please contact Sarah Boomer (boomers@wou.edu) who is archiving career-related exit data.

Non-Majors Biology Offerings in 2011-12

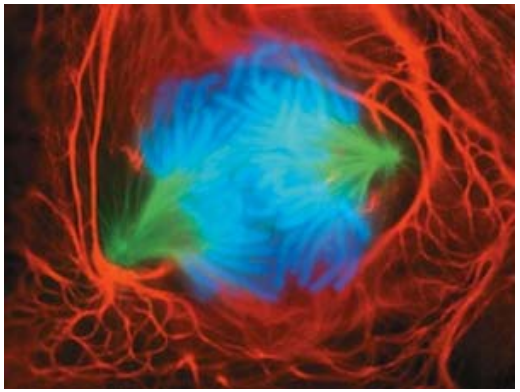


Did You Know?

These courses focus on biology relevant to everyone and everyday life!
None of these courses has any pre-requisites!
You can take ANY single course, or any set of courses in ANY order!
Any of these courses count toward the LACC Lab Science requirement!

What Will I Learn About In Each Course?

Biology 101	Biology 102	Biology 103
Ecology	Biological Molecules	Basic Anatomy & Physiology
Diversity of Life	Cell Structure & Function	Plant Structure & Function
Introduction to Evolution	Genetics and Inheritance	Animal Structure & Function



When Are Each Offered? / How Many Seats Available?	**Fall 2011**	**Winter 2012**	**Spring 2012**
	Bl 101 (216 seats!)	Bl 102 (384 seats!)	Bl 101 (288 seats!)
	Bl 102 (288 seats!)	Bl 103 (48 seats!)	Bl 102 (120 seats!)

Photo Credits: all images from Campbell Biology, Reece et al., 2011

Biology 211 Active Learning Assessment Report – 2010, With Key Comparisons to 2009

To: Biology Department **From: Boomer**

Report Sections

1. Overview – History, BI211 Content Changes, Active Learning Goals/Activities
2. Pre-Test/Background Information – 2009 vs. 2010
3. At-Risk and Pre-Test Summary – 2010 Only
4. Learning and Retention Evaluation – 2009 vs. 2010
5. General Efficacy Ratings – Boomer 2010 Only
6. Active Learning Efficacy Ratings – Boomer 2010 Only
7. Student Behavior, Observed and Reported – Boomer 2010 Only
8. Summary, Workload, and Thoughts About the Future

Section 1: Overview – History, BI211 Content Changes, Active Learning Goals/Activities

Last year, I presented the first major assessment report for BI211 – including a number of recommendations for improving student advising and preparation. These included the following:

2009-10 Recommendation	Actual Follow-Up/Boomer Commentary
1. Additional Pre-Course Surveys, At-Risk Advising	DONE, but not very productive or predictive
2. More Active Learning	DONE, well-received by students but little improvement
3. Expansion of Pre-Test Content – Predictive?	ATTEMPTED, but not very predictive
4. Change Labs – New Content, Improvements	DONE, well-received
5. Scholarly Products – Presentations, Publications	DONE, ASM-CUE abstract, ASM-JMBE manuscript

This year, Kristin and I taught the first FOUR-HOUR/WEEK BI211 lecture schedule in the history of WOU (as I know it). Honestly, I found it VERY exhausting. Those retrospective feelings aside, every effort was made to NOT add more content (although some was added – see below) but, rather, enhance student engagement via active learning exercises (see below). Indeed, a paper about active learning by Freeman et al. saw learning/retention improvements of 12-15% - which was highly motivating.

Unit - Lecture	Content Additions (As Compared With 2009) - Lecture
Biology/Science, Bio-Mol, Cells	More Evolution and Scientific Method 10% More Bio-Mol (e.g. added sat, unsat, trans fats)
Membranes, Metabolism, Signaling	Signaling moved from end of class to this unit – but no content added
Cell Division, Genetics, DNA	10% More History of DNA
Central Dogma, Gene Expression, Applications	10% More Gene Expression, NEW Virology Lecture, 50% More Biotechnology

Unit - Lab	Content Changes (As Compared With 2009) - Lab
1	No Lab Week One; No Explicit Scientific Method Lab (attempted in lecture… so-so/wonky)
2	HEAVILY Revised, Some New Photosynthesis Activities
3	HEAVILY Revised and More Comprehensive Genetics Lab
4	Added Dusted-Off Plasmid Lab, NEW Transformation/Gene Regulation Lab

In my section, active learning consisted of several things – some graded (including pop quizzes and pop homework), some ungraded. In terms of graded activities, active learning assignments were worth 2 points each – and there were 6 such assignments per unit. Of the 12 total points available per unit, only 6 were counted, meaning the rest were extra credit (i.e. 24 points extra credit during whole term). I also held it constant that there would be 2 quizzes per unit, and 2 pop homework assignments per unit.

Unit	Boomer's Active Learning – Graded	Boomer's Active Learning - Ungraded
1	In-Class Scientific Method Analysis 2 Pop Quizzes	On The Spot Chemistry and Bio-Mol Problems Bio-Mol Building/Modeling Exercises

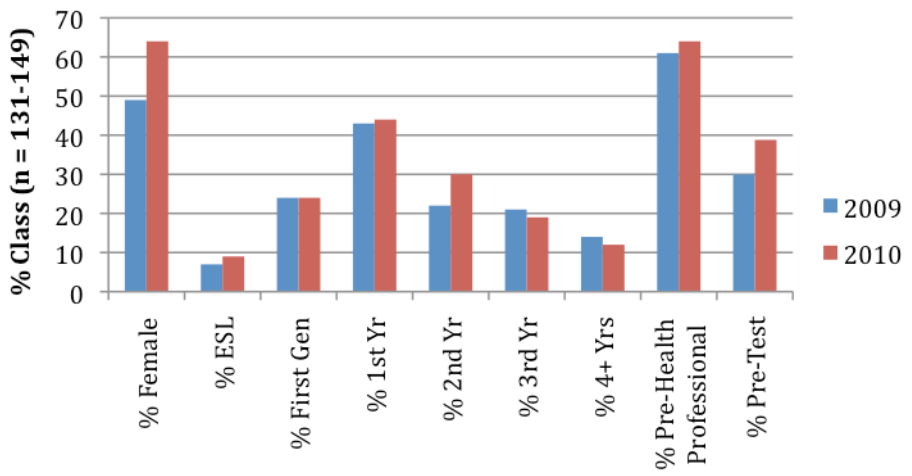
	2 Pop Homework Collections Protein Folding/Modeling Exercise	On The Spot Cell/Microscopy Problems Exam Writing/Review Exercise
2	3 Pop Quizzes 2 Pop Homework Collections Exam Writing/Review Exercise	On The Spot Membrane Problems On The Spot Energy Problems Metabolism Modeling Exercises
3	2 Pop Quizzes 2 Pop Homework Collections In-Class Replication Drawing Exercise Exam Writing/Review Exercise	On The Spot Cell Division Drawing Problems On The Spot Genetics Drawing Problems THREE Lecture Hour Equivalents of Genetics Problems… MOST Involving Human Disease/Relevant Issues
4	2 Pop Quizzes 2 Pop Homework Collections Gene Regulation Worksheet Video – Human Genome Project Write-Up	ONE Lecture Hour Equivalent of Central Dogma Problems… Half lecture of On The Spot Transcription Half lecture of On The Spot Translation Exam Writing/Review Exercise

Section 2: Pre-Test/Background Information

Given the aforementioned Freeman paper, an obvious long-term interest was to determine the efficacy of active learning on our students – with the ever-present goal of improving learning and retention. Consequently, carefully describing and comparing our students in 2009 (no active learning plan in terms of lecture) vs. 2010 (major active learning plan in terms of lecture) was important. Here is a synopsis of key background data collected for both Kristin and my classes from 2009 and 2010. It should be noted that I did not report some survey data (e.g. self-assessment of knowledge in BI211 units).

<table>
<tr>
<td>Basic Information
Although there were similarities (e.g. ESL, generation, % Health Science), there were THREE big differences (t-test = 0.17), which complicate further analysis.

Gender (MORE females, 2010)
% Second Years (MORE, 2010)
Pre-Test (HIGHER, 2010)*

*observed however data were compared – all questions, just assessment questions, just same assessment questions!</td>
<td> 
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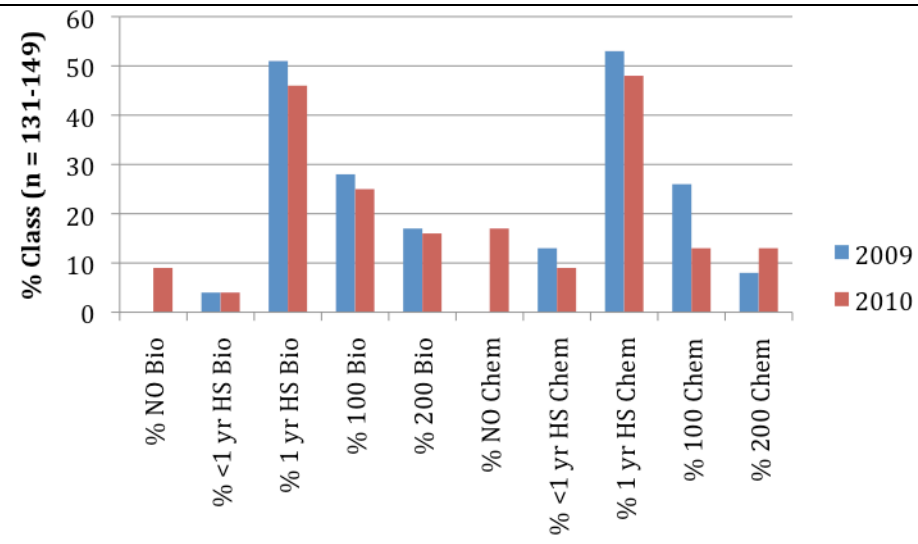
<tr>
<td>Previous Science
Although there were some similarities, there were also differences (t-test = 0.11). Most problematic: last year, we did NOT provide students with the option of reporting “NO biology or chemistry” between 9-12th grade. As evidenced this year, a fair number of students reported this option. ALSO – some students hand-wrote that they only learned A&P topics in HS or college… not cell/genetics.</td>
<td> 
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Section 3: At-Risk Summary

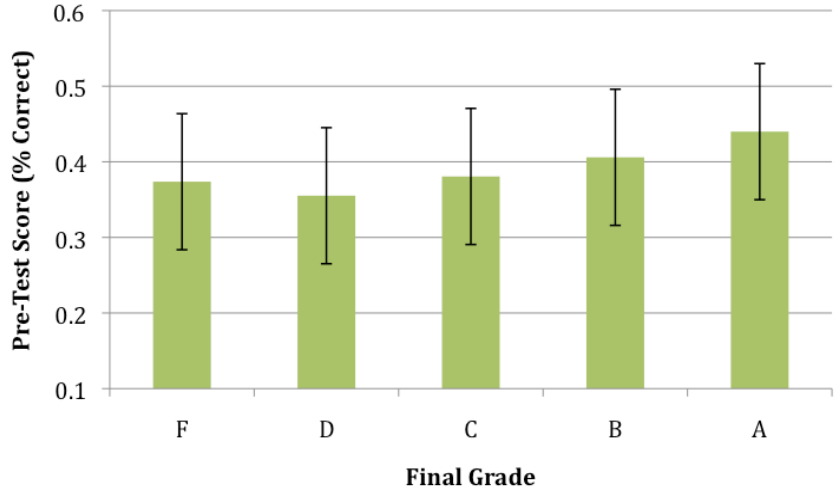
Given 2009 evidence suggesting some correlation between pre-test scores (using a more limited content exam with 33 assessment questions) and final grades, we expanded the pre-test to include 24 assessment questions (15 were IDENTICAL to those from 2009) plus 36 "easier" questions focused on basic topics like chemistry, bio-molecules, and cells. Our hope was that this expanded exam would provide better predictive resolving power. We used pre-test data to define 29 "at-risk" students (all earned <30% on the pre-test – where the class average was 39%), meeting with each 15 minutes during week one (total = 7 hours). Although we (at the time) felt an additional 10 could have benefited from advising, workload issues ultimately won out. Here is a summary of what happened with at-risk students:

Post Meeting	#	Final Outcome	Comments
left biology	2	No more to say	
switched to 100	4	Need to hear from 100 instructors	Bockelman, Mendenhall, Jansen, Hill
uncertain	1	ultimately stayed course	failed (58%)
never came	1	never came, never dropped	failed (0%)
stayed the course	1	withdrew before week 5	failing at the time
stayed the course	1	medical withdrawal after week 5	failing at the time
stayed the course	19	21% Failed and 37% Earned D's 32% = C's and 10% = B's or A's	The average of this group was 67% vs. class average of ~71%.

Section 4: Learning and Retention Evaluation – 2009 vs. 2010

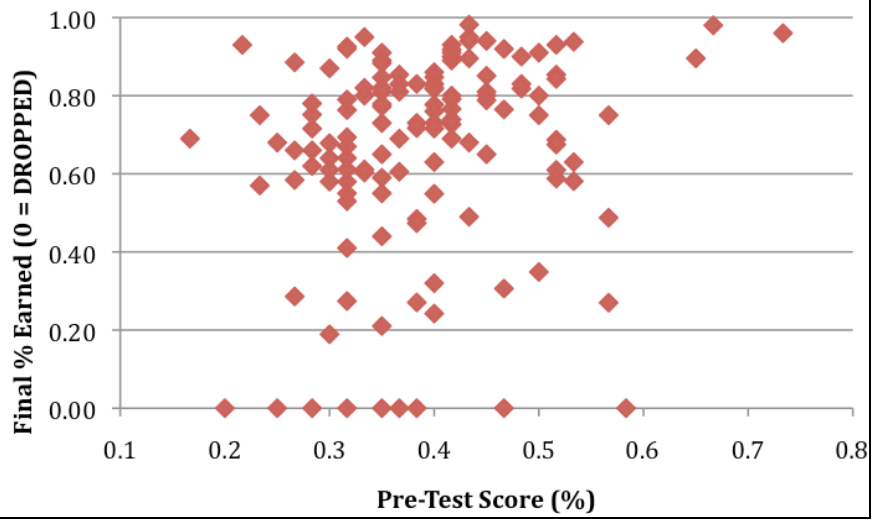
Whole Class Analysis I

First, I performed the same kind of graph as last year (sorting by final grade and then averaging the pre-test scores from each group). Being that I have become more clever, I was able to add STDEV to the graphs this year. Although there were generally similar trends as last year (except among the F students), there is a LOT of overlap with STDEV and so the expanded pre-test did little/nothing to improve our resolving power on this matter.



