Cassie M. Dresser

Teaching Portfolio

January 2017

University of Tennessee
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CASSIE M. DRESSER

Abbreviated CV

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EDUCATION

Ph.D., Biology, University of Tennessee, Knoxville, TN	2013-2017
M.S., Conservation Biology, Central Michigan University, Mount Pleasant, MI	2010-2013
B.A., Biology, Hartwick College, Oneonta, NY	2006-2010
HSD, South Seneca Central School, Ovid, NY	2002-2006

EXPERIENCE

Research Assistant, Dr. Bradley Swanson, Central Michigan University	2013
Field Research Assistant, Dr. Mark Kuhlmann, Hartwick College	2010
Graduate Teaching Assistant, Vertebrate Biology, Dr. Benjamin Fitzpatrick	2017
Head Teaching Assistant, BIOL 150, University of Tennessee	2016
Graduate Teaching Assistant, Biology Literacy, Dr. Benjamin Keck, University of Tennessee	2016
Instructor of Record, BIOL 280: Evolution, University of Tennessee	2015
Instructor of Record, BIOL 281: Evolution Discussion, University of Tennessee	2015
Graduate Discussion Instructor, Dr. Stan Guffey, University of Tennessee	2014
Graduate Lecture Assistant, Dr. Sarah Dalrymple, University of Tennessee	2014
Graduate Lecture Assistant, Dr. Elizabeth Schussler, University of Tennessee	2013
Graduate Teaching Assistant, Mr. Daniel Benjamin, Central Michigan University	2010-2013
Student Instructor, Dr. Douglas Hamilton, Hartwick College	2009
State Park Explorer Guide, Pontiac Lake Recreation Area, Michigan DNR	2013

PUBLICATIONS

Dresser, C.M. and B.J. Swanson (2013) Preemptive legislation inhibits the anthropogenic spread of an aquatic invasive species, the rusty crayfish (*Orconectes rusticus*). Biological Invasions, 15, 1049-1056.

Dresser, C.M. and B.J. Swanson (In Press) Variation in native crayfish agonistic response to the invasion of the rusty crayfish *Orconectes rusticus* (Girard, 1852). Journal of Crustacean Biology. DOI: 10.1163/1937240X-00002404.

Dresser, C.M., M. Kuhlmann, and B.J. Swanson (In Review; American Naturalist) Role of abiotic factors on native crayfish behavioral defense against invasive rusty crayfish (*Orconectes rusticus*).

Literman, R., S. Radhakrishnan, J. Tamplin, R. Burke, **C. Dresser**, and N. Valenzuela (In Review; Conservation Genetics Resources) Development of sexing markers in *Glyptemys insculpta* and *Apalone spinifera* turtles uncovers an XX/XY sex-determining system in the critically-endangered bog turtle *Glyptemys muhlenbergii*.

Dresser, C.M., R.M. Ogle, and B.M. Fitzpatrick (In Review; Conservation Genetics) Genome scale assessment of a species translocation program.

PRESENTATIONS

Dresser, C.M., J. Brigati, and E.E. Schussler (November 2016) Which active learning approaches are most effective? Poster presentation. Innovation in Teaching and Learning Symposium, University of Tennessee, Knoxville, TN.

Dresser, C.M. (September 2016) A tiny turtle tale: Genetic assessment of a captive breeding and release program for the endangered bog turtle. Oral presentation. Tennessee Herpetological Society, Knoxville, TN.

Dresser, C.M. (July 2016) Genetic assessment of a bog turtle captive breeding and release program. Oral presentation. North American Congress of Conservation Biology, Madison, WI.

Dresser, C.M., J. Brigati, and E.E. Schussler (July 2016) Which active learning approaches are most effective? Poster presentation, Society for the Advancement of Biology Education Research, University of Minnesota, Twin Cities, MN.

Dresser, C.M. (November 2015) The do's and don'ts of genomic assessments: case study on bog turtles. Oral presentation. Project Bog Turtle, Schindler Wildlife Center, Asheboro, NC.

Dresser, C.M. (April 2015) Turtle Talk: Genetic assessment of a reintroduction program. Oral presentation, Women in STEM Research Symposium, University of Tennessee, Knoxville, TN.

Dresser, C.M. (February 2015) Genetic assessment of a bog turtle reintroduction. Speed Talk. Seminar Series, University of Tennessee, Knoxville, TN.

Dresser, C.M., C.L.F. Landerer, and J.B. Corush (July 2014) Read the room: instructor assumptions about student perceptions. Poster presentation, Society for the Advancement of Biology Education Research, University of Minnesota, Twin Cities, MN.

Dresser, C.M. and B.J. Swanson (September 2013) Evaluating the role of anthropogenic introductions in the distribution patterns of invasive rusty crayfish (*Orconectes rusticus*). Poster presentation, South Eastern Population Ecology and Evolutionary Genetics, Mountain Lake Biological Station, University of Virginia, Charlottesville, VA.

Dresser, C.M., M.L. Kuhlmann, and B.J. Swanson (August 2012) Role of abiotic factors on native crayfish behavioral defense against invasive rusty crayfish (*Orconectes rusticus*). Oral presentation, 97th Annual Meeting for the Ecological Society of America, Portland, OR.

Dresser, C.M. (April 2012) Native crayfish behavioral defense against invasive rusty crayfish. Poster presentation, Student Research and Creative Endeavors Exhibition, Central Michigan University, Mount Pleasant, MI.

Dresser, C.M. and B.J. Swanson (December 2011) They fought the law and the law won: Impact of legislation on the anthropogenic spread of rusty crayfish. Poster presentation, 25th International Congress for Conservation Biology, Auckland, New Zealand.

Dresser, C.M. (May 2010) The sensitive period of temperature-induced variation in coloration of monarch larvae. Oral presentation, Biology Symposium, Hartwick College, Oneonta, NY.

Dresser, C.M. (May 2009) The art of code. Poster presentation, Student Showcase, Hartwick College, Oneonta, NY.