Whole Class Analysis II

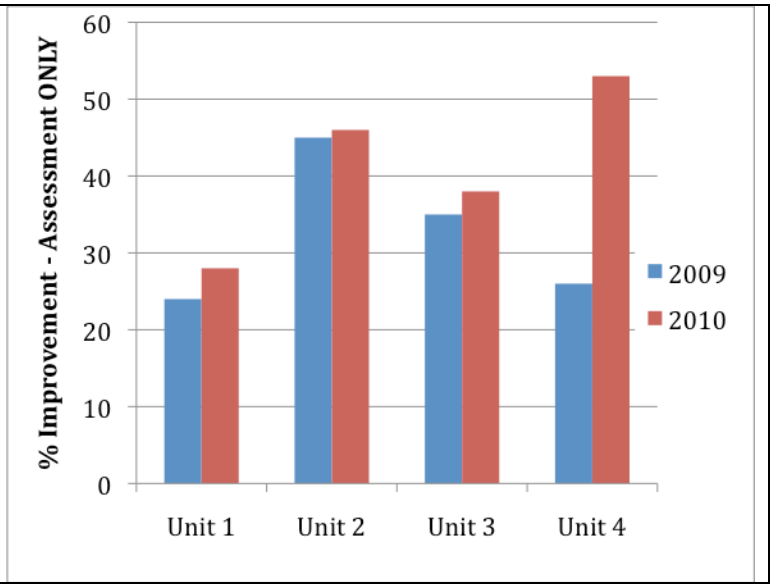
I also ran a scatter plot that shows all 2010 student scores. I don't pretend to be a stat's person but I don't see any line-like trend, indicating any strong correlation between the two. Indeed, just surveying the folks who ultimately dropped (i.e. the zero's), one can appreciate that these folks were all over the board with their pre-test. Again, someone more clever than me is welcome to conduct additional analyses.



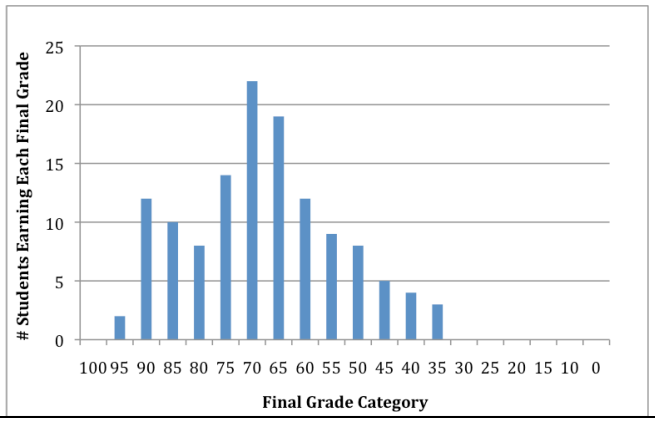
Section 4: Learning and Retention Evaluation – 2009 vs. 2010

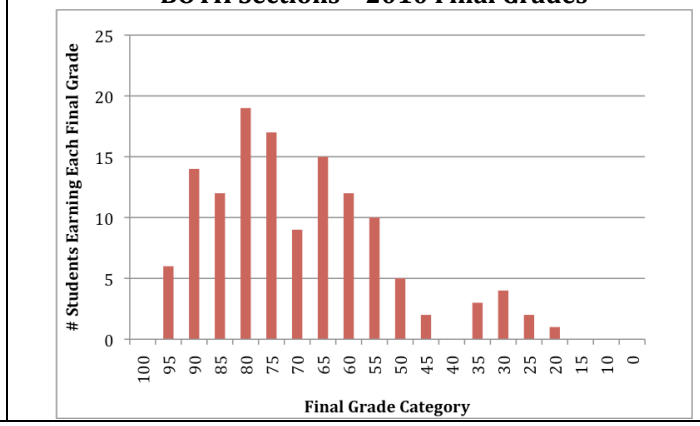
Whole Unit Comparison – BOOMER ONLY

For this analysis, only "harder" course-based assessment questions were analyzed (33 questions in 2009 and 24 questions in 2010, 15 of which overlapped verbatim). In the final course assessment report, individual question analysis will be included but, for this "active learning" report, I have included only the big picture stuff. Although the average improvement in 2010 was 41% vs. 32% in 2009, t-tests on all unit improvement data were 0.247. Given substantial content and pre-test question changes in unit 4, I am also concerned that observed differences will ultimately have to be thrown out for that group!

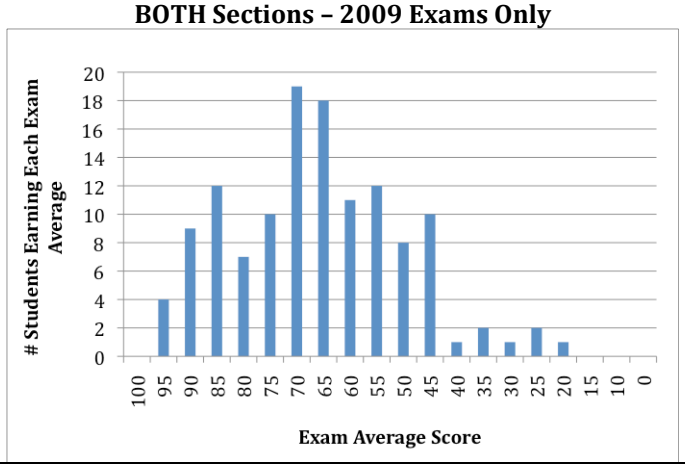


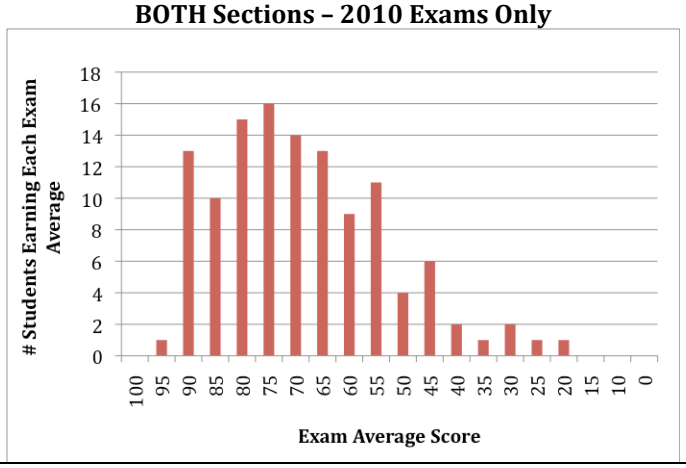
For the next analysis, I obtained final grades from Kristin and my sections, both 2009 and 2010. As per the Freeman paper, I defined grade categories in 5% intervals (i.e. 95-100 one category, 90-94 etc.). I counted the numbers of students in each category to build the graphs, and then t-tested the datasets.





Although the above graphs look a little different, the t-test score = 0.885. Also, it is not fair to analyze final whole grades because students earned active learning points in 2009 (including – as I said – up to 24 points of active learning extra credit). Therefore, my next analysis was to analyze ONLY exam averages (see below). As with final grades, however, the t-test score = 0.602.

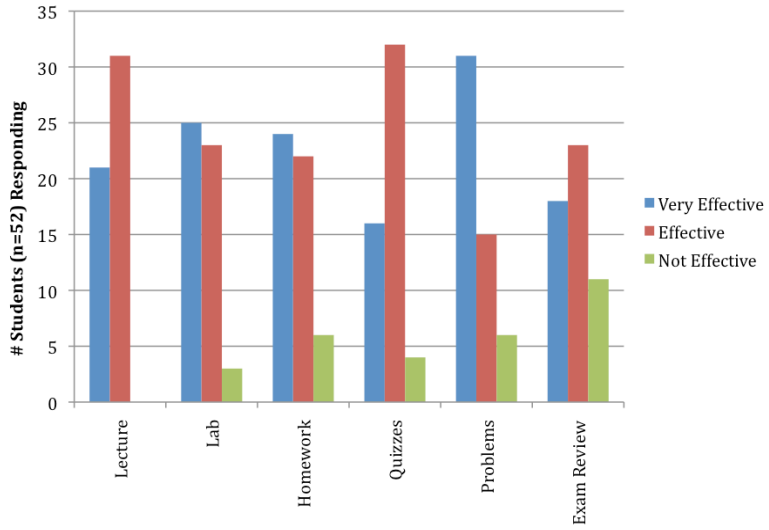




Section 5: General Efficacy Ratings – Boomer 2010 Only

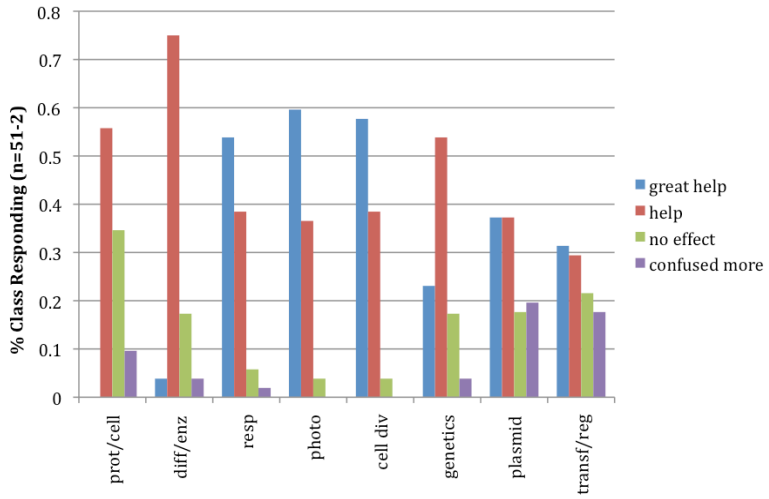
Basic Lecture Components

As with last year, we performed post-course attitudinal surveys about the efficacy of course components. Observed data were very similar to 2009 responses; further analysis should be performed once Kristin's data are complete.



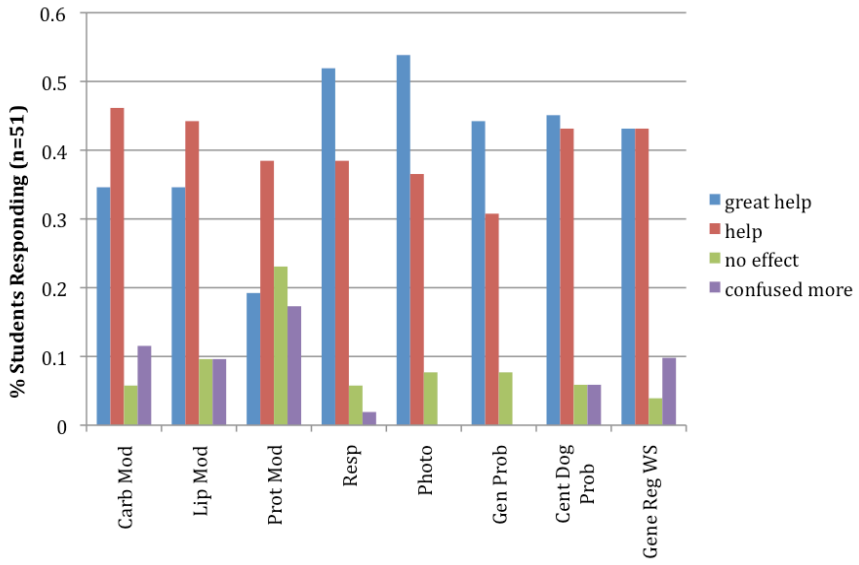
Lab Efficacy

As with last year, manipulatives-driven labs received the most "great help" ratings, and the final two labs received the lowest ratings. The first two labs, however, were more well-rated than last year - but further analysis should be performed once Kristin's data are complete.



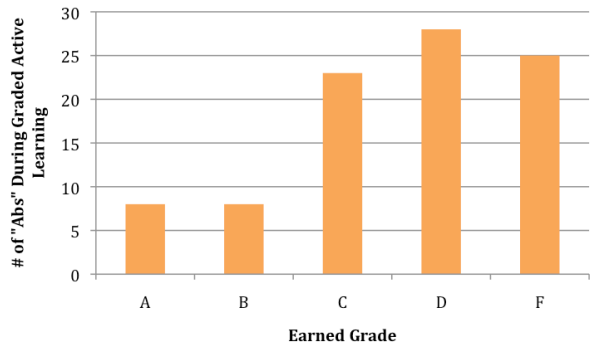
Section 6: Active Learning Efficacy Ratings – Boomer 2010 Only

To evaluate student perceptions about active learning efficacy, Kristin and I chose 8 commonly employed tools – including 3 bio-molecule modeling worksheets and 2 identical metabolism worksheets. Although we both performed extensive in-class problem solving, problems did vary; likewise, we both developed independent gene regulation worksheets when (in my case) it was clear students were not mastering concepts. With the exception of the protein modeling exercise, ALL activities were well-rated as "greatly helpful" or "helpful." Again, further analysis may be performed once Kristin's data are complete.



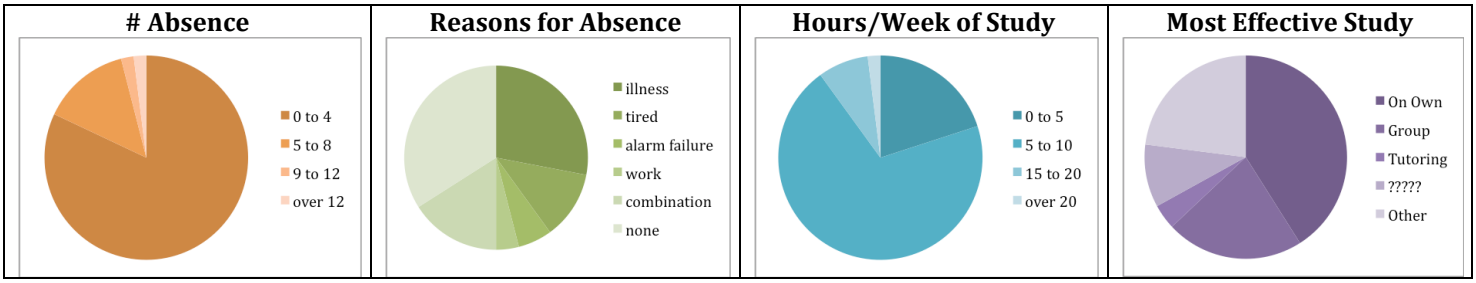
Section 7: Student Behavior, Observed and Reported – Boomer 2010 Only

One of the things I wish I'd made more of an effort to track was attendance – because there were grade record patterns suggesting folks with A's and B's didn't miss much class. Unfortunately, I could only definitively count on attendance records for 14 class days (37% class): namely, in-class quizzes or activities (given that pop homework zero's could be due to absence or a simply not turning in the assignment). Here is a graph showing these data.



Once again – to quote Freeman, "Our data suggest that simply being in class and responding to questions has a benefit for students." Conversely, NOT being in class and responding to questions is a detriment.

In addition to asking students about absenteeism, Kristin and I also attempted to post-course survey student study habits. Here are several graphs based on student-reported data about attendance and study habits, suggesting the following: illness is the major reason students report being absent, most students report studying 5-10 hours/week, and most students STILL find studying on their own as the most effective way to learn material. Once Kristin's data are complete, additional analysis (including analyzing each question dataset against final grades) may be undertaken.



Section 8: Summary, Workload, and Thoughts About the Future

In my opinion, our new efforts this year were – at some level - testing 2 big hypotheses: (a) expanded pre-testing and at-risk advising will improve student placement and retention; and (b) that active learning will increase learning and improve retention.

Unfortunately, none of the data above support these statements. The TWO most damning things: (a) NO difference in retention (as defined by the #D, F, or drops, which = ~44% BOTH years) – EVEN after at-risk advising screen; and (b) t-test comparisons of assessment question improvement, overall exam performance, and even final grades do not show any significant difference between 2009 (no active learning) and 2010 (active learning); differential background data make comparisons even more muddy. Even though students positively rated active learning activities, the question is: how much effort should be put into these strategies next year. To consider this question, here is a breakdown of hours and workload expended (based on my/Sarah's experience):

Active Learning/At-Risk Workload Information	Boomer Hours
Instructor Time - preparation of new course materials	50 (+) – mostly summer
Instructor Time – pre-testing, at-risk advising	10 – mostly week one
Instructor Time – grading ~2 active learning assignments/week	30 – throughout term
Class Time – actually doing active learning, not lecturing	10 – throughout term
Instructor Time – data entry, writing reports	20 – throughout term
TOTAL	120 hours

My overall blunt response is "no – not to this level" and my recommendations are as follows:

(1) No instructor-student at-risk advising meetings based on pre-testing next year; losing lab week one and doing the scientific method exercises in lecture was wonky. Thus, we are going back to a typical introductory/scientific method lab that week – additionally emphasizing graphing skills, data analysis, and basic microscopy.

(2) A limited pre-test should be developed using Survey Monkey and linked to the registration process. This should include background information and basic content – but students will ultimately be on their own to evaluate their own preparation. I am also very concerned about scaring too many students out of fall 2011 given that we entirely lack the resources to grow the winter trailer of BI211 for the foreseeable future (without completely changing the times some core courses are offered – like micro).

(3) Reduce graded active learning assignments to ease the workload associated with grading. If the students don't "get" that it's not about the points – no amount of extra credit carrots can help them. Whether clickers should be recommended is debatable; few of the problems I used could be effectively made click-able.

(4) The jury is out, in my opinion, on bringing back PLTL – especially given that so much revolves around attendance and the ability, commitment, and motivation to study.

(5) Finally, here are some "food for thought" concerns about some possible negative impacts of the new 200 series structure and active learning – all based on admittedly anecdotal observations and feedback.

a. Adding another lecture hour of week may actually be hurting a fair number of our students (I would estimate 30% of my class – overlapping strongly with the students who were not retained) because absenteeism, in general, is such a problem for them. Adding another class/week simply means more opportunities to miss more classes.

b. For a small group of students (I would estimate 5% of my class), some active learning activities are perceived as too remedial, pandering to the lowest common denominator – and this likely instills a sense of boredom with coming to lecture.

c. I also think many students perceive doing problems in class as an acceptable substitute for home study. Although active learning pop homework and pop quizzes were specifically meant to encourage home engagement of the material, a fair number of students (about 10%) were verbally frustrated every time I did NOT collect pop homework. Again – they are fixated by the points… not the idea that active learning is a process of leading them towards better study habits.

Biology Exit Exam Survey – June 4, 2011

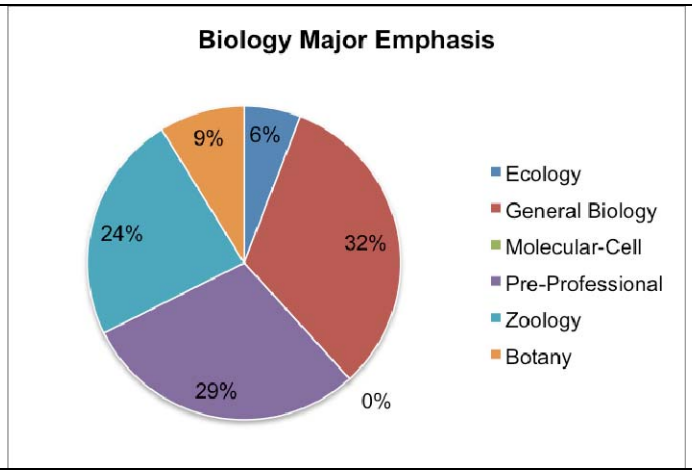
Administered by Dutton, Baumgartner, Boomer, Haberman; Compiled By Boomer (maintaining database, raw data)

General Description:

To improve assessment of soon-to-be graduating Biology Majors, we developed an exit survey (appendix 1) and administered it to all students immediately following completion of the ETS biology content exam. The spring 2011 ETS exam was required for all students who planned to graduate some time before spring 2012 (the next ETS exam).

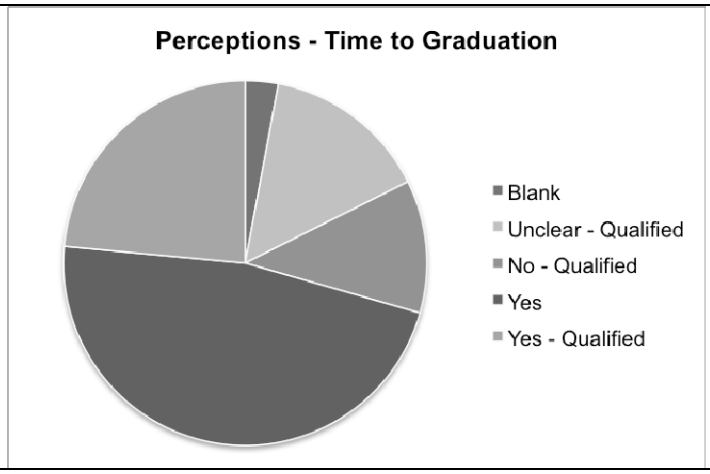
General Cohort Features:

Thirty-four (DOUBLE the last 2 years!) Biology majors took this exit exam and survey. Of these 65% were female and 35% were male. As shown in the left figure below, the majority of students in this cohort received general biology degrees (32%), with pre-professional (29%) and zoology (24%) in close second and third. Botany (9%) also made its first showing since this survey began! The stated professional aims (right figure below) of this cohort were very diverse, with education (21%), wildlife and/or fish (12%), and PA (12%) being the top three. Less half the students (41%) reported that their goals changed over the course of finishing their degrees.



Professional Aim	# (n = 34)
Education	7
PT or OT	1
Pharmacy	2
PA	4
Optometry	1
Medicine	3
Dietician	2
Graduate/Research	3
Clinical Lab Science	1
Wildlife/Fish	4
Dentistry	3
Undecided/Not Sure	2
Government/Conservation	1

The average length of time it took for students to finish their degrees was 4.5 years (range = 2.5-9 years, with 35% taking 5 or more years; it was unclear whether students reporting less than 4 years factored in community college time). This year's cohort was more ambiguous about whether they felt the time spent pursuing degrees was "reasonable" and, if not, why/what could have helped.

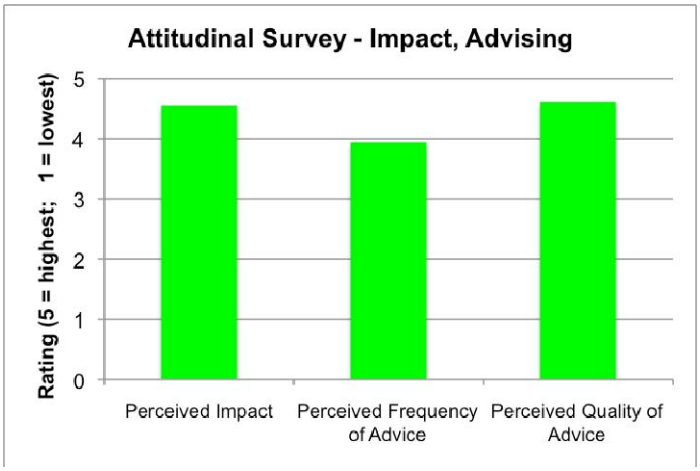


Qualification	UQ	NQ	YQ
changed majors or moved	2	1	2
more/frequent class offerings	3		2
need to be smarter		1	
non-trad with kids and work		1	1
more planning at start		1	
started major too late			2
had to take summer school			1

UQ = unclear – qualified
NQ = No – qualified
YQ = Yes - qualified

Securing Professional Aims:
Within this cohort, only 15% reported that they had secured positions related to their professional goals - although it should be noted that at least 6 students are still 2-3 terms from graduating. In terms of students who attained their professional goals, 60% were in secondary education (accepted to WOU-MAT), 20% special education (WOU), and 20% dietician program. In terms of students who had yet to attain their professional goals, 41% corresponded to students who want to pursue pre-professional health sciences. Many of these students reported that they planned to seek lower-level training positions (e.g. CNA, pharm tech) before applying – some explicitly saying: because they lacked required contact hours.

Attitudinal Survey:
When asked whether they felt their experience in Biology would impact their career, this cohort said it would (average = 4.5). Although students sought advice less (3.9), they felt the advice they received was helpful (4.6).



Anecdotal Responses, Open-Ended Question:
The final question of this survey was a somewhat open-ended question that asked what other things Biology Faculty could do to assist future graduates. Although 29% of the students left this blank, here is a summary of major points students provided:

"Classes offered more often, don't let lower classmen take upper division classes"

"I think they are doing just fine."

"They're great, I don't know what else."

"Provide more opportunities for biomedical and clinical experience."

"The advisors all seem pretty busy. More advisors would be helpful. Somewhere/book that we can see what classes are offered every other year or what term because that gets confusing."

"Providing a list of job search resources in the biology/science field so graduates can secure a job before or close after graduating."

"Encourage and facilitate more internship/research opportunities to increase competitiveness for graduate school."

"More volunteer opportunities."

"For the PA program, I think Biology faculty should be aware or know about schools outside of Oregon due to the fact that there are 2 schools in Oregon for PA and the requirements for programs are strict."

"Especially for PA, identifying the different requirements of different schools (especially outside the region), identifying programs than an undergraduate could immediately apply for. "

"Keep up with the loyalty and helpfulness."

“More class selection options.”

“Notify about internship opportunities.”

“Start emphasizing internships and jobs in the science industry in addition to the undergrad research opportunities that this university provides. Posters can only take you so far… Finally, let students know how to properly network on a professional basis!”

“I would encourage students to focus more on required classes over LACC’s.”

“Nothing – students need to do most of it.”

“Pre-professional seminars?”

“Biology job fair – lots of work, but I don’t know my ‘scientific passion.’”

“Maybe providing more research assistance or internship information.”

Appendix One: Department of Biology – Exit Tracking Assessment

In order to better serve our majors and campus accreditation, we are collecting data about professional aims and/or placement of our graduates. Survey data will only be used for assessment purposes. Thank you for your assistance!

1. Name: _____

2. Which Biology Degree track did you complete? _____

3. How many years did you take to complete your degree? _____

4. Do you feel this was a reasonable amount of time? If not, what could have helped you finish more quickly?

5. At this time, what is your intended professional aim? _____
   e.g. medical school, lab technician, secondary education…

6. Did this change during the course of your undergraduate education? If yes, please explain how.

7. Have you secured your current professional aim at this time? _____

   - If **YES**, please describe where you were hired or accepted:
     e.g. OHSU Medical School, Oregon Dept. of Agriculture, Salem Public School…

   - If **NO**, please describe your immediate career plans:

8. If possible, please provide a permanent email (preferred) or snail mail address where we can contact your with follow-up questions regarding your professional development.

9. How much do you believe your undergraduate Biology experience will factor into your long-term professional aims?

(Very Much) 5 4 3 2 1 (Not at All)

10. How much did you seek professional advice or recommendation from Biology Faculty?

(Very Much) 5 4 3 2 1 (Not at All)

11. How helpful did you find the advice from Biology Faculty?

(Very) 5 4 3 2 1 (Not at All)

12. What other things do you believe would be helpful for Biology Faculty to do to assist future graduates in terms of securing professional goals?

13. Would you like to receive future mailings about the Biology Department? _____

Finally, we hope you will consider sending us updates about your professional development in the future – specifically please contact Sarah Boomer (boomers@wou.edu) who is archiving career-related exit data.

LAS
Embedded Assessment Action Report
For
Program Review

Degree Program(s): ___LACC_____

(BA, BS, BFA, MA, MS, LACC, etc.)

Course # / Title: _Bi 101, Bi 102, Bi 103 _____

Faculty name: __Erin Baumgartner_____

Date: _____June 7, 2011_____

A) State the program **learning outcome** or **general education goal** this assessment is linked to:

1. Students will demonstrate effective critical thinking;
2. Students will demonstrate effective literacy and communication skills;
3. Students will demonstrate an ability to explore the world in integrative and synthetic ways through disciplinary study across the arts, sciences, and humanities;

B) Check the embedded assessment tool(s) used :

- ☐ Exam question
- ☐ Essay
- ☐ Oral presentation
- ☐ Thesis
- ☐ Portfolios
- ☐ Practicum / Service Learning
- ☐ Capstone paper / project
- ☐ X Other ___*Lab report/Lab Writeup*_____

Attach a copy of the actual question / assignment as it is presented to the student or a description of the embedded process.

Please submit a copy of this action report to the LAS dean's office.

Lab Report Assignment (Bi 102/103) Sample Instructions

The purpose of this assignment is to get you to think deeply and critically about one of your laboratory activities, then write a detailed report in which you draw conclusions about a natural phenomenon based upon data you have collected. You will be writing a report on Laboratory 4: Transpiration.

Your report is due at the beginning of your regular lab class during the week of May 10th. Once it has been graded and returned, you have the option of rewriting. Your rewrite score will then be averaged with your original score. Rewrites are due one week after your report is returned.