AWARDED GRANTS

Ecology & Evol. Biol. Dept. Research and Chancellor Funds ($2500), UTK	2016
Ecology & Evol. Biol. Dept. Research and Chancellor Funds ($1794), UTK	2016
North Carolina Herpetological Society Grant ($1000), North Carolina Herpetological Society	2015
Conservation Grants Fund ($21,588), Association of Zoos and Aquariums	2014
Ecology & Evol. Biol. Dept. Research Funds ($482), University of Tennessee	2014
Chadwick Lewis Memorial Grant ($500), Tennessee Herpetological Society	2014
Ecology & Evol. Biol. Dept. Research Funds ($428), University of Tennessee	2013
Sigma Xi Grant-in-Aid of Research ($650)	2012
Crustacean Society Fellowship ($1,000)	2012
Graduate Student Research & Creative Endeavors Grant ($700), Central Michigan	2011
Marion Whitney Summer Graduate Scholarship ($950), Central Michigan	2011

Recent Teaching Responsibilities

Position Title: Instructor of Record
Department / Institution: Biology, University of Tennessee
Duration of Position: January 8th - May 12th, 2015
Course: Evolution (BIOL 280) & Evolution Discussion (BIOL 281)
Course Description: Biology course for Ecology and Evolutionary Biology (EEB) majors (or related majors) comprised of a twice a week lecture component. Once a week discussion component only required for EEB majors. *Ranged from second year to fifth year students.*
Course Objectives: Survey the major topics in evolutionary biology, including the mechanisms of evolutionary change, elementary population genetics, concepts of fitness and adaptations, modes of speciation, phylogenetic tools, paleontology, and macroevolutionary trends. Throughout the course students address and clarify common misconceptions regarding evolution and answer particularly intriguing questions about life.
Learning Objectives: (1) Explain how the four forces of evolution cause change within populations, (2) Compare and contrast the requirements of natural selection, sexual selection, and artificial selection using examples, (3) Interpret phylogenies and analyze taxonomic relationships, (4) Identify the major evolutionary innovations in the context of geologic time, (5) Explain how new species form, (6) Recognize the importance of evolutionary biology in conservation, medicine, and life in general
Class Size: 37 students
Responsibilities:

1. Design new 200 level evolution course and discussion section (select textbooks, create learning objectives, write syllabi)
2. Mentor graduate teaching assistant to teach discussion section
3. Develop and present lectures (PowerPoints, activities, clicker questions)
4. Write assignments (homework, papers, activities, exams, quizzes)
5. Grade assignments and post grades for students on Blackboard
6. Hold office hours
7. Address student concerns and provide necessary campus resources to distressed students as needed

Position Title: Head Graduate Teaching Assistant
Department / Institution: Biology, University of Tennessee
Duration of Position: August 10th - December 9th, 2016
Course: Introduction to Organismal and Ecological Biology – Biology Literacy (BIOL 150)
Course Description: Biology course for undergraduate biology majors comprised of a twice a week lecture component (70-250 students per section) and a once a week biology literacy (BioLit) component (20-24 students per section). *Mostly first year students.*
Course Objectives: The overall learning goal for the BioLit session is to become more proficient at understanding and interpreting modern scientific studies related to organismal and ecological biology being conducted by scientists at UTK and across the world.
Content Learning Objectives: (1) Identify the purpose of a scientific study, (2) describe and evaluate a study's methods, (3) interpret figures, (4) synthesize scientific results and draw conclusions, and (5) use a model to describe a system and make predictions.
Professional Development Learning Objectives: (1) Improve scientific communication skills (reading, writing, and speaking), (2) strengthen ability to manage one's time, work both independently and collaboratively, and take initiative of one's own learning, and (3) recognize the importance of and develop skills in critical thinking
Class Size: 20-24 students per section (30 sections taught by 10 teaching assistants)
Responsibilities:

1. Update syllabus (e.g. added professional development learning objectives and replaced two scientific articles to incorporate more evolution papers into the course – all papers were ecology based previously)
2. Prepare all teaching materials (in-class worksheets, homework assignments, answer keys, PowerPoints, articles, etc.)
3. Create professional development sessions for graduate teaching assistants (e.g. how to ask the right questions: guiding students without giving away the answer, how to grade efficiently, University resources for struggling students, recognizing and dealing with bias in the classroom)
4. Provide crisis management for logistical conflicts, lecturer-TA issues, and student issues
5. Lead weekly preparation meetings for teaching assistants

Teaching Philosophy Statement

No one enters the classroom as a blank slate. My approach to teaching uses the initial diversity of student knowledge and experiences to create a more comprehensive learning experience; as not to limit their experience to *my* personal interests, knowledge, and presentation style. I have successfully achieved this in both small (~40 students) and large (~200 students) biology classes by encouraging a collaborative learning environment, making expectations clear, and providing timely feedback.

Collaborative learning environment:

To create a collaborative learning environment, I make it clear to students that (1) they can learn from each other, not just from me and (2) their effort and interests shape their learning experience. These points are introduced on the first day of class when groups work together to brainstorm how the course learning objectives can be achieved and what evidence would be needed to verify learning. The first day sets the tone for the rest of the semester because the majority of class time is spent on group discussion and activities designed to further their understanding of lecture content and assigned readings.

Getting to know the academic background of my students is a top priority as sustainable learning can be enhanced when new information is linked with existing knowledge. I use ungraded pre-tests to assess their current understanding of biological concepts, areas of interest, and previously used learning strategies. I regularly refer back to the pre-tests as I prepare lessons for the relevant topics and before introducing new learning strategies. I also structure a portion of each lecture around what *they* say interests them, but I have found that my students also appreciate the inclusion of instructor-selected content because my passion for the subject can facilitate new interests. This approach facilitates a collaborative learning environment that extends beyond student-student interactions by also encouraging student-instructor communication.

Clear expectations and timely feedback:

When I was a student, one of the most frustrating academic memories was when I left a lecture without a clear understanding of the take-home message or how my learning would be assessed, which is why I am so adamant about using learning objectives in my classes. My learning objectives are more than just an outline for each lecture; they also serve as a study guide to students ensuring they focus their efforts not on memorization, but on higher-level application and evaluation.

In my classes, exams do not serve exclusively as a means to assign grades; exams also serve as a learning tool. I delay posting student grades on their exams until after handing them back. This forces students to focus on the process of learning itself rather than the grade, an approach that has received little resistance from my students. I also provide class time for students to read the feedback and ask questions, even providing workstations with guiding questions that help bring students to the correct answers on their own.

Although none of my students enter the classroom as a blank slate, they all leave with the same comprehensive learning experience facilitated by a collaborative learning environment, clear expectations, and timely feedback.

Diversity Statement

From my small town beginning to current big city experience, I have learned to embrace cultural and gender diversity, as well as, consider the (in)compatibility of individual personalities and teaching strategies and its influence on academic performance.