The report must be typed and be free from spelling and grammatical errors (make sure your proofread!). The report will be approximately 3-5 pages (double-spaced), however the actual length of the report is less important than meeting all the requirements and presenting a complete and well thought-out description and discussion of your experience in the laboratory. A complete lab report must include the following components:

Introduction: The introduction lays the foundation for your report. It should provide background information about the phenomenon you are investigating, define concepts that you will be using and describe their biological importance and relevance to the world. The purpose of the introduction is to make the reader familiar with the concepts behind your experiment and to help explain why you developed your particular hypothesis. The hypothesis is your tentative explanation for the phenomenon you are investigating and includes a prediction about what will happen in your experiment if the hypothesis is supported.

One way to tie your introduction and hypothesis together is to use an "if… then" statement: "If transpiration occurs under X conditions, then my experiment will show…" While the "if" is actually the hypothesis and the "then" is your prediction, for the purposes of this assignment you can consider the whole "if… then" statement as your hypothesis. It is essential that you explain the rationale for your hypothesis and prediction. The information you presented in the introduction should help you build this rationale.

You don't need to include everything known about transpiration, but enough that the reader can understand the importance of your research questions. Use your lab book, your textbook, or other sources to gain the background information you need, but be sure that the entire section is in your own words. *Those who plagiarize earn a 0 on the assignment*. Be sure to cite all of your sources. Within the text, use the author's last name and the date of the publication: (Audesirk, Audesirk, & Byers, 2008). At the end of the report you will include a list of all of the sources you have cited in the text.

Methods: The methods section clearly describes exactly what you did in your experiment so that someone else could repeat your experiment by reviewing your methods. Because this section describes what you did, you should write your methods section in paragraph format, *not* as a numbered list of steps and use first person, past-tense for this write-up. Include enough detail that another person could use your methods section as instructions and be able to repeat the experiment. Do *not* say, "see lab manual." And definitely do *not* copy the directions from the lab manual, which would be plagiarism. A diagram or digital photo of your lab set-up is helpful. If you decide that a diagram or photo would be helpful to describe your methods, be sure that this visual resource is labeled and clearly referenced within the text.

Results: The results section describes what happened in the experiment. In this section, you should present your data clearly, and report only your observations, but do not yet try to explain why you think these things happened. In the results section you are organizing your data so that they make sense for the reader. Include a table or a graph (or both, if appropriate). If graphing, be sure to use the right kind of graph: line graphs are for continuous data, bar graphs are for discontinuous data. Time nearly always goes on the X-axis. Even if you include tables and graphs, you must also include a brief written summary that clearly describes the events that you observed or the patterns that are demonstrated by your data.

Discussion: Now you are ready to describe why you think you got the results you did. In the discussion section you draw conclusions from your data. You need to evaluate your hypothesis as part of these conclusions. Explain whether you think it was supported or not, and why you think so. If you made a prediction that the transpiration will happen more slowly at cold temperatures, then you need to refer back to that prediction in your discussion and use your data to support or refute your hypothesis. Remember that it is only possible to support a hypothesis, not to

"prove" one (that would require testing every possible permutation and combination of factors). You should also describe any potential sources of error that may have had an impact on your results and describe what those impacts may have been.

Expanded Assessment Rubric (Each element is worth a possible total of 5 points)

	Element	Misses (1 point)	Approaches (3 points)	Meets (5 points)
What is the importance of this topic? Why is it interesting?	**Introduction** *Depth and breadth of information*	___Little background information or details in introduction, no biological relevance	___Some background information, but not very many details and biological relevance is unclear	___Ample background information is provided in detail and biological relevance is made clear
	Quality of information provided	___Information included in introduction is inaccurate or does not relate directly to hypothesis	___Information included in introduction is accurate and relates at least partially to hypothesis	___Information included in introduction is accurate and is extensively connected to the hypothesis
	Hypothesis	___Hypothesis is unclear or absent	___Hypothesis included is clearly stated, but the reasoning not well explained	___Hypothesis included is clearly stated and reasoning behind it explained
What *exactly* did you do in the experiment?	**Methods** *Quality*	___Methods are bullet points and written with many errors	___Methods written in the incorrect tense or person and contain some errors	___Methods written in first person past tense paragraph form and accurately describe the procedures.
	Repeatability	___Methods are poorly outlined and unclear with few details	___Most of the procedures are outlined, but not very clearly, and some details are lacking	___Someone else could repeat the experiment just by reviewing the methods section, all procedures are outlined in detail
	Diagrams (if included)	___Included diagrams are unclear and do not correlate well to text	___Included diagrams are difficult to understand, but do connect to text	___Included diagrams are clear and well labeled and correlate well to information in text

What did you find out? What happened?	**Results** *Quality* *Tables/Graphs* *Content*	___Results unclear as to what happened with no details; no written description of data patterns ___No tables or graphs included ___Blended together with discussion	___Results clearly stated, with brief written description but there aren't many details or numbers ___Tables and graphs are included, but incomplete or without labels ___Some explanation of why the results happened are included	___Results are clearly stated and explain what happened using both words and numbers ___Tables and graphs are well drawn and clearly labeled ___No discussion/ explanation included in this section
What do the data mean? What explains the results you found?	**Discussion** *Hypothesis* *Data addressed* *Conclusions* *Error*	___Hypothesis is not considered in conclusions, use of language like proven, true, or right ___Conclusions do not address data or data do not support conclusions ___No explanations for conclusions or why the results happened . ___No potential sources of error described	___Hypothesis is mentioned, but not linked well to what happened in the experiment ___Some data considered in conclusions but other data is ignored. ___Conclusions are not fully explained and unclear why the results may have happened ___Sources of error are mentioned, but impact on experiment are unclear	___Hypothesis is linked to data and evaluated based upon what happened in experiment, described as supported or refuted ___All data collected is considered and addressed by conclusions ___Conclusions are explained as to why the results happened ___Sources of error are thoroughly described and the potential impact on the experiment are discussed
General Quality of Writing	**Mechanics** *Title* *ID* *Grammar/Spelling* *Section Labels* *Citations*	___No title ___No name ___Many grammar and spelling errors ___Sections blend together and difficult to tell where one starts and end ___ No reference list or in-text citations	___Title is not descriptive ___Name only ___Few grammar and spelling errors ___Sections not well labeled ___ Reference list provided without in-text citations or vice versa	___Descriptive and concise title ___Name, date, period ___Free from grammar and spelling errors ___Sections clearly labeled ___ Reference list and corresponding use of in-text citations

BI 101 Lab 1 Writing Assignment

When scientists complete an experiment it is very important that they share their results so that other researchers can confirm and build upon their findings. Ultimately, once several researchers publish results in support of a particular finding, that information can be used to inform new laws, policies, medical practices and various technologies that impact our daily lives. A full scientific article is written in paragraph form with a distinct set of subheading and a strict style. The researchers must thoroughly examine other relevant published research and explain their findings and how they relate to these other published results. You will not need to complete an exhaustive search of the literature, but you will practice communicating the results of your simulation of natural selection. The questions below are meant to guide you to reporting the key findings of your simulation and help you think through how to explain the findings and draw conclusions from them in a scientific manner.

ASSIGNMENT: Please respond to the following questions to write your laboratory report. To be in the "meets" column of your grading rubric you should provide quality answers to all of these questions as well as meeting all "quality of writing and Mechanics" elements described in the rubric. Use your rubric to help you assess if your answers are "quality" answers.
FORMAT: Please type your responses and include the question number (example: 1, 2, 3, etc) in your answers but do *not* rewrite the question. Graphs may be made with a computer program (example: Microsoft excel, Mac numbers, etc) or may be neatly produced with a ruler on graphing paper.
DUE DATE: Your write up is due at the beginning of class next week. Late assignments will have 1 point deducted per day up to 5 days, at which point the assignment will be assigned 0 points.

Hypothesis and Prediction – Part 1 of Rubric

1. Before you completed the simulation, what results did you expect to get? Why? State your answers to these questions as a single "if-then" hypothesis-prediction. Be sure to follow all guidelines for a good quality hypothesis and prediction.

Results – Part 2 of Rubric

2. How did simulated natural selection affect the population size of differently colored fish? Answer this question by creating a line graph that shows the results of your simulation experiment. Be sure you follow all guidelines for a good quality graph.

Analysis- Part 3 of Rubric

3. Do the results support or refute your hypotheses? Remember we never "*prove*" anything in science!
4. *How* do the results support or refute your hypothesis? Consider all your data and the overall data pattern as you answer this question. Don't ignore unusual data that may not seem to fit into a specific patterns ("outliers").
5. What is the biological significance of your results?

References- Mechanics Checklist

6. Provide at least one full citation for a resource you made use of in performing the experiment, understanding the concepts and writing this assignment. (Perhaps your lab manual? Your textbook? A website?) If you used more than one resource, you need to cite each one!

Lab Writeup Assignment (1) Assessment Rubric- 10 points total

Element	Misses (1 point)	Approaches (2 points)	Meets (3 points)
Hypothesis			
Clarity/Specificity	___Hypothesis is unclear and hard-to-understand	___Hypothesis included is clearly stated, but lacks specific details	___Hypothesis included is clearly stated and very specific
Testability	___Hypothesis is not testable	__Hypothesis is testable, but not in a feasible way	___Hypothesis is testable and could be tested within lab parameters
Graph			
Title	___Graph lacks a title	___Graph has a title that is not very descriptive	___Graph has a concise, descriptive title
Axes	___Axes are not labeled	___Axes are labeled, but units are unclear or vice versa	___Axes are labeled, including clarification of units used
Variables	___Variables not addressed in graph	___Variables addressed in graph, but not on correct axes	___Variables on correct axes
Key	___No key or way to tell data points apart	___Key included, but is hard to understand	___A clear, easy-to-use key to data points is included
Graph clarity	___Graph is hard to read and comparisons cannot be made: Inappropriate graph type or use of scale	___Graph is somewhat readable, comparisons can be made with difficulty: Appropriate graph type, but not scaled well	___Graph is very clear and easy-to-understand, comparisons between treatments are easy to make: Graph type and scale are appropriate to data
Analysis			
Hypothesis	___Hypothesis is not addressed	___Hypothesis is mentioned, but not linked well to data presented in graph	___Hypothesis is linked to data and evaluated based upon is shown in graph
Scientific language	___Hypothesis is described using language like proven, true, or right	___Hypothesis is not described as proven, but neither is it described as supported or refuted	___Hypothesis is described as supported or refuted
Data addressed	___Conclusions do not address data or data do not support conclusions	___Some data considered in conclusions but other data is ignored.	___All data collected is considered and addressed by conclusions
Explanation	___No explanations for data patterns observed in graph	___Data patterns are not fully explained- any unusual "outliers" are ignored- and unclear without any biological detail	___Data patterns are fully explained, including presence of outliers, as to why they happened with relevant detail that relates to biological concepts

Reminder: Writeups with spelling and grammatical errors will have an automatic 1 point deduction.

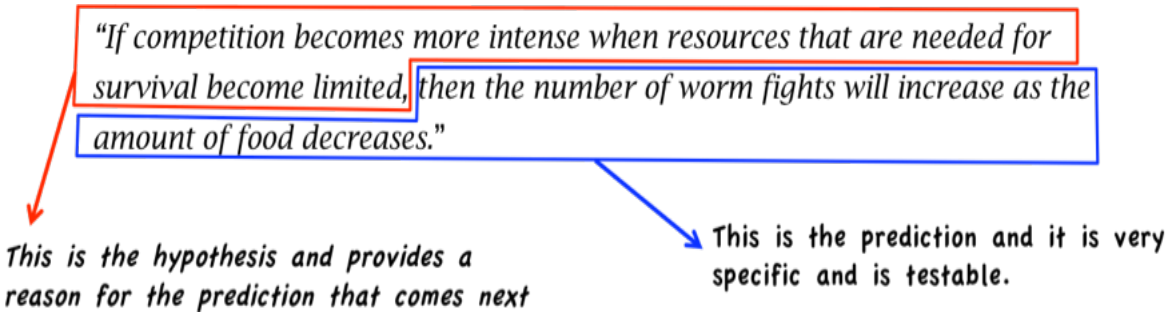
Yes	No	
☐	☐	Writeup includes your name, the date, and your lab section
☐	☐	Writeup is free from spelling and grammatical errors
☐	☐	Writeup includes full citation for at least one reference, and all references used are cited
☐	☐	All portions of writeup are clearly labeled, and question numbers are included (without rewriting of questions)

Guidelines for Good Quality Scientific Reports

Hypothesis and Prediction: The hypothesis is a tentative explanation for the phenomenon. Remember that:

- A good hypothesis and prediction is testable (and should be testable under the conditions of our lab environment; For example, if your hypothesis requires shooting a rocket into space, then its not really testable under our laboratory conditions).
- Once tested, a hypothesis and prediction can be falsified, or your explanation can be ruled out through testing.
- A good hypothesis and prediction is detailed and specific in what it is testing.
- A good hypothesis provides a rationale or explanation for why you think your prediction is reasonable.
- A good prediction is specific and can be tested with a specific experiment.