Small town to big city: As a small-town girl from upstate New York, I was most comfortable in a small university setting where professors knew me by name. Yet, as I have pursued higher educational degrees I have attended larger and larger institutions. The bachelor degree experiences of my large University students are drastically different than my own, yet many of my students come from rural Tennessee towns. Unfortunately for those students the experience can be overwhelming and some feel lost in the crowd, *but not my students*. Even in my 250 student classes, I strive to create a learning experience where students feel valued by their peers and by me. Even in a large class, I can simulate a small university atmosphere by facilitating small group discussions and activities, meandering around the classroom rather than standing behind a podium, and most importantly - I learn their names! Even a quick and sincere comment to a student who was absent last class, acknowledging that you would have enjoyed his/her take on the subject discussed, goes a long way in making a student feel welcomed, involved, and appreciated in the learning process.

Women in science: As a woman in a STEM discipline, I've had to overcome societal stereotypes, but thanks to several remarkable mentors, I have not been discouraged and continue to pursue my passion. I strive to be such a mentor to not only my female students, but also my male students because societal change will require a change in the mindset of both men and women, where men support women in science and women support each other. I share existing gender issues within the science field with my students and encourage them to take an Implicit Association Test to promote awareness of conscious (and unconscious) individual gender biases and strive to dispel such attitudes over the course of the semester. Additionally, I have personally mentored one male and four female students in biology research (all four women have gone on to pursue degrees in STEM).

Overcoming performance diversity: Some of the existing diversity in academic performance among students is a result of the variable quality of their previous primary and secondary schools. However, a portion of the diversity may be the result of individual personalities and the incompatibility of certain learning environments with certain personalities. Although classroom groups are sometimes student selected, as I get to know my students I discretely assign groups based on student personalities. A shy, introverted student if grouped with an outgoing, outspoken student, may be intimidated, so I initially group the relatively shy students together to build confidence and create an environment where one or more shy students can step into a leadership role, many for the first time. Over the course of the semester, the shy students gain confidence and hold their own in groups containing outspoken individuals or even speak out in front of the whole class, while the outspoken students learn to listen, as well as, speak.

Over the years, I've been fortunate to have the opportunity to implement teaching strategies that recognize and appreciate cultural and gender diversity, as well as, strategies to help diminish the academic performance diversity present in a classroom, by creating an inclusive environment that builds confidence and allows students to exceed even their own expectations.

Teaching Evaluations

Summary / Highlights

Course: Biodiversity (BIO 130)
Term: Fall 2013
Class Size: 209 students
Number of Respondents: 99
Class Composition: 85% Freshman, 11% Sophomore, 3% Junior

Quantitative Responses: (Excellent - Very Good - Good - Fair - Poor - Very Poor)

- Effectiveness in teaching material
  80% good or better (35% Excellent, 21% Very Good, 24% Good)
- Clarity of instructors voice
  89% good or better (40% Excellent, 32% Very Good, 17% Good)
- Use of examples and illustrations
  85% good or better (36% Excellent, 34% Very Good, 15% Good)
- Students' confidence in instructor's knowledge
  83% good or better (38% Excellent, 27% Very Good, 18% Good)
- Instructor's enthusiasm
  92% good or better (43% Excellent, 36% Very Good, 13% Good)
- Availability of extra help when needed
  85% good or better (36% Excellent, 33% Very Good, 16% Good)
- Interest in whether students learned
  84% good or better (40% Excellent, 30% Very Good, 14% Good)

Student Comments:

"She did an excellent job expanding on what was on the lecture notes. Being able to print them off and add to them was very helpful."

"Cassie was very clear and concise with her explanations of phylogenies and other material within the course. Very knowledgable and kind!"

" Cassie was an amazing TA helping students in her free time, even when it was not her office hours. She would break down complex subjects giving
scenarios that helped in every aspect of the class."

Course: Biodiversity (BIO 130)
Term: Spring 2014
Class Size: 144 students
Number of Respondents: 26
Class Composition: Mostly freshman

*Informal anonymous survey issued to students following a guest lecture

Student Comments:

"She had a great energy and enthusiasm about presenting the material that drew my attention. I appreciated her concise way of explaining concepts and I loved all the examples. They helped solidify the concepts for me. I felt confident answering the questions. Also, the clicker questions were very straightforward."

"She used a lot of examples and even got the class involved which not only made it more interesting, but easier to remember."

"I like how she smiles a lot! Even though I don't agree with all of the evolutionary theories that this course teaches, I did appreciate that she tried to present good examples to us and she is always very willing to answer questions."

"There were way too many discussion sessions. But, that's more a personal thing about wanting lectures than discussions."

"I really liked your style! I think overall the lecture was as good as any professor I have encountered so far. Biology, even though it is very interesting, can be a dry subject thanks for giving some life to the lecture."

"I like how she used a sense of humor during the lecture. It really helped to keep me interested in what was being said."

"She is meant to be a teacher!"

Course: Evolution (BIO 280)
Term: Spring 2015
Class Size: 34 students
Number of Respondents: 15
Class Composition: 33% Sophomore, 33% Junior, 33% Senior

Quantitative Responses: (Excellent - Very Good - Good - Fair - Poor - Very Poor)

- Effectiveness in teaching material
  67% good or better (27% Excellent, 33% Very Good, 7% Good)
- Clarity of course objectives
  93% good or better (53% Excellent, 33% Very Good, 7% Good)
- Use of examples and illustrations
  87% good or better (53% Excellent, 27% Very Good, 7% Good)
- Instructor's enthusiasm
  93% good or better (73% Excellent, 7% Very Good, 13% Good)
- Availability of extra help when needed
  86% good or better (20% Excellent, 53% Very Good, 13% Good)
- Interest in whether students learned
  93% good or better (53% Excellent, 27% Very Good, 13% Good)

Student Comments:

"This class was intellectually stimulating and encouraged students to think outside of the box."

"Going over the learning objectives after class made it easier to understand the full scope of the class."

"Dresser was awesome. Her passion for biology is contagious."

"The group work contributed [to my learning] a lot. I didn't like it at all in the beginning, but it really helped make the ideas concrete when we did hands on work with it."

"I like the lectures being posted but need the answers to clicker questions posted to be guaranteed I'm right, being able to review answer to the online homework would be useful too."

"Students will hate it, but continue to be a tough grader. It made my grades better in the long run."