Example:



Graph: The graph is a visual representation of the data you gathered while testing your hypothesis. Remember that:

- A graph needs a concise title that clearly describes the data that it is showing.
- Data must be put on the correct axes of the graph. In general, the data you collected (representing what you are trying to find out about) goes on the vertical (Y) axis. The supporting data that that describes how, when or under what conditions you collected your data goes on the horizontal (X) axis. (For this reason time nearly always goes on the X-axis).
- Axes must be labeled, including the units in which data were recorded
- Data points should be clearly marked and identified; a key is helpful if more than one group of data is included in the graph.
- The scale of a graph is important. It should be consistent (there should be no change in the units or increments on a single axis) and appropriate to the data you collected

Example:

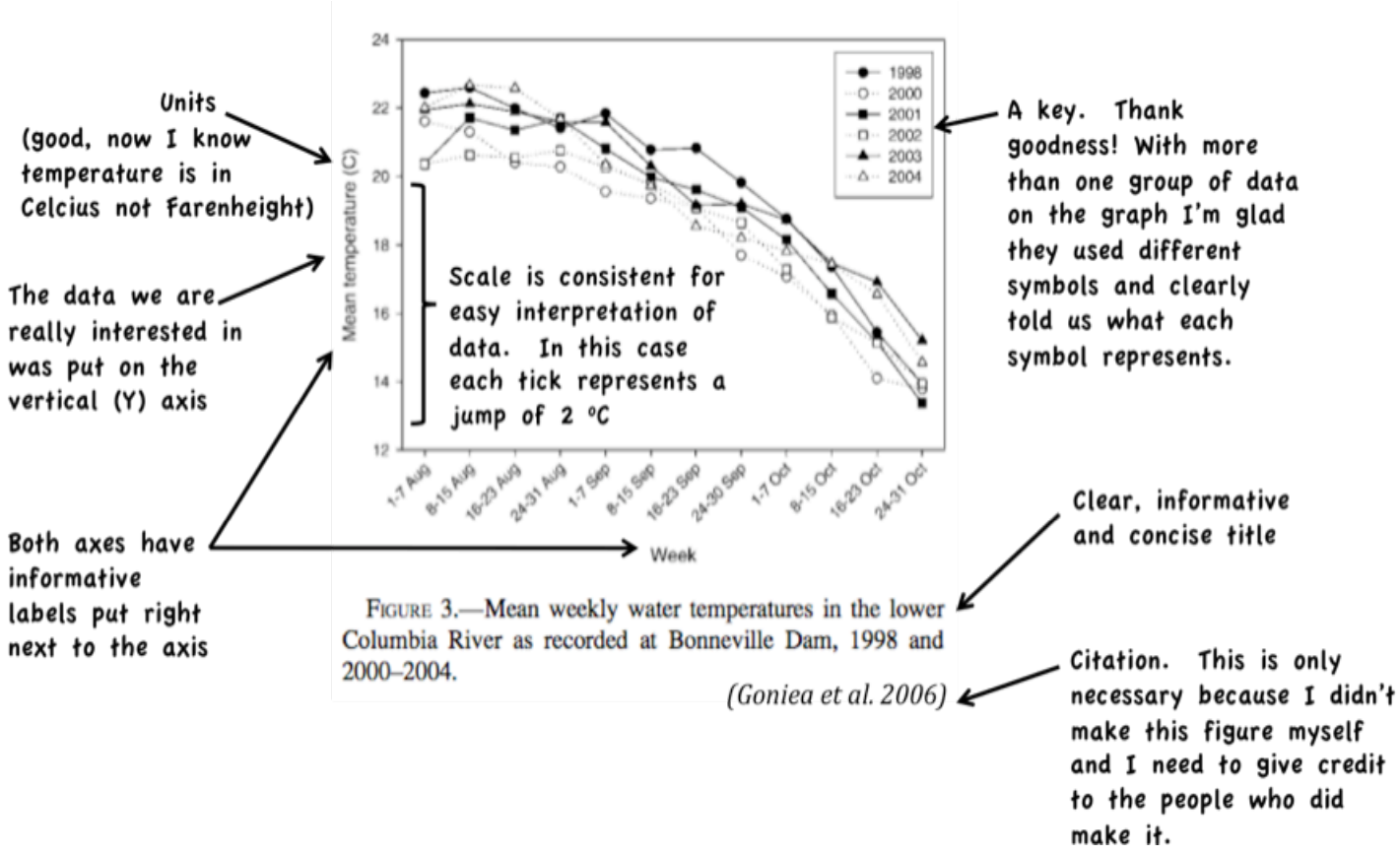


FIGURE 3.—Mean weekly water temperatures in the lower Columbia River as recorded at Bonneville Dam, 1998 and 2000–2004.

(Goniea et al. 2006)

Analysis: You need to evaluate your hypothesis based on the data patterns shown by your graph. Remember that:

- You use data to determine support or refute your hypothesis. It is only possible to support a hypothesis, not to "prove" one (that would require testing every possible permutation and combination of factors). Your evaluation of your hypothesis should not be contradicted by the pattern shown by your data.
- Refer back to the prediction you made as part of your hypothesis and use your data to justify your decision to support or refute your hypothesis.
- In the "if" part of your hypothesis you should have provided a rationale, or explanation for the prediction you made in your hypothesis ("then" part of hypothesis"). Use this to help you explain why you think you observed the specific pattern of data revealed in your graph.
- You should consider all of the data you collected in examining the support (or lack of support for your hypothesis). If there are unusual data points or "outliers" that don't seem to fit the general pattern in your graph, explain what you think those mean.

LAS
Embedded Assessment Action Report
For
Program Review

Degree Program(s): ___LACC_____

(BA, BS, BFA, MA, MS, LACC, etc.)

Course # / Title: _Bi 101, Bi 102, Bi 103 _____

Faculty name: __Erin Baumgartner_____

Date: _____June 9, 2010_____

A) State the program **learning outcome** or **general education goal** this assessment is linked to:

4. Students will demonstrate a basic knowledge of natural, social, cultural, psychomotor, and value systems.

B) Check the embedded assessment tool(s) used :

- ☐ X Exam question (aligned to specific Bi 100 content learning outcomes)
- ☐ Essay
- ☐ Oral presentation
- ☐ Thesis
- ☐ Portfdios
- ☐ Practicum / Service Learning
- ☐ Capstone paper / project
- ☐ X Other _Survey*_____

*Although not technically an embedded assessment, this represents a significant effort to collect information on student accomplishment of learning outcomes related to scientific literacy. These questions are also embedded in student exams as indicators of learning

Attach a copy of the actual question / assignment as it is presented to the student or a description of the embedded process.

Please submit a copy of this action report to the LAS dean's office.

Learning Outcome	Questions
Nature of Science & Living Things	1. A carefully formulated scientific explanation that is based on a large accumulation of observations and is in accord with scientific principles is termed a/an a. Control b. Hypothesis c. Fact d. Postulate e. Theory 2. Which of the following is/are characteristic of living organisms? a. RNA is molecule of inheritance b. Process energy c. Grow and reproduce d. B & C are correct e. A, B, & C are correct
Foundations of Evolution	3. Evolution can be defined as a. A change in the genetic makeup of a population over time b. A change in phenotype of an individual over its lifetime c. One species diverging into two species d. A change in the genetic makeup of an organism over time e. An individual changing into another species 4. Which of the following statements about mutations is TRUE? a. Mutations have no effect on the survival and reproduction of an organism b. Mutations occur at random and may be good, bad, or neutral c. Mutations are caused by natural selection d. Mutations are almost always better for the organism e. Mutations are very dangerous to the health of organisms
Natural Selection	5. Natural selection can only act upon a certain trait if the trait is a. Favorable b. Morphological c. New d. Behavioral e. Heritable 6. Having greater evolutionary fitness means? a. Having greater strength b. Gathering more food c. Being larger or faster than others d. Having more offspring e. Being able to produce more sperm or eggs
Population Structure & Growth	7. Exponential growth

	a. Never occurs under natural conditions b. Is represented by an S-shaped curve c. Shows increasingly accelerating growth d. Is limited to bacteria and other single-celled organisms e. Includes carrying capacity 8. Intraspecific competition a. Is between individuals of the same species b. Tends to be more intense than other forms of competition c. Increases near carrying capacity d. All of the above e. Both b & c
Community Interactions	9. Some species can influence the structure of the entire community by their presence or absence. These species are known as a. Awesome b. Essential c. Invasive d. Keystone e. Symbiotic 10. Predators and prey often place selective pressure on one another. This is known as a. Nature b. Symbiosis c. Co-evolution d. Carrying capacity e. Biotic potential
Energy & nutrient cycles	11. How do energy pathways in the ecosystem differ from nutrient pathways in the ecosystem? a. Energy reservoirs include the atmosphere and terrasphere b. Energy cannot be recycled c. Energy relies on the activities of bacteria and other decomposers to move through the system d. Energy transfer is extremely efficient e. All of the above 12. In a system with 600,000,000 calories of primary productivity, how many calories of energy would be available to organisms at the 3^{o} consumer level? a. 200,000,000 b. 60,000,000 c. 60,000 d. 60,000,000,000,000 e. 18,000,000,000
Speciation	13. Speciation occurs when

	a. A population is in equilibrium b. There is a mutation in a population c. A population becomes reproductively isolated d. A species becomes extinct and thus makes room for a new species to appear e. A population migrates to a new location 14. A single species of snail from the African continent was displaced to a new habitat on the island of Madagascar, and evolved rapidly into several new species as it exploited new resources. What has occurred in these snails? a. Adaptive radiation b. Divergent speciation c. Polyploidy d. Phyletic speciation e. Stabilizing selection
Classification	15. How did Darwin's and Wallace's evolutionary theory change the significance of the taxonomic categories of organisms? a. Darwin's theory of natural selection has had no effect on taxonomy b. Taxonomists no longer consider anatomical similarity in classifying organisms c. Darwin described the Kingdoms that we use today which include all organisms d. The relationships between organisms became completely known and many species were renamed e. Taxonomic categories are now considered to reflect the evolutionary relationships of organisms 16. Organisms are classified together when we hypothesize that they share a. A habitat b. A common ancestor c. A diet d. An appearance in the fossil record at the same time e. None of the above
History of Life & Evolutionary Innovations	17. If the early Earth's atmosphere contained little or no O_2 then where did most of the O_2 in our modern atmosphere come from? a. Respiration b. The breakdown of CO_2 c. The splitting of water vapor by sunlight d. The oxidation of metals e. Photosynthesis 18. Which group of vertebrates was the first to evolve a waterproof egg, allowing the group to move away from water, further onto dry land a. Birds b. Primates

	c. Mammals d. Lobefins e. Reptiles
Biodiversity	19. Eukaryotes differ from prokaryotes in that a. Eukaryotes have cell walls b. Eukaryotes have a nucleus c. Eukaryotes can do photosynthesis d. Eukaryotes do not have a nucleus e. Eukaryotes have alternating haploid and diploid generations 20. Periods of climate change in Earth's history have also been tied to what kinds of biological events? a. Pandemics b. Mass extinctions c. Genetic bottlenecks d. Long periods of evolutionary stasis e. Founder events
Laboratory basics	21. A compound microscope is used to view: a. Objects that are opaque (nontransparent) b. Objects that are larger than a pencil eraser c. Objects that are very tiny d. Objects that are too large to view with a stereomicroscope e. Both a & b 22. What is the dependent variable in the following example: Snails that live in acidic water with a pH of less than 6.5 will have thinner shells than snails living in alkaline water with a pH of more than 7.5. a. The pH of the water b. The number of snails c. The thickness of the shells d. The amount of water e. The device used to measure pH

Learning Outcome	**Questions**
Nature of Science & Biology	23. A carefully formulated scientific explanation that is based on a large accumulation of observations and is in accord with scientific principles is termed a/an a. Control b. Hypothesis c. Fact d. Postulate e. Theory 24. Which of the following is/are characteristic of living organisms? a. RNA is molecule of inheritance b. Process energy

	c. Grow and reproduce d. B & C are correct e. A, B, & C are correct
Atoms & Bonds	25. Atoms react through interactions between their a. Nuclei b. Neutrons c. Protons d. Quarks e. Electrons 26. A chemical bond that forms between molecules as the result of weak electric charges a. Ionic b. Polar covalent c. Nonpolar covalent d. Hydrogen e. Aquatic
Biomolecules	27. Which is not a major category of biomolecule? a. Protein b. Lipid c. Nucleic acid d. Carbohydrate e. Amino acid 28. Many monomers together make up a a. Polymer b. Molecule c. Nucleotide d. Ion e. Salt
Cell structure & function	29. A major difference between prokaryotic & eukaryotic cells is a. Prokaryotic cells do not undergo mitosis b. Prokaryotic cells lack membrane-bound organelles c. Prokaryotic cells lack a nucleus d. All of the above are true e. Only b & c are true 30. Which of the following best describes the path taken by most proteins produced by the cell a. Nucleus → vesicle → Rough ER b. Golgi Apparatus → Rough ER → Smooth ER c. Smooth ER → Rough ER → vesicle

	d. Nucleus → vesicle → Golgi Apparatus e. Rough ER → Golgi Apparatus → vesicle
Movement across membranes	31. The spontaneous movement of molecules from an area of high concentration to low concentration is known as a. Deconcentration b. Fluidity c. Tonicity d. Diffusion e. Gradient transport 32. The unique nature of the phospholipid bilayer is that it is a. Hydrophobic inside and hydrophilic outside b. Hydrophilic inside and hydrophobic outside c. Completely waterproof d. Rigid under normal cellular conditions e. Highly permeable to many molecules
Energetics	33. An enzyme a. Lowers the activation energy of a cellular reaction b. Works only under a narrow range of conditions c. Is not used up or permanently changed during the course of a reaction d. All of the above are true e. Both a & b are true 34. The role of ATP in the cell a. Store genetic information b. Regulate which substances enter or leave the cell c. Shuttle energy in the cell d. Provide insulation to the cell e. All of the above
Photosynthesis	35. Photosynthesis is an endergonic process that a. Stores sunlight energy in chemical bonds b. Uses sunlight energy to break chemical bonds and release large amounts of energy for use c. Creates energy for animals to use d. Requires sunlight in green wavelengths, which is why chlorophyll is green e. Is one of the few biological processes that can violate the first law of thermodynamics 36. During photosynthesis a. O_2 is used as a source of electrons to power reactions b. CO_2 provides a source of carbon atoms to build organic molecules c. H_2O is given off as a waste product

	d. Glucose is used as a source of energy e. CO_2 is produced and released into the environment
Respiration	37. An alternative metabolic pathway that can produce small amounts of energy in the absence of oxygen is a. Glycolysis b. C3 cycle c. Photosystem II d. Fermentation e. None of the above 38. The bulk of the ATP production during cellular respiration occurs during a. Glycolysis b. The Transition Reaction c. The Krebs Cycle d. The Electron Transport System e. All of these phases produce approximately equivalent amounts of ATP
From DNA to protein	39. DNA differs from RNA because a. RNA contains thymine instead of uracil b. RNA is a protein c. RNA has a phosphate-sugar backbone d. RNA is transcribed in a 3' to 5' direction e. RNA is a single strand 40. In eukaryotes, translation occurs a. In the nucleus b. In the ribosome c. In the mitochondrion d. In the golgi apparatus e. Throughout the cell
Cellular reproduction (Mitosis/Meiosis)	41. During mitosis a. Two daughter cells containing haploid chromosomes are produced b. Four daughter cells containing haploid chromosomes are produced c. Four daughter cells containing diploid chromosomes are produced d. Two daughter cells containing diploid chromosomes are produced e. Two daughter cells containing a random number of chromosomes are produced 42. During Meiosis, Anaphase I and Anaphase II differ because a. In anaphase I homologous pairs line up along the equator with one pair oriented toward each pole b. In anaphase I sister chromatids line up along the equator with one sister chromatid oriented to each pole

	c. In anaphase I homologous pairs are separated when spindle fibers shorten d. In anaphase I sister chromatids are separated when spindle fibers shorten e. Anaphase I is not followed by cytokinesis
Genetic inheritance	43. In a study of goldfish genetics, the allele for fanned tails is recessive and the allele for forked tails is dominant. If two heterozygous goldfish mate, what proportion will have forked tails? a. 4% b. 25% c. 50% d. 75% e. 100% 44. Color blindness is a sex-linked trait in humans. This means a. Females are more likely to be color blind than males b. Males are more likely to be color blind than females c. The gene for color blindness is on the x-chromosome d. Both a & c e. Both b & c
Laboratory basics	45. A study of acid diffusion finds that different acids diffuse at different speeds through a block of agar gelatin. The conclusion that it is something about the acid that requires what other experimental condition? a. The gelatin blocks have different concentrations of gelatin b. The gelatin blocks are of different thickness c. The gelatin blocks are all exactly the same d. The gelatin blocks are held at different temperatures e. The gelatin blocks were made at different times- some are older 46. During an experiment of photosynthesis in ambient sunlight, 12 cubic centimeters of oxygen is produced over a thirty-minute period. What is the rate of oxygen production? a. 12 cubic centimeters per minute b. 0.4 cubic centimeters per minute c. 2.5 cubic centimeters per minute d. 2.5 minutes per cubic centimeter e. 0.4 minutes per cubic centimeter