Professional Development in Teaching

Graduate Teaching Certificate Program, UTK 2015

This 15-18 month program was developed by the Tennessee Teaching and Learning Center (TennTLC) in collaboration with the Graduate School at UTK. Program requirements include, (1) completion of one seminar or course in teaching pedagogy, (2) attendance at all TennTLC sponsored seminars and workshops, and (3) completion of a supervised teaching practicum.

Best Practices in Teaching Graduate Program, UTK 2014

The program discusses teaching-related issues over the course of seven sessions; successful competition requires attendance at each session, submission of a response paper for each session, and completion of a teaching portfolio.

SMART Sympodium I Workshop, Office of Technology, UTK 2014

A two-hour workshop on how to use the interactive features of the SMART Sympodium (an interactive electronic lectern with an electromagnetic stylus) to meet diverse learner needs.

Turning Point Technology Workshop, Office of Technology, UTK 2014

A two-hour workshop on the use of Turning Point software and student response clickers to engage and assess student learning in the classroom.

Mastering™ Learning Platform Updates Session, Pearson, UTK 2014

A two-hour session hosted by a Pearson technology representative that provides instruction on how to use the new Mastering Biology features, such as the Dynamic Study Modules, Adaptive Follow-up, and Learning Catalytics.

Teaching and Learning Collective Conference, CMU 2011

A one-day conference on the best practices for improving student learning that includes several lecture seminars and small group activities and discussions.

Undergraduate Mentoring, CMU 2012

Mentored four undergraduate biology students in aquatic field techniques and practical application of the scientific method for two months during the summer of 2011 or 2012. Mentees were also provided with advice regarding academic and career aspirations.

Recommendations

Dr. Elisabeth Schussler
Education Research Collaborator
Associate Professor
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University of Tennessee
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Mr. Daniel Benjamin
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Dr. Benjamin Fitzpatrick
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Dr. Bradley Swanson
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Summer Research Supervisor
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Teaching Awards & Recognitions

Graduate Teaching Certificate Program Graduate (2015), UTK
Outstanding Graduate Teaching (2015), Graduate and Professional Student Appreciation Week, UTK
Bio 150 Teaching Award for Most Original Quiz Questions (2014), Introductory Biology, UTK

Teaching Goals

Short-term Goals: (within 5 years)

- For existing, previously taught courses insert additional content related to the ethical and social implications of various research examples and integrate more mathematics, history, philosophy, and sociology content
- Develop a series of assignments called "Scientist Spotlights" (highlighting the accomplishments and research conducted by counter-stereotypical examples of scientists) to help all students visualize themselves succeeding in a science career.
- Continue to read literature in education research and adjust teaching practices to incorporate knew knowledge
- Implement/test various technological tools in the classroom and assess implications on student learning
- Attend professional conferences and professional development seminars to improve my teaching, such as SABER
- Present and publish current teaching related research projects
- Obtain a teaching position at a college or University with a small research component requirement (conservation genetics and/or discipline-based education research)
- Get involved in the university community (e.g. serve on committees as needed)

Long-term Goals: (within 15 years)

- Broaden teaching experience beyond introductory biology to include a variety of upper level undergraduate research-focused courses, perhaps in conservation, ecology, animal behavior, genetics, and/or aquatic biology
- Obtain a permanent position as a professor at a college or university
- Form strong collaborative teaching and research bonds with local faculty and government entities, as well as, several external persons
- Publish several studies in education research and conservation
- Mentor several undergraduates (e.g. senior or honors independent research projects)
- Develop a new study-abroad course in field ecology or conservation
- Serve in a leadership role to share the knowledge obtained at conferences and professional development classes (as well as personal DBER research) with others
- Continue to achieve short-term goals listed above

BIO 391: Applied Conservation Biology

University of Tennessee, Spring 2015

Lecture: Monday & Friday 11:15-12:05, Hesler 430 (3 credits)
Field Trips / Workshops: Saturday, Feb. 7th, Feb. 28th, April 11th

Instructor: Ms. Cassie Dresser (cdresser@utk.edu)
Office: Hesler 435

Office Hours: Wednesday 11:00-12:00; Thursday 2:30-3:30; or by appointment

Anonymous Feedback: http://www.cassiedresser.info/feedback
You will evaluate the course at the end of the semester, but if you see a way to improve your learning at any point during the semester, feel free to let me know.

Course Description: The study of conservation biology is often plagued with the gloom and doom associated with biodiversity loss, species extinctions, and habitat destruction, but this course will highlight the success stories in conservation. Case studies will range from species-specific to ecosystem level conservation and particular attention will be given to theoretical and empirical research. Scheduled field trips and workshops will introduce students to real-world conservation programs and personnel, as well as, hands-on experience with computer programs used in conservation. Additionally, students will have the opportunity to design their own conservation plan for an imperiled species or ecosystem.
**Recommended Prerequisites: Introductory Biology (BIO 130 or BIO 140) and Genetics (250); biology and non-biology majors welcome*

Course Website: http://bblearn.utk.edu/ (Blackboard, i.e. BB)

Required Texts & Materials:
REQUIRED - Goodall, Jane. 2011. Hope for Animals and Their World: How Endangered Species Are Being Rescued from the Brink (HOPE). (Available on Amazon in hardcover, paperback, or on Kindle for $2-$12)
STRONGLY RECOMMENDED - Frankham, Richard; Jonathan D. Ballou; David A. Briscoe. 2010. 2nd Edition. Introduction to Conservation Genetics. (Available on Amazon for rent, purchase used or new for $17-$65)
REQUIRED - Notebook; (A Rite in the Rain Notebook for $3-$12 is recommended for field trips)

*Other readings will be provided on BlackBoard, including essays and chapters from Groome et al. 2006 Principles of Conservation Biology (PCB) - 3rd edition

Course Learning Objectives:
Content
- Apply conservation principles to develop a conservation plan for a species or area

Professional Development
- Gain contacts with various conservation agencies and personnel
- Improve scientific communication skills (reading, writing, and speaking)

- Strengthen ability to manage one's time, work both independently and collaboratively, and take initiative of one's learning
- Recognize the importance of and develop skills in critical thinking

Course Schedule:

Date	Day	Topic/Question	Reading *(complete before class)*
Jan. 12	M	Introduction to Conservation, Course Overview, **PRE-TEST** https://www.youtube.com/watch?v=0ZmqwdBeuKs	Syllabus
Jan. 16	F	Final Project Overview & Pre-interviews*	
Jan. 19	M	Review: Biodiversity Patterns	Gaston 2000 (Nature)
Jan. 23	F	Review: Threats to Biodiversity	Crisis of Life Videos (1-4) https://www.youtube.com/watch?v=xBwg9xT7ilw
Jan. 26	M	**BIG QUIZ** & Video Discussion: "Kilowatt Ours"	
Jan. 30	F	Core concepts: What is a species?	Mallet 1995 (TREE); Harrington & Rizzo 1999 (Stru.Dyn.Fung.Pops) ***Mini HW 1**
Feb. 2	M	*Case study:* Florida Panther	Roelke et al. 1993 (Curr.Biol.)
Feb. 6	F	The ESA and the IUCN Red List	Rodrigues et al. 2006 (TRENDS); Utter 2011 (Can.J.Fish.Aquat.Sc.)
Feb. 7	S	**Workshop**: Population Viability Analysis	***Workshop Pre-assignment**
Feb. 9	M	Core concepts: Species Recovery Plans	Dodson et al. 1998 (Can.J.Fish.Aquat.Sc.); Shilling 1997 (Science) ***Mini HW 2**
Feb. 13	F	*Case study:* Black-Footed Ferret	HOPE (p.7-17) http://www.blackfootedferret.org/ ***Field Trip Post-assignment**
Feb. 16	M	*Case study*: Black-Footed Ferret	Recovery Plan (2013)
Feb. 20	F	*Case study*: Whooping Crane	HOPE (p.105-120) https://www.savingcranes.org/whooping-crane-conservation.html
Feb. 23	M	*Case study*: Whooping Crane	International Recovery Plan (2007)
Feb. 27	F	*Case study:* Bog Turtles	Recovery Plan (2001) ***MIDTERM assigned**
Feb. 28	S	**Field Trip:** Knoxville Zoo Herpetological Department	***Field Trip Pre-assignment**
Mar. 2	M	Core concepts: Conservation Genetics	Amos & Balmford 2001 (Hered.); Frankham 1995 (Con.Gen.) ***Mini HW 3**
Mar. 6	F	*Case study:* Cheetah (Inbreeding Depression)	Merola 1994 (Con.Biol.) ***Field Trip Post-assignment**
Mar. 9	M	*Case study*: Common Deerweed / California Broom (Outbreeding Depression)	Montalvo & Ellstrand 2001 (Amer.J.Bot.)
Mar. 13	F	**Midterm Workday** (no class)	***MIDTERM due by 11:59 PM**
Mar. 16	M	**SPRING BREAK** (no class)	
Mar. 20	F	**SPRING BREAK** (no class)	
Mar. 23	M	Core concepts: A Multidisciplinary Science	Soule 1985 (BioSci) ***Mini HW 4**
Mar. 27	F	U.S. Gov't Agencies & NGOs in Conservation	Clark 2006 (PCB p.13); Fuller 2006 (PCB p. 16)
Mar. 30	M	*Case study*: Giant Panda (Zoos)	HOPE (p.169-177)

April 3	F	Role of Academia and Private Landowners	Fleishman 2006 (PCB p.8); McDonald 2006 (PCB p.21)
April 6	M	*Case study*: Texas Songbirds (Landowner Incentives)	Sorice et al. 2011 (Con.Biol.)
April 10	F	*Case study*: Golden Lion Tamarin (Community Involvement)	HOPE (p.67-75)
April 11	S	**Field Trip:** US Fish & Wildlife Service	***Field Trip Pre-assignment**
April 13	M	Core concepts: Habitat Conservation Plans	Harding et al. 2001 (Con.Biol.); Lin 1996 (Ecology) ***Mini HW 5**
April 17	F	*Case study*: Tiritiri Matangi, NZ	http://www.tiritirimatangi.org.nz/ ***Field Trip Post-assignment**
April 20	M	*Case study*: Marine Reserves	Gell & Roberts 2003 (TRENDS); Halpern 2003 (Ecol.App.)
April 24	F	*Case study*: Detroit River **Guest Speaker	http://www.environmentalcouncil.org/priorities/article.php?x=13
April 27	M	Corridors (Pros and Cons)	Berges et al. 2010 (Sc.Eaux.Terr.); Hess 1994 (Con.Biol.)
May 1	F	**BIG QUIZ** & Post-interviews	***Course Reflection Survey**
May 4?	M	**FINAL PROJECT PRESENTATIONS**	

* Content and readings subject to change as deemed necessary by the professor

Pre-test: An ungraded individual assessment will be issued to evaluate your knowledge about basic biology concepts obtained prior to this course, topics of interest, and previously used learning strategies. This assessment will be used to modify planned course content as needed to fill knowledge gaps, correct misconceptions, and introduce new learning strategies.

Mini Homework List: Pre-lecture homework and readings serve to prep your mind for receiving new content and is most effective when completed the night before the lecture. I also use your responses to clarify misunderstandings and incorporate topics that interest you in the coming lecture.

Please submit a typed, free-write response to the appropriate question below (100-300 words).

1. What is a species (how can one be defined)? Why is a clear definition important in conservation?
2. What information should be included in a species recovery (i.e. conservation) plan? Make a generic table of contents.
3. Why might increasing population sizes alone not be enough to save a species? Why is genetics important?
4. Why are multiple disciplinary perspectives important in conservation biology?
5. Which are better, species-specific recovery plans or habitat conservation plans? Support your answer.

Field Trips / Workshops: There are three required Saturday classes (1 workshop and 2 field trips). Events are expected to start at 8:30 AM and end at 12 PM, but specific times are dependent on host flexibility and travel time. Transportation will be provided. Pre and post assignment instructions will be provided one week before the scheduled trip. Pre assignments are due the morning of the workshop or field trip (hardcopy) and post (reflective) assignments are due the following Friday (BB).

Midterm: You will be given two weeks to complete the take-home midterm exam. The exam will require substantial scientific literature searches and a good deal of writing. You are permitted and

encouraged to use your notes, Internet resources, and books, but you may NOT discuss the exam with any other human being. Individuals violating this restriction will be given a zero.

Final Project: All conservation work requires collaboration, thus this project must be completed in groups of 3-4 people (no individual projects will be accepted). Project guidelines will be provided on the second day of class and due at the scheduled final day/time.

Pre and Post Interviews: Individual interviews will be conducted during the first and last week of the semester. The interviews are not graded and completely voluntary. Pre-interview responses will serve to better structure the course content to reflect knowledge gaps and/or topics of particular interest to you. Post-interview responses will be compared to pre-interview responses to see if and how your opinions and understanding of conservation biology changed as a result of taking this course.