Learning Outcome	**Questions**
Homeostasis & organization	2. Homeostasis is best defined as a. The regulation of body temperature by animals b. The constancy of the body's internal environment c. The active adjustment to ongoing internal and external changes d. The ability to tolerate either fresh or salt water e. Returning the body to a set condition using feedback

	3. A tissue is a. Only found in animals b. Found in both plants and animals c. Is a group of similar cells that together carry out a specific function d. Both A & C e. Both B & C
Nervous & Endocrine systems (How do we control our bodies?)	4. Chemical communication in which hormones are carried from a gland through the bloodstream to a target organ or tissue: a. Nervous b. Exocrine c. Paracrine d. Endocrine e. Lymphatic 5. Nervous communication occurs when a. The voltage charge of a nerve cell changes at all b. The voltage charge within a nerve cell increases above a threshold value c. The voltage charge within a nerve cell decreases below a threshold value d. The voltage charge within a nerve cell equalizes with the outside e. A nerve cell contracts and squeezes out chemicals
Muscles & Bones (What effects movement after a nerve impulse?)	6. What happens when a muscle contracts? a. Thick and thin filaments separate from one another b. The sarcomere lengthens c. Binding sites on actin subunits are exposed for myosin to attach to d. Z-lines are pushed apart e. All of the above 7. Which of the following is NOT a role of bones in the body? a. Protection of organs b. Produce blood cells c. Aid movement d. Control mineral stores in the body e. Bones do all of the above
Digestion & Excretion (urinary) (Where do we get the energy we need for activities and what happens to "leftovers"- wastes?)	8. Where does the majority of digestive activity occur? a. Mouth b. Pharynx c. Stomach d. Small Intestine e. Large Intestine 9. What happens in a nephron? a. Nutrients are absorbed b. Fats are stored c. Waste and excess water are filtered out of the blood, and urine is formed

	d. Urine is stored prior to release e. Enzymes are produced that neutralize toxins in the blood
Respiration (Where do we get the O_2 needed to make ATP from food energy?)	10. Animals that need respiratory systems tend to a. Be very active b. Be very small or thin c. Live in moist environments d. Be very inactive e. All animals need respiratory systems 11. In vertebrates, O_2 and CO_2 are exchanged between a. Capillaries and bronchioles b. Arterioles and bronchioles c. Capillaries and tracheoles d. Venules and alveoli e. Capillaries and alveoli
Circulation (How are gasses and other molecules carried where they need to go?)	12. The large blood vessel that carries oxygenated blood from the heart to the body a. Pulmonary Vein b. Superior Vena Cava c. Pulmonary Artery d. Aorta e. Jugular Vein 13. A defibrillator is employed when heart contractions become weak and uncoordinated. What part of the heart is the defibrillator most likely stimulating? a. AtrioVentricular node b. SinoAtrial node c. Aorta d. Pulmonary Arteries e. Semi-lunar valves
Immunity (How do we maintain our bodies?)	14. Human Immunodeficiency Virus is especially dangerous because it targets the immune cells responsible for recognizing antigens and stimulating a full immune response. These cells are a. Natural killer cells b. Helper t-cells c. Macrophages d. Cytotoxic t-cells e. Memory b-cells 15. What is a vaccine? a. A drug that kills viruses b. A drug that kills bacteria or macroparasites c. A weakened pathogen that is used to stimulate production of antibodies for future immune response

	d. An injection that stimulates the bone marrow to produce more white blood cells to boost the immune response e. Any medical intervention that helps strengthen the immune system
Plant form & function (How do plants maintain life –like and unlike animals?)	16. Primary growth in plants a. Increases the diameter of a shoot or root b. Increases the length of a shoot or root c. Is determinate d. Occurs at the lateral meristem e. Both a & d 17. Xylem is a plant tissue that a. Moves sugar from roots to shoots b. Moves sugar from shoots to roots c. Moves water from roots to shoots d. Stores sugar following photosynthesis e. Collects sunlight energy for photosynthesis
Plant reproduction & growth (How do plants carry out their life cycle?)	18. The ovary of a plant develops into what structure? a. Flower b. Fruit c. Seed d. Plant embryo e. Nothing- it drops off after fertilization 19. The main role of plant cotyledons is a. Produce hormones that help a seed break dormancy b. Transfer nutrients to a growing plant during sprouting c. Protect a growing shoot as it emerges through the soil d. Provide shade for a baby shoot e. All of the above
Plant-animal interactions (Why are plants and animals essential to one another?)	20. Dodo birds were fruit eaters. Following the extinction of the Dodo bird, an island palm also experienced rapid decline. Some scientists hypothesized that the Dodos ate and defecated the fruits and seeds of the palm, and without the Dodos, the palm could no longer spread and germinate. This is an example of a relationship known as a. Dysfunctional b. Mass extinction c. Co-evolution d. Highly selective e. Predation 21. Some plants, like legumes, have a symbiotic relationship with bacteria that "fix" atmospheric nitrogen into a useable form. This relationship is the foundation behind a. Counting growth rings to estimate the age of a tree

	b. "Girdling" trees to kill them by removing a strip of bark all the way around the tree c. Crop rotation d. Use of fertilizers e. Vegetarians eating lots of soybeans
Laboratory basics	22. You want to conduct an experiment examining plant phototropism. You have a choice of using plants that have been grown in full sunlight or plants that have been grown in a darkened greenhouse. What do you use? a. Both types of plants b. The dark-growth plants c. The light-growth plants 23. Your blood pressure reading comes back as 150 over 90. Which reading describes the contractions of the heart that send blood to the body and what is that reading called? a. 150-diastolic b. 90-diastolic c. 150-systolic d. 90-systolic e. You must divide 150 by 90 to get the ventricular reading

LAS
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For

Program Review

Degree Program(s): LACC, BA, BS

(BA, BS, BFA, MA, MS, LACC, etc.)

Course # / Title: BI 211

Faculty name: Sarah Boomer

Date: June 7, 2011

A) State the program **learning outcome** or **general education goal** this assessment is linked to:

Course Objectives: *At the end of the course, students should be able to…*

UNIT ONE
- describe properties of life, emphasizing levels of biological organization through the cell
- explain biological molecules, including building blocks, chemical properties, and function
- describe required parts of eukaryotic (both plant and animal) cells and prokaryotic cells

UNIT TWO
- describe membrane structure and function, including diffusion, osmosis, and transport
- explain basic thermodynamics, emphasizing the relationship between order and energy
- diagram and explain how cells harvest energy via respiration, fermentation, photosynthesis

UNIT THREE
- understand the cell cycle and compare and contrast mitosis and meiosis
- recognize inheritance patterns, including for genetic diseases, to predict cross outcomes
- describe DNA, replication, and understand the basis for genetic variation and evolution

UNIT FOUR
- explain gene expression (transcription and translation), and mechanisms of gene regulation
- describe special examples of molecular biology, including viruses and cancer
- describe molecular applications, including biotechnology, genomics, and bioinformatics

CROSS-CUTTING
- engage in laboratory experimentation, data analysis and interpretation, and critical thinking

B) Check the embedded assessment tool(s) used :

☐ Exam question- X
☐ Essay

☐ Oral presentation
☐ Thesis
☐ Portfolios
☐ Practicum / Service Learning
☐ Capstone paper / project
☐ X Other ___Pre-Post Surveys_____

Attach a copy of the actual question / assignment as it is presented to the student or a description of the embedded process.

SEE ATTACHED pdf

Please submit a copy of this action report to the LAS dean's office.

LAS
Embedded Assessment Action Report
For
Program Review

Degree Program(s): Pre-Nursing, Human Biology Minor
(BA, BS, BFA, MA, MS, LACC, etc.)

Course # / Title: BI 318

Faculty name: Sarah Boomer

Date: June 7, 2011

A) State the program **learning outcome** or **general education goal** this assessment is linked to:

Learning Outcomes Summary

Unit One - Introduction, Viruses, Defenses & Immunology	
Lecture/Lab	**Learning Outcomes - Things to Know, Be Able To Describe…**
Lecture 1: Introduction	Categories of microbes, their applications and benefits, historical landmarks Virus features, compare/contrast RNA viruses, DNA viruses, retroviruses ALL featured viral diseases – transmission, source, target, special issues Nonspecific body defenses and immunology (humoral, cell-mediated, MALT) Prion structure, control, diseases, recent history Aseptic techniques, media, various counting methods, including ALL MATH
Lectures 2-5: Virology, Defenses, Immunology	
Lab 1: Introduction, Counting	
Unit Two - Bacterial Structures and Diversity	
Lectures 6-7, Lab 2: Prokaryotic Cells Virulence Factors	Compare/contrast prokaryotic vs. eukaryotic cells – basic structures Bacterial Classification using cell wall, shapes, rudimentary – all examples Virulence factors: kinds, function, examples, lab tests – all examples ALL featured bacterial diseases – transmission, source, target, special issues Respiration, fermentation - compare/contrast with novel bacterial reactions Lab media, ID testing, clinical sampling methods, microscopy methods
Lecture 8, Lab 3: Metabolism, GI Pathogens	
Unit Three - Bacterial Control and Infection Issues	
Lecture 9: Genetics, Evolution	Compare/contrast prokaryotic vs. eukaryotic DNA, mutation, recombination What affects microbial growth, examples of extreme pathogens Defensive body chemicals that control bacteria, name and mechanism ALL chemicals in vitro from lecture, lab, including target ALL drugs (history, kinds, targets, spectrum), resistance issues, superbugs Normal flora ecology, related diseases – including nosocomials and trends
Lecture 10, Lab 4: Microbial Control	
Lecture 11: Normal Flora, Nosocomials	
Unit Four - Eukaryotic Pathogens, Immunity, Epidemiology	
Lecture 12-13, Lab 5: Eukaryotic Microbes	Algae, Fungi, Protozoa, Worm traits, subgroups, pathogens, lab methods Active (natural vs. artificial), passive (natural vs. artificial) immunity Immunology applications - vaccines, neutralizing Ab treatments ALL Childhood vaccines - name, disease/agent, what kind each is Epidemiology vocabulary, public health agencies and their approaches ALL Top Global Infectious Killers details - see additional worksheet below…
Lecture 13 Epidemiology	
Lecture 14: Immunity, Vaccines	

B) Check the embedded assessment tool(s) used :

☐ Exam question- X

☐ Essay
☐ Oral presentation
☐ Thesis
☐ Portfolios
☐ Practicum / Service Learning
☐ Capstone paper / project
☐ X Other ___Pre-Post Surveys_____

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For

Program Review

Degree Program(s): BA, BS

(BA, BS, BFA, MA, MS, LACC, etc.)

Course # / Title: BI 331

Faculty name: Sarah Boomer

Date: June 7, 2011

A) State the program **learning outcome** or **general education goal** this assessment is linked to:

Unit One Learning Outcomes = Prokaryotic Diversity - Ecology, Metabolism, Genetics, Control	
Lecture	Things to Know, Be Able To Do
Introduction	Ways to categorize and describe microbes, examples thereof Microbiology applications and landmarks in microbiology history
Prokaryotic Cell Biology	Compare/contrast domain membranes, walls, surface & cytoplasmic structures Environmental bacteria with unique structures and/or lifestyles
Chemotrophy	Recognize e- donor and acceptor in prokaryotic reactions Prokaryotic chemolithotrophic and anaerobic respiration examples
Phototrophy	Compare/contrast domain photosynthesis reactions, pigments, membranes Earth history landmarks, emphasizing metabolic features
Central Dogma, Antibacterials	Compare/contrast domain structures and processes related to central dogma Antibacterial drugs - history, source, spectrum, target, resistance
Control Pathogens	Physical and chemical factors that affect microbial growth Environmental microbes that evade control, contaminate food
Ecology of You Nosocomials	Ecology of normal flora, emphasizing body regions and their control Nosocomial infections, emphasizing overall trends and examples
Unit Two Learning Outcomes = Medical - Immunology and Pathogens (Prok, Euk, Viral)	
Immunology	Distinguish nonspecific (1^{st}, 2^{nd}) vs. specific (3^{rd}) defenses, players for each For specific, understand humoral, cell-mediated, mucosal - all players, all Ab Know strategies pathogens use to exploit the defenses - examples
Pathogens, STD's	Understand steps of bacterial pathogenesis, virulence factors that facilitate All lecture pathogens (including STD's) that illustrate virulence factors, how Compare/contrast STD agents - all levels (structure, classification, disease…)
Applied Immunology	Compare/contrast active and passive immunity - natural and artificial Example vaccines & neutralizing Ab treatments - pathogens/virulence factors
Eukaryotic Microbes	All major eukaryotic classification groups from lecture Unique features of fungi and protozoa, example pathogens
Virology I	Attributes of viruses - compare/contrast with cells, history/discovery Viral classification, structures and replication cycle features

	Class I viruses, emphasizing structures, replication, host/diseases
Virology II	Class IV-VII viruses, emphasizing structures, replication, host/diseases Compare/contrast viruses in terms of unique evolution, features Compare/contrast viruses in terms of cancer - cis/trans capabilities
Virology III Epidemiology	Compare/contrast antivirals - natural and synthetic drugs Prions - all levels of understanding (structure, function, disease) Epidemiology vocabulary, strategies, agencies, top 10 global killers
Lab Learning Outcomes = Culture-Dependent and -Independent Approaches to Microbiology	
Basic Techniques	Describe media and septic techniques, including all tools and procedures Microbial division and growth curve, counting methods - pros, cons, and math
Nitrogen Cycle, Enrichments	Nitrogen cycle chemistry, example genera - their ecology and applications N fixation diversity, how different genera handle the oxygen problem Describe enrichment strategies, procedures – advanced methods (paper!)
Applied Micro Gram Positives	Industrial microbiology, example products, all aspects of fermentation Compare/contrast Gram Positive phylum subgroups, microbes - all levels Soil procedures, microbes and useful products (all antibacterial facts/data)
Evolution	Compare/contrast prokaryotic recombination - transformation methods Deino/Thermus applications, genomic biology (paper, review genome lecture!)
Food/Fecal Proteobacteria	Compare/contrast food/feces-associated Proteobacteria subgroups, microbes Understand medical ID testing, on-line tools for archiving and analyzing DNA Compare/contrast diarrhea agents, toxins, disease/pathogenicity
16S Analysis Studying/Using Plasmids	All molecular tools and procedures - especially plasmid isolation flow chart All vector/plasmic features, how they are used in cloning Principles of gel electrophoresis, fingerprinting, restriction enzymes
Immunology, Epidemiology	Immunodiagnostic tests – agglutination, ELISA, fluorescence, gel (paper) Epidemiology vocabulary and example pathogens from lab (including paper)

B) Check the embedded assessment tool(s) used :

☐ Exam question- X
☐ Essay
☐ Oral presentation
☐ Thesis
☐ Portfolios
☐ Practicum / Service Learning
☐ Capstone paper / project
☐ X Other ___Pre-Post Surveys_____

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For

Program Review

Degree Program(s): ___BA, BS_____

(BA, BS, BFA, MA, MS, LACC, etc.)