Assessment: Quizzes, exams, and assignments are vital components of the learning process. Studies have shown that frequent assessment, greater variety in assessment methods, and active participation result in higher-level understanding of material. Therefore, your grade will be determined as follows:

Big Quiz (50 pts. each)	100 pts.	(12.5%)
Midterm	200 pts.	(25.0%)
Final Project	150 pts.	(18.8%)
Presentation of Final Project	50 pts.	(6.25%)
Workshop / Field Trip Assignments (30 pts. each)	90 pts.	(11.3%)
Mini HW Assignments (5-7 pts. each)	35 pts.	(4.37%)
Participation (5-6 pts. per day)	150 pts.	(18.8%)
Course Reflection Survey	25 pts.	(3.12%)
	800 pts.	

Final letter grades will be determined by the total percentage of 800 points accumulated as follows:

A	93 – 100%	B-	80 – 82%	D+	67 – 69%
A-	90 – 92%	C+	77 – 79%	D	63 – 66%
B+	87 – 89%	C	73 – 76%	D-	60 – 62%
B	83 – 86%	C-	70 – 72%	F	<60%

Technology: In the interest of facilitating a healthy and productive learning environment for yourself and your peers... Cell phone use is strictly prohibited during class. Laptops and tablets are welcome in class, but may only be used for class purposes (i.e. note taking and/or viewing assigned readings). Violation of either policy will result in a daily participation grade of zero for the violator.

Communications:

- If you need to meet and can't make office hours, please email me using your UTK e-mail with a list of 3 days/times that you are available.
- I am happy to answer specific questions via e-mail, but please allow up to 24 hours for a response. NOTE: any emails received after 4 PM on Friday may not receive a response until Monday.

- If you require a more prompt response post your question on the course discussion board on BB. I will still receive an email about it, but someone else may be able to answer you sooner. Furthermore, posted answers will be available to everyone. The discussion board may NOT be used for questions related to the midterm.

Make-ups, Extensions and Extra Credit:

- Emergencies do happen, but you MUST contact me prior to the start of class via email, a phone call, or a note on my office door (make sure to include your full name, e-mail, and phone number where I can contact you) to inform me of your situation. NOTE: Intercollegiate athletes, musicians, etc. must provide documentation of all departure dates and times for university sponsored events that occur during the semester (provide schedule within the first two weeks of the term).
- One make-up for a missed field trip or workshop will be permitted if the professor is notified at least 1 week in advance (or in the case of an emergency as instructed in the first bulleted point above). The make-up will take the place of pre and post-assignments and the day's participation points. A scientific critique paper will serve as the make-up, as assigned by the professor and will be due at the same time as the post-assignment.
- Homework is intentionally created to provide the foundation necessary to better absorb lecture content, thus late homework is not accepted. The same is true for in-class assignments that use peer instruction to meet course learning objectives – no extensions are permitted for in-class assignments. Only in extreme circumstances -- as deemed by the professor -- will this policy be waived.
- There are extra points built into the course to allow for missing class or a homework assignment (i.e. I will assign 820 points, but you can only receive a maximum of 800 points, which effectively drops your lowest participation grades or in the case of perfect attendance, your lowest homework assignment grade) and thus there is no additional extra credit offered.

HOW TO SUCCEED IN BIO 491:

1. **Come prepared** (do readings, bring questions / comments)
2. **Participate** (ask questions, make comments, engage in discussion)
3. **Don't procrastinate** (set mini deadlines for midterm)
4. **Review content regularly** (Core concepts!)
5. **Use your resources** (office hours, email, peers, google, etc.

BIO 280: Evolution

University of Tennessee, Spring 2015

Lecture: Tuesday & Thursday 9:40-10:55 AM, HSS 206 (3 credits)
***BIOL 281 Discussion:** Monday 1:25-2:15 PM, NBA 111 (1 credit)

Instructor: Ms. Cassie Dresser (cdresser@utk.edu)
Office: Hesler 537

TA: Todd Pierson (tpierso1@vols.utk.edu)
Office: Hesler 435

Office Hours: Tuesday 1:30-2:30; Wednesday 4:00-5:00; or by appointment

Anonymous Feedback: http://www.cassiedresser.info/feedback
You will evaluate the course at the end of the semester, but if you see a way to improve your learning at any point during the semester, let me know.

Course Description: We will survey the major topics in evolutionary biology, including the mechanisms of evolutionary change, elementary population genetics, concepts of fitness and adaptations, modes of speciation, phylogenetic tools, paleontology and macroevolutionary trends. Throughout the course we will address and clarify common misconceptions regarding evolution and answer particularly intriguing questions about life.
**Prerequisites: BIOL 150-160-159 or equivalent*

Course Website: http://bblearn.utk.edu/ (Blackboard, i.e. BB)

Required Texts & Materials:
REQUIRED - Zimmer, C. and D.J. Emlen. 2013. Evolution: Making Sense of Life. Roberts & Company Publishers

1. **Buy hardcover** (ISBN 9781936221172) - $100 Roberts & Company
2. **or buy digital copy (**for iPad only) - $80 Roberts & Company
3. **or rent paperback (**ISBN 9781936221363) - $40 Alibris

REQUIRED - TurningPoint response "clicker" (You MUST register your clicker on BB)
*Other readings will be provided on BlackBoard

Learning Objectives (Content):

- Explain how the four forces of evolution cause change within populations
- Compare and contrast the requirements of natural selection, sexual selection, and artificial selection using examples
- Interpret phylogenies and analyze taxonomic relationships
- Identify the major evolutionary innovations in the context of geologic time
- Explain how new species form
- Recognize the importance of evolutionary biology in conservation, medicine, and life in general

Learning Objectives (Professional Development):

- Improve scientific communication skills (reading, writing, and speaking)
- Strengthen ability to manage one's time, work both independently and collaboratively, and take initiative of one's learning
- Recognize the importance of and develop skills in critical thinking

Course Schedule:

Date	Day	Topic/Question	Reading *(complete before class)*
Jan. 8	R	Course Structure / **PRE-TEST**	Syllabus
Jan. 13	T	A Case for Evolutionary Thinking: Understanding HIV	p.23-24; 270-271
Jan. 15	R	Four Forces of Evolution: Mutation	p.122-133; 136-140
Jan. 20	T	Four Forces of Evolution: Genetic Drift	p.155-165
Jan. 22	R	**BIG QUIZ / ARTICLE DISCUSSION**	Losos et al. 2004; Khamsi 2006
Jan. 27	T	The Four Forces of Evolution: Natural Selection	p.219-226
Jan. 29	R	The Four Forces of Evolution: Gene Flow	p.226-228
Feb. 3	T	Example Case Studies: Four Forces of Evolution	p.230-237
Feb. 5	R	**EXAM 1**	
Feb. 10	T	Evolution of Sex and Sexual Selection	p.331-357
Feb. 12	R	Special Topic: Artificial Selection	TBA
Feb. 17	T	Evolution of Life Histories	p.367-381
Feb. 19	R	Review Evolution of Life Histories **/ ARTICLE DISCUSSION**	Hanifin et al. 2008; Gross 2008
Feb. 24	T	**SNOW DAY** (no class)	
Feb. 26	R	Coevolution	p.477-493
Mar. 3	T	Epigenetics	Hughes 2014
Mar. 5	R	**EXAM 2**	
Mar. 10	T	Phylogeny and Taxonomy	p.85-108
Mar. 12	R	**ARTICLE DISCUSSION**	Shubin et al. 2014; SciDaily 2014
Mar. 17	T	**SPRING BREAK** (no class)	
Mar. 19	R	**SPRING BREAK** (no class)	
Mar. 24	T	Paleontology & Fossils	p.52-61; **BIG QUIZ Due**
Mar. 26	R	Major Evolutionary Innovations: Pre Phanerozoic Era	Inside book covers; p.65-72
Mar. 31	T	Major Evolutionary Innovations: Phanerozoic Era	Inside book covers; p.73-78
April 2	R	Species Concepts	p.394-395; p.134-135; 422-426
April 7	T	Speciation: Allopatric and Sympatric	p.396-414
April 9	R	Special Topic: Hybridization	p.397-401; 417-418; 573-577
April 14	T	**EXAM 3**	
April 16	R	Human Evolution	p.266-267; skim p.555-577
April 21	T	Evolutionary Medicine	p.605-606; Box 18.1; Box 18.2
April 23	R	Course Evaluation / Course Review	Review all learning objectives
April 30	R	**FINAL EXAM** (8:00-10:00 AM)	**FINAL PAPER DUE**

* Content and readings subject to change as deemed necessary by the professor

Assessments:

Pre-test: Ungraded individual assessment of knowledge about basic evolutionary biology concepts obtained prior to taking BIOL 280. This assessment will be used to modify planned course content as needed to fill knowledge gaps and correct misconceptions.

Pre-lecture homework: You will have pre-lecture homework for all lectures (21 lectures) that will consist of multiple choice, short-answer, and figure interpretation questions on your assigned reading for that lecture, due at midnight prior to lecture. Your lowest two pre-lecture homework grades will be dropped.

Post-lecture homework: You will have post-lecture homework for all lectures (21 lectures) that will require you to answer the learning objectives for the most recent lecture, due at midnight the day after lecture. Your lowest two post-lecture homework grades will be dropped. (Only applicable until Exam 1, afterwards points will be reallocated into Pre-lecture homework.)

In-class assignments: Your in-class assignments will consist of individual clicker questions and team activity worksheets.

Article discussions: You will read the assigned articles and complete a homework assignment prior to class. During class you will discuss the articles in small groups and/or with the entire class and complete an extra in-class assignment as a team. The article discussions are designed to prepare you for the final paper assignment.

Big quizzes and exams: While big quizzes are shorter and cover less material than the exams, both quizzes and exams will consist of multiple-choice (30-40% of points) and short-answer questions (60-70% of points). The final exam will be cumulative.

Final Paper: You (individually) will be asked to create a general news article (i.e. ScienceDaily article) for a scientific paper on the evolutionary consequences of invasive species or climate change.

Evaluation: Quizzes, exams, and assignments are vital components of the learning process. Studies have shown that frequent assessment, greater variety in assessment methods, and active participation result in higher-level understanding of material. Therefore, your grade will be determined as follows:

Pre/Post-lecture Homework (9 pts. each)	171 pts.	(17%)
In-class Assignments (9 pts. each)	189 pts.	(19%)
Article Discussions (10 pts. each).....	30 pts.	(3%)
Big Quizzes (45 pts. each)	90 pts.	(9%)
Exams (110 pts. each)	330 pts.	(33%)
Final Exam	150 pts.	(15%)
Final Paper	40 pts.	(4%)
	1000 pts.	

Final letter grades will be determined by the total percentage of 1000 points accumulated as follows:

A	93 – 100%	B-	80 – 82%	D+	67 – 69%
A-	90 – 92%	C+	77 – 79%	D	63 – 66%
B+	87 – 89%	C	73 – 76%	D-	60 – 62%
B	83 – 86%	C-	70 – 72%	F	<60%

Technology: In the interest of facilitating a healthy and productive learning environment for yourself and your peers... Cell phone use is strictly prohibited during class. Laptops and tablets are welcome in class, but may only be used for class purposes (i.e. note taking and/or viewing assigned readings). A second offense violation of either policy will result in an in-class assignment grade of zero for the violator and an extra writing assignment for the entire class. Please be respectful of your peers' right to learn.

Communications:

- If you need to meet and can't make office hours, please email me using your UTK e-mail with a list of 3 days/times that you are available.
- I am happy to answer specific questions via e-mail, but please allow up to 24 hours for a response. NOTE: any emails received after 4 PM on Friday may not receive a response until Monday.
- If you require a more prompt response, post your question on the course discussion board on BB. I will still receive a notification about it, but someone else may be able to answer you sooner. Furthermore, posted responses will be available to everyone. The discussion board may NOT be used for questions related to the final papers.

Make-ups, Extensions and Extra Credit:

- Emergencies do happen, but you MUST contact me prior to the start of class via email, a phone call, or a note on my office door (make sure to include your full name, e-mail, and phone number where I can contact you) to inform me of your situation.
- Homework is intentionally created to provide the foundation necessary to better absorb lecture content, thus late homework is not accepted. The same is true for in-class assignments that use peer instruction to meet course learning objectives – no extensions are permitted for in-class assignments. Only in extreme circumstances -- as deemed by the professor -- will this policy be waived.
- There are extra points built into the course to allow for missing class or a few homework assignments (i.e. I will assign 1018 points, but you can only receive a maximum of 1000 points) and thus there is no additional extra credit offered.