Course # / Title: _Exit Survey – Given With ETS Before Graduation _____

Faculty name: __Sarah Boomer_____

Date: _____June 7, 2011_____

A) State the program **learning outcome** or **general education goal** this assessment is linked to:

To assess soon-to-be graduating Biology Majors, we developed an exit survey (see attached) and administered it to all students immediately following completion of the ETS biology content exam.

B) Check the embedded assessment tool(s) used :

- ☐ Exam question
- ☐ Essay
- ☐ Oral presentation
- ☐ Thesis
- ☐ Portfolios
- ☐ Practicum / Service Learning
- ☐ Capstone paper / project
- ☐ X Other ___Exit Survey_____

Attach a copy of the actual question / assignment as it is presented to the student or a description of the embedded process.

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Please submit a copy of this action report to the LAS dean's office.

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For

Program Review

Degree Program(s): ___LACC_____

(BA, BS, BFA, MA, MS, LACC, etc.)

Course # / Title: _GS 201_____

Faculty name: __Erin Baumgartner_____

Date: _____June 9, 2010_____

A) State the program **learning outcome** or **general education goal** this assessment is linked to:

1. Students will demonstrate effective critical thinking;
2. Students will demonstrate effective literacy and communication skills;
3. Students will demonstrate an ability to explore the world in integrative and synthetic ways through disciplinary study across the arts, sciences, and humanities;

B) Check the embedded assessment tool(s) used :

- ☐ Exam question
- ☐ Essay
- ☐ Oral presentation
- ☐ Thesis
- ☐ Portfolios
- ☐ Practicum / Service Learning
- ☐ Capstone paper / project
- ☐ Other __*web page*_____

Attach a copy of the actual question / assignment as it is presented to the student or a description of the embedded process.

Please submit a copy of this action report to the LAS dean's office.

GS 201H Fall 2010 <u>Biodiversity Project (120 points):</u>

This project is an investigation of and public report on the biodiversity on the WOU campus. As a class, we will be collecting data on the species diversity on our campus. We are going to

develop a class website that presents an overview of that diversity. In addition, each student will select an organism that is found on our campus and develop a webpage that highlights that element of our campus biodiversity. These individual webpages will highlight individual species, their taxonomic classification and role in our campus environment, and provide information on how to identify them.

PLAGIARISM OF ANY PORTION OF YOUR PROJECT WILL RESULT IN A ZERO FOR THE ENTIRE ASSIGNMENT

Plagiarism refers to the use of original work, ideas, or text that are not your own. If you submit any work that incorporates the ideas or words of others, you must cite their work. If you need help figuring out how to cite your sources, please see me or visit the writing center. Also be aware that a paper made up entirely of quotes and citations does not constitute a high-quality assignment. I am interested in your ability to gather, synthesize, and evaluate information, not your ability to cut and paste. ***(This includes the group portion; I assume you are verifying one another's work, so the entire group WILL be held accountable for plagiarized group pages).***

Group project overview pages (20 points)

As a class, we'll be developing a main site that will include general background information on biodiversity, specific background information about our class biodiversity project, the design and methodology of our class study of biodiversity, and the results of our study. Each of these four broad topics will be covered by small groups of students working together.

- Mechanics
  - Adherence to page theme developed by class consensus
  - Free from grammatical and spelling errors. **PROOFREAD CAREFULLY!**
  - Graphics, photographs, and figures must be cited and adhere to copyright laws. I recommend that you use media commons and other free-use sources (they must still be cited). If you find a photograph or other figure you would like to use that is copyrighted, you must obtain permission from the copyright holder.
  - Information obtained from other sources must also be referenced appropriately, using American Psychological Association document style. Refer to the page on our Moodle class site on citations for assistance (or ask me for help!).
- Content
  - Content is concise
    - This is an introductory overview; provide only the critical information
    - Do not include a lot of unnecessary or irrelevant details
  - Content is easy-to-understand
    - Avoid jargon when possible and provide definitions and examples for scientific terms
    - A picture is worth 1000 words! Use (appropriately labeled) figures to illustrate relevant points (but don't forget your alternate tags).
  - Content is accurate
    - Double check your information, provide references if necessary
    - All information you provide must be biologically accurate and represent truthfully what we did and found in our project (even any errors we may have made or disappointing results we may have achieved).

Individual webpages (75 points)

Each individual student will select an organism that you would like to focus on and develop a page that highlights that species.

- Mechanics – same as for our group pages outlined above
- Content
  - The same criteria of concise, easy-to-understand, and accurate that we used in our group pages apply to the individual pages
  - All pages must include the following information:
    - Clearly describe the organism that you have chosen.
      - How is it identified?
      - What are the distinctive or distinguishing characteristics?
      - Where can it be found?
    - What is its taxonomic status?
      - Provide a classification hierarchy.
      - You may choose to identify some close relatives if you feel it is relevant or might be of interest to our audience.
    - What is its biogeographic status?
      - How widespread is it?
      - Is it endemic, indigenous, alien?
    - What is its ecological importance?
      - Biotic interactions – how it interacts with other living things
      - Abiotic interactions – how it impacts the physical environment
      - Does it have any interesting symbiotic interactions?
      - Does it play a special role (e.g. keystone species or invasive species)?
      - Where does it fit in the food web?
    - What is its relationship (if any) to humans?
      - Is it helpful, innocuous, or a pest?
      - How do humans impact it?
    - Reflection
      - Why did you choose to focus on this organism?
      - What do you think is most interesting about it?
- References
  - You will need to submit a bibliography of at least 5 references that you used to help you develop your webpage.
  - Of the 5 minimum references, at least 3 must NOT be webpages; at least 1 must be a primary literature reference (primary literature refers to a journal article or research report that first describes a discovery or research study). These can be downloaded electronically or accessed through the library.
  - Other acceptable references include newspapers, magazine articles, and webpages *if the source is credible* (avoid the *Weekly World News* articles about Bigfoot)
  - Wikipedia is a great place to begin gathering information, but must be verified. Wikipedia is NOT an acceptable reference

- Peer Review (15 points)
  - Your team members will provide a confidential participation score for your work (10 pts)
  - The entire class will evaluate the effectiveness of your webpage. These scores (5 pts each for group page and individual page) will be averaged.

  Note: if you do not complete a peer review for your classmates, you will automatically forfeit your own peer review points.

Assessment of Learning Rubric (Group):

PROJECT ELEMENTS (20 TOTAL)	**MISSES (1 POINT)**	**APPROACHES (3 POINTS)**	**MEETS (5 POINTS)**
Mechanics	Not all criteria applied Many grammatical & spelling errors Apparent copyright violations	Criteria applied appropriately; few grammatical & spelling errors No copyright violations	Criteria applied appropriately; free from grammatical & spelling errors No copyright violations
Concise Content	Page is overly lengthy with 8 or more paragraphs of text per most major topics. A visitor will need more than 20 minutes of reading to gather information.	Page is somewhat concise, with 4-7 paragraphs of text per topic or more than 8 paragraphs of text on some topics. A visitor can gather information within 10-20 minutes of reading.	Page is concise. Text is generally limited to 1-3 paragraphs per major topic. A visitor can gather information within 5-10 minutes of reading.
Understandable Content	Page is difficult to understand. There is extensive use of jargon. Few or no scientific terms are explained. No examples are provided. Figures are not provided to illustrate key concepts.	Page is mostly understandable with some use of jargon. Most scientific terms are explained. Examples are provided but not entirely relevant. Figures are provided but not labeled appropriately.	Page is understandable. Jargon is minimized. Needed scientific terms are explained and relevant examples are provided. Figures (pictures, graphics, graphs) are provided to illustrate key concepts and are labeled appropriately.
Accurate Content	Lots of inaccurate information and/or misrepresentations of project work. Many misleading statements and scientific disagreements are disregarded.	Information is not entirely biologically accurate, or misrepresents project work. Some misleading statements. Existing scientific disagreements on topics are disregarded.	Information provided is biologically accurate and truthfully represents our project work. There are no misleading statements. If there are scientific disagreements regarding a topic, you have presented those.

Assessment of Learning Rubric (Individual):

PROJECT ELEMENTS (15 TOTAL)	**MISSES (1 POINTS)**	**APPROACHES (3 POINTS)**	**MEETS (5 POINTS)**
Mechanics	Not all criteria applied Many grammatical & spelling errors Apparent copyright violations	Criteria applied appropriately; few grammatical & spelling errors No copyright violations	Criteria applied appropriately; free from grammatical & spelling errors No copyright violations
References	Less than 5 references, use of Wikipedia as a reference, no primary references are included, some references are suspect or unreliable	At least 5 references, but less than 3 are not webpages, no primary references are included	At least 5 references; at least 3 are not webpages, 1 or more primary references All references are reliable, legitimate sources.
Content	Meets one or none of the content criteria outlined in group rubric	Meets at least two of the content criteria outlined in group rubric	Meets all content criteria outlined in group rubric (concise, understandable, & accurate)
INFORMATION (60 TOTAL)	**MISSES (2 POINTS EACH)**	**APPROACHES (6 POINTS EACH)**	**MEETS (10 POINTS EACH)**
Description **Taxonomy** **Biogeography** **Ecology** **Humans** **Reflection**	50% or more of the required elements are incomplete.	Most elements of required content are complete, but at least one is incomplete.	All elements of required content are complete. If you were unable to determine information, or it is scientifically unknown, that is stated.

LAS
Embedded Assessment Action Report
For
Program Review

Degree Program(s): ___B Ed_____

(BA, BS, BFA, MA, MS, LACC, etc.)

Course # / Title: _GS 311_____

Faculty name: __Erin Baumgartner_____

Date: _____June 9, 2011_____

A) State the program **learning outcome** or **general education goal** this assessment is linked to:

1. Demonstrate evidence of appropriate content knowledge, skills, and dispositions necessary for attaining high achievement for all PK-12 students;

B) Check the embedded assessment tool(s) used :

- ☐ Exam question
- ☐ Essay
- ☐ Oral presentation
- ☐ Thesis
- ☐ Portfolios
- ☐ Practicum / Service Learning
- ☐ Capstone paper / project
- ☐ X Other _Lesson plan_____

Attach a copy of the actual question / assignment as it is presented to the student or a description of the embedded process.

Please submit a copy of this action report to the LAS dean's office.

GS 311 Spring 2011
Lesson Plan Project

You will be developing a lesson plan to teach a 30-minute lesson about some concept or skill related to estuarine ecology. This lesson plan will also need to support your chosen learning outcome within the Oregon Content Standards for Science. This lesson plan will be grounded in relevant education research and must reflect the your personal philosophy of science teaching. You will be responsible for presenting a 10-minute overview of your lesson to a group of science and education students and for teaching your lesson to our class during the last two weeks of the term.

This is a **BIG** project, so it makes sense to stay on track with it over the course of the term. You will also need the support of your peers and your instructor. To this end, we will be employing a tool to help you progress on your lesson plan and provide you with regular feedback. For each item on your checklist, you will reflect on your progress, share ideas with your peers, and get some instructor feedback. You will use your checklist to help you prepare your full lesson plan. Except for the first one, each checkpoint is worth 5 points (combined reflection and review of a classmate's work), for a total of 15 points.

Checkpoint 1: Choose your learning objective. DO THIS FIRST!!!
By the end of class on **4/7** you need to decide on the Content Standard you will focus on, and notify me of the particular learning outcome you will be targeting. Your teaching projects and lesson plan will all focus on and support the learning outcome.

Checkpoint 2: (in class 4/21) Assessment - How will you know that your students have accomplished your learning outcome? What product(s) will you have them produce to show that they understand? What will those products look like if they "get it" compared to if they do not? How will you measure student achievement of the learning outcome? You should examine opportunities for both formative assessment, in which you assess learning during the course of the lesson to modify instruction, and summative assessment, in which you examine the final achievement of learning outcomes. You should also consider how to engage students in assessing themselves. How will you help them measure their own learning?

Checkpoint 3: (in class 5/3) Inquiry Plan - How will you engage the students in inquiry? What are the steps you will take (think of this as a "script" with room for flexibility)? What *questions* will you ask to stimulate student interest and curiosity? What kinds of questions will you have them ask? What ways or modes of finding out new knowledge will you use? How will students be able to help drive or control the process?

Checkpoint 4: (in class 5/12) Learning Strategies - How will you motivate learners in your lesson and engage students in directing their own learning? How will you address the needs and interests of different students? How will you provide a learning environment that is both engaging and safe for students (consider how to make sure that students are both emotionally and physically safe)? How will you provide opportunities for students to interact with one another? How will you connect what you are doing in science class to other disciplines (think reading, writing, mathematics, social studies, and creative arts). How could you connect what you are doing in science class to the community beyond your classroom (this includes students' lives at home and the broader community)?

Lesson plan (Final Project): Due 6/3. 70 points

You will submit your full lesson plan on 6/3. These are the things your lesson plan MUST include: (many of these items will be accomplished as you complete your checklist, but will need to be integrated into your full plan)

- What is your personal philosophy of science teaching? Basically, what do you think is the most effective way to teach science to your students? How does your lesson reflect this philosophy?

- What is the learning outcome (specific content or skill) you have focused on? What Oregon Content Standards for Science are aligned to the learning outcome?

- How will you assess student learning; basically, how will you know that anyone learned anything?

- How does your lesson convey the nature of scientific thinking? How does it promote scientific inquiry?

- What strategies will you use to convey the information? What questions will you ask?

- What strategies will you use to motivate and engage students? How does your lesson promote rigor, relevance, and relationships?

- How will you connect your science content to other disciplines (reading, writing, mathematics, social studies, art)?

- What safety issues do you need to consider? How will you address them?

Lesson Presentation. 25 points:

We'll be presenting our lesson plans during the final two weeks of class. You will have 10 minutes to provide a brief overview of your outcome and learning strategies to the combined BI 361 and GS 311 classes on 5/24 and 30 minutes (based on the appropriate length for an elementary science lesson) to present your lesson and teach your learning outcome to your peers in GS 311. This presentation is worth 25 points. Your lesson will be reviewed by your peers (using the criteria listed in the peer review form) and that score will be averaged with my score, which will incorporate the same criteria.

Assessment Rubric for Lesson Plan:

	Misses 3 pts	**Approaches 7 pts**	**Meets 10 pts**
Mechanics	Lesson plan is sloppy and poorly organized Many grammatical & spelling errors Resources are not properly cited	Lesson plan is well-organized, but presentation is poor. Few grammatical & spelling errors Resources are properly cited	Lesson plan is well-organized and well presented. Free from grammatical & spelling errors Resources are properly cited and a variety are used
Teaching philosophy	Teaching philosophy is unclear Philosophy is not described within framework of lesson.	Teaching philosophy briefly described, but not clearly tied to lesson plan, Supporting components to philosophy within the lesson are unidentified.	Teaching philosophy is very well described, and embedded in lesson Lesson includes exemplars that highlight the teaching philosophy identified.
Learning Goals	No clear learning goals identified No connection between learning goals and instruction	Learning goals briefly described Learning goals not clearly tied to instruction.	Learning goals clearly described Learning goals tied to instruction and assessment.
Inquiry Plan	No plan for instruction beyond basic lecture notes. Scientific inquiry not addressed. Lecture notes do not make it apparent that students will be asking or answering questions. "Cookbook" directions tell students what to do.	A plan for instruction described, but not carefully thought out. Little discussion of actual instructional strategy beyond notes for material to be covered Minimal number of low-critical thinking level questions integrated into lesson. Students have limited choices	A plan for instruction thoroughly described and mapped out Lesson engages students in scientific discovery Variety of questions, including higher thinking levels, thoroughly integrated into lesson. Students can make choices and direct their own activities
Assessment	Learning goals are not assessed. Assessment is only summative, not formative. Students not involved in assessment with no opportunity to reflection on what they've learned.	Assessment not well aligned to learning goals or not all goals assessed Only basic assessments used both formatively and summatively, Students minimally engaged in assessment with little opportunity for reflection on learning.	Assessments align to learning goals and all goals are assessed. Multiple formative and summative methods for assessing student learning Students fully engaged in assessment process with ample opp.ortunity to reflect on their learning

	Misses 3 pts	Approaches 7 pts	Meets 10 pts
Learning Strategies	Lesson plan does not provide opportunities for engagement in other disciplines Little opportunity for students to interact with one another Activities are not student-centered; little opportunity for student input Activities are disconnected from student's experience and lack relevance. Activities do not challenge students	Minimal opportunity for engagement in other disciplines Multiple opportunities for students to interact with one another Activities provide some opportunity for student input Activities have some connection to student's experience Activities are moderately challenging for students	Well connected to other disciplines with mutually supportive material Student interaction is an essential feature of the plan Activities are student-centered and require student input Activities are clearly relevant to student's daily lives and local experience Activities are challenging, but instructor support is provided
Safety	Safety issues ignored Potential for emotional or physical danger to students Potential for mishandling or unnecessary harm to living animals or plants	Safety issues (emotional & physical) mentioned, but not addressed thoroughly General safety protocols, but special needs of some student groups are not considered Living organisms are not unnecessarily harmed, but also not clearly treated respectfully	Safety issues (emotional & physical) identified and clearly addressed All student groups are considered in safety protocols Living organisms are not unnecessarily harmed and are treated with respect

Lesson Presentation Evaluation (to be completed for Peer Review):

Was the lesson enjoyable?

No, it was boring and difficult to understand — Yes, I enjoyed it and felt like I could do it

1 2 3 4 5

Were the learning outcomes clear?

No, I didn't know what I was supposed to get out of this — Yes, I knew what I should get out of this lesson

1 2 3 4 5

Was the lesson relevant?

No, I didn't relate to it at all — Yes, I felt like it connected to me and my life

1 2 3 4 5

Did the lesson reflect the nature of science?

No, I didn't feel like I was doing science at all — Yes, this lesson engaged me in scientific inquiry

1 2 3 4 5

Was the lesson presented in a professional manner?

No, I don't feel like this lesson was presented professionally — Yes, I found this lesson to be very professional

1 2 3 4 5

LAS
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Program Review

Degree Program(s): ___B Ed_____

(BA, BS, BFA, MA, MS, LACC, etc.)

Course # / Title: _GS 311_____

Faculty name: __Erin Baumgartner_____

Date: _____June 9, 2011_____

A) State the program **learning outcome** or **general education goal** this assessment is linked to:

1. Demonstrate evidence of appropriate content knowledge, skills, and dispositions necessary for attaining high achievement for all PK-12 students;

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- ☐ Exam question
- ☐ Essay
- ☐ Oral presentation
- ☐ Thesis
- ☐ Portfolios
- ☐ Practicum / Service Learning
- ☐ Capstone paper / project
- ☐ X Other _Journaling_____

Attach a copy of the actual question / assignment as it is presented to the student or a description of the embedded process.

Please submit a copy of this action report to the LAS dean's office.

Each week you will write a journal response to the National Science Teachers Association Professional Development Standards. Each week of class corresponds to a standard (listed below). Your journal response should be 2-3 paragraphs. It must include *your interpretation of the standard*- what you think it means. It must include *a personal reflection on what this standard means to you* as a student (perhaps think about how you've learned from a teacher who embodied it) or as a future teacher of science. Finally, you must provide *a concrete, specific example of how you will incorporate this standard* into your future teaching of life science. I will choose highlights from various journal entries each week to share with the class.

Journaling rubric:
1 pt: Journal entry is free from grammatical and spelling errors
1 pt: Thoughtful interpretation of standard (not just rephrased)
1 pt: Personal reflection relates clearly to interpretation
1 pt: Example of potential teaching practice is specific and detailed
1 pt: Example of potential teaching practice relates to *life* science

WEEK 1: Standard 1: Content
Teachers of science understand and can articulate the knowledge and practices of contemporary science. They can interrelate and interpret important concepts, ideas, and applications in their fields of licensure; and can conduct scientific investigations. To show that they are prepared in content, teachers of science must demonstrate that they:
a. Understand and can successfully convey to students the major concepts, principles, theories, laws, and interrelationships of their fields of licensure and supporting fields as recommended by the National Science Teachers Association.
b. Understand and can successfully convey to students the unifying concepts of science delineated by the National Science Education Standards.
c. Understand and can successfully convey to students important personal and technological applications of science in their fields of licensure.
d. Understand research and can successfully design, conduct, report and evaluate investigations in science.
e. Understand and can successfully use mathematics to process and report data, and solve problems, in their field(s) of licensure.

WEEK 2: Standard 2: Nature of Science
Teachers of science engage students effectively in studies of the history, philosophy, and practice of science. They enable students to distinguish science from nonscience, understand the evolution and practice of science as a human endeavor, and critically analyze assertions made in the name of science. To show they are prepared to teach the nature of science, teachers of science must demonstrate that they:
a. Understand the historical and cultural development of science and the evolution of knowledge in their discipline.
b. Understand the philosophical tenets, assumptions, goals, and values that distinguish science from technology and from other ways of knowing the world.
c. Engage students successfully in studies of the nature of science including, when possible, the critical analysis of false or doubtful assertions made in the name of science.

WEEK 3: Standard 3: Inquiry
Teachers of science engage students both in studies of various methods of scientific inquiry and in active learning through scientific inquiry. They encourage students, individually and collaboratively, to observe, ask questions, design inquiries, and collect and interpret data in order to develop concepts and relationships from empirical experiences. To show that they are prepared to teach through inquiry, teachers of science must demonstrate that they:
a. Understand the processes, tenets, and assumptions of multiple methods of inquiry leading to scientific knowledge.
b. Engage students successfully in developmentally appropriate inquiries that require them to develop

concepts and relationships from their observations, data, and inferences in a scientific manner.

WEEK 4: Standard 4: Issues
Teachers of science recognize that informed citizens must be prepared to make decisions and take action on contemporary science- and technology-related issues of interest to the general society. They require students to conduct inquiries into the factual basis of such issues and to assess possible actions and outcomes based upon their goals and values. To show that they are prepared to engage students in studies of issues related to science, teachers of science must demonstrate that they:
a. Understand socially important issues related to science and technology in their field of licensure, as well as processes used to analyze and make decisions on such issues.
b. Engage students successfully in the analysis of problems, including considerations of risks, costs, and benefits of alternative solutions; relating these to the knowledge, goals and values of the students.

WEEK 5: Standard 5: General Skills of Teaching
Teachers of science create a community of diverse learners who construct meaning from their science experiences and possess a disposition for further exploration and learning. They use, and can justify, a variety of classroom arrangements, groupings, actions, strategies, and methodologies. To show that they are prepared to create a community of diverse learners, teachers of science must demonstrate that they:
a. Vary their teaching actions, strategies, and methods to promote the development of multiple student skills and levels of understanding.
b. Successfully promote the learning of science by students with different abilities, needs, interests, and backgrounds.
c. Successfully organize and engage students in collaborative learning using different student group learning strategies.
d. Successfully use technological tools, including but not limited to computer technology, to access resources, collect and process data, and facilitate the learning of science.
e. Understand and build effectively upon the prior beliefs, knowledge, experiences, and interests of students.
f. Create and maintain a psychologically and socially safe and supportive learning environment.

WEEK 6: Standard 6: Curriculum
Teachers of science plan and implement an active, coherent, and effective curriculum that is consistent with the goals and recommendations of the National Science Education Standards.
They begin with the end in mind and effectively incorporate contemporary practices and resources into their planning and teaching. To show that they are prepared to plan and implement an effective science curriculum, teachers of science must demonstrate that they:
a. Understand the curricular recommendations of the National Science Education Standards, and can identify, access, and/or create resources and activities for science education that are consistent with the standards.
b. Plan and implement internally consistent units of study that address the diverse goals of the National Science Education Standards and the needs and abilities of students.

WEEK 7: Standard 7: Science in the Community
Teachers of science relate their discipline to their local and regional communities, involving stakeholders and using the individual, institutional, and natural resources of the community in their teaching. They actively engage students in science-related studies or activities related to locally important issues. To show that they are prepared to relate science to the community, teachers of science must demonstrate that they:
a. Identify ways to relate science to the community, involve stakeholders, and use community resources to promote the learning of science.
b. Involve students successfully in activities that relate science to resources and stakeholders in the community or to the resolution of issues important to the community.

WEEK 8: Standard 8: Assessment
Teachers of science construct and use effective assessment strategies to determine the backgrounds and achievements of learners and facilitate their intellectual, social, and personal development. They assess students fairly and equitably, and require that students engage in ongoing self-assessment. To show that they are prepared to use assessment effectively, teachers of science must demonstrate that they:

a. Use multiple assessment tools and strategies to achieve important goals for instruction that are aligned with methods of instruction and the needs of students.
b. Use the results of multiple assessments to guide and modify instruction, the classroom environment, or the assessment process.
c. Use the results of assessments as vehicles for students to analyze their own learning, engaging students in reflective self-analysis of their own work.

WEEK 9: Standard 9: Safety and Welfare
Teachers of science organize safe and effective learning environments that promote the success of students and the welfare of all living things. They require and promote knowledge and respect for safety, and oversee the welfare of all living things used in the classroom or found in the field.
To show that they are prepared, teachers of science must demonstrate that they:
a. Understand the legal and ethical responsibilities of science teachers for the welfare of their students, the proper treatment of animals, and the maintenance and disposal of materials.
b. Know and practice safe and proper techniques for the preparation, storage, dispensing, supervision, and disposal of all materials used in science instruction.
c. Know and follow emergency procedures, maintain safety equipment, and ensure safety procedures appropriate for the activities and the abilities of students.
d. Treat all living organisms used in the classroom or found in the field in a safe, humane, and ethical manner and respect legal restrictions on their collection, keeping, and use.

WEEK 10: Standard 10: Professional Growth
Teachers of science strive continuously to grow and change, personally and professionally, to meet the diverse needs of their students, school, community, and profession. They have a desire and disposition for growth and betterment. To show their disposition for growth, teachers of science must demonstrate that they:
a. Engage actively and continuously in opportunities for professional learning and leadership that reach beyond minimum job requirements.
b. Reflect constantly upon their teaching and identify ways and means through which they may grow professionally.
c. Use information from students, supervisors, colleagues and others to improve their teaching and facilitate their professional growth.
d. Interact effectively with colleagues, parents, and students; mentor new colleagues; and foster positive relationships with the community.

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Degree Program(s): B Ed

(BA, BS, BFA, MA, MS, LACC, etc.)

Course # / Title: GS 311

Faculty name: Erin Baumgartner

Date: June 9, 2011

A) State the program **learning outcome** or **general education goal** this assessment is linked to:

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- ☐ Thesis
- ☐ X Portfolios
- ☐ Practicum / Service Learning
- ☐ Capstone paper / project
- ☐ Other _____

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GS 311 Portfolio Assignment (50 points)

You will be responsible for compiling a portfolio of your class activities to represent your knowledge acquisition over the term. You will select five assignments from the activities that we've completed this term. For each assignment you will write a brief (approximately 1 pg double-spaced) reflection that describes how that selection demonstrates some aspect of something you've learned this term.

Your portfolio should include an assignment (document or product that you produced this term) and reflection for each of the following (each worth 10 points):

1. An assignment that you feel represents your worst effort- what did you learn from this and how did you improve?

2. An assignment that you feel represents your best efforts- why do you feel this is a particularly strong effort and how does it demonstrate how you've built knowledge and skills?

3. An assignment that you feel demonstrates a commitment to the National Science Teachers Association Professional Development Standards (you've been journaling on these this term)- how does this reflect your professional growth?

4. An assignment that you feel helped you build your mastery of the Oregon Content Standards for Science- how does this demonstrate something you've learned that connects to the OCSS and/or your ability to implement these standards in the classroom?

5. An assignment that you feel helped you gain understanding of biological content about estuarine ecology- how does this demonstrate something you've learned about the ecology of estuaries?