Academic integrity: Academic dishonesty of any sort will not be tolerated. **Plagiarism** includes the copying of phrases, portions of sentences or the main ideas from ANYONE (including a classmate) on ANY work submitted for an individual grade (exams, assignments, etc.). Academic dishonesty also includes assisting other students on exams and submitting clicker responses in their absence.

You are expected to abide by The University of Tennessee honor statement in BIOL 280 and in all of your university activities as pledged in the honor code:

> ***"An essential feature of the University of Tennessee, Knoxville, is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the University, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity."*** (*2012-2013 Undergraduate Catalog*)

Depending on the offence, penalties for academic dishonesty range from a zero on the assignment, to an F in the course, to the filing of formal academic dishonesty charges seeking dismissal from The University of Tennessee. These choices are at the discretion of the instructor, and can occur in either the lecture or the discussion portion of the class. NOTE: You should be familiar

with the requisites of academic honesty and what constitutes academic dishonesty as outlined in the UT Undergraduate Catalog (http://catalog.utk.edu/).

Disability Services: If you need course adaptations or accommodations because of a documented disability, or if you have questions or concerns about disabilities or emergency information to share, please contact Disability Services: 2227 Dunford Hall; 974-6807; Email: ods@utk.edu; Website: http://ods.utk.edu/).

Counseling Center: http://counselingcenter.utk.edu/ (900 Volunteer Boulevard**;** 865-974-2196; Email: counselingcenter@utk.edu)

Academic Assistance:

- **Tutoring:** The Division of Biology does not offer tutoring services. Contact the Student Success Center and the Academic Support Unit of The Office of Minority Student Affairs for information about tutoring opportunities.
- **Student Success Center:** The comprehensive source for information, services, and resources to assist your success at UT: http://studentsuccess.tennessee.edu/studentsuccesscenter/ (1817 Melrose Avenue, and 812 Volunteer Boulevard, 865 974-6641, Email: studentsuccess@utk.edu)
- **Academic Support Unit of The Office of Minority Student Affairs** offers some tutoring services available to all students, but openings are limited and are filled quickly. The office offers other types of academic assistance and support as well: http://omsa.utk.edu/services/ (1800 Melrose Avenue, 865 974-6861, Email: omsa@utk.edu)

Study Rooms: NBA 103 and Hesler 417 are quiet study rooms for majors in Biology.

Technical Assistance:
Blackboard or general information technology assistance:

- http://remedy.utk.edu/contact/
- Help Desk: 865-974-9900 (M – F, 8:00 – 5:00)
- OIT Computer Support Service Center and Walk-In Help Desk: Commons South, 2nd floor Hodges Library

HOW TO SUCCEED IN BIOL 280:

6. **Come prepared** (do readings, bring questions / comments)
7. **Participate** (ask questions, make comments, be engaged)
8. **Don't procrastinate** (set mini deadlines for final paper)
9. **Review content regularly** (learning objectives!)
10. **Use your resources** (office hours, peers, book, Google, etc.)

Sample Assignments: Pre-Test given in BIOL 280, Evolution

See "Teaching Philosophy" for information regarding how this pre-test was used to structure the course.

PRE-TEST (ungraded)

This ungraded individual assessment will test your understanding about basic evolutionary biology concepts obtained prior to taking BIOL 280. Please answer the following questions to the best of your ability as your responses will shape the content covered in this course.

PART I: Knowledge Assessment

1. Indicate whether the following statements are true (T) or false (F). If false, please provide a brief (one sentence) explanation.

   A. _____ Evolution is the result of individuals adapting to their environment.

   B. _____ Evolution provides species with adaptations they need.

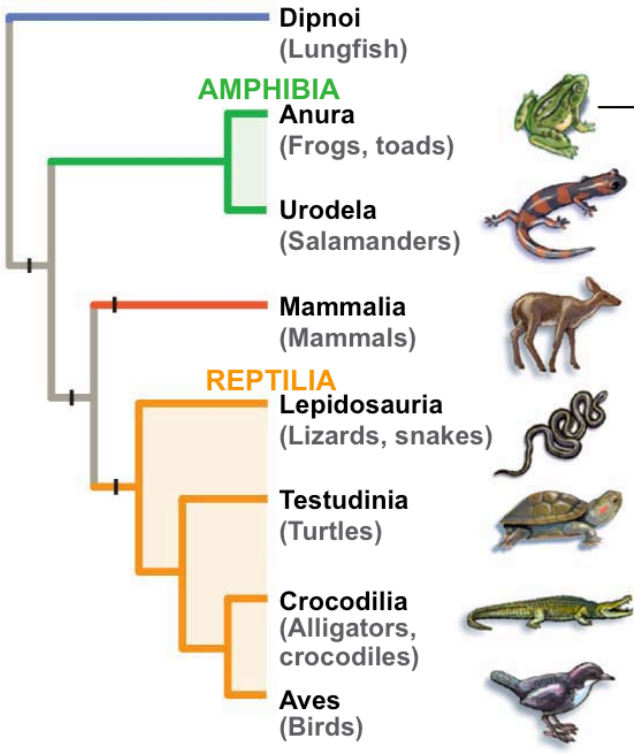
   C. _____ Evolution always goes from simple to complex.

2. Which of the following statements correctly defines **gene flow**?
   A. Flow of DNA from parent to offspring
   B. Transfer of alleles from one population to another
   C. Spread of mutations from one cell to another
   D. Insertion of viral DNA into a eukaryotic cell

3. Which of the following statements correctly defines **genetic drift**?
   A. Change in allele frequency due to chance
   B. Sharing of genetic information between parent and offspring
   C. Shift in allele frequencies caused by genetically linked loci
   D. Random event that causes a genetic change within an individual

4. How old is the earth?
   A. Under 1 million years
   B. 4.5 million years
   C. 4.5 billion years
   D. 4.5 trillion years

5. Circle and label an example of the following features on the phylogeny to the right:
    A. Taxon
    B. Clade
    C. Synapomorphy



6. Which of the following groups are **NOT** monophyletic?
    A. Amphibia
    B. Reptilia
    C. Reptilia & Mammalia
    D. Amphibia & Mammalia

7. Which of the following are lizards most closely related to?
    A. Mammals
    B. Birds
    C. Salamanders
    D. Lungfish

8. One population of *Rhagoletis pomonella* flies lays its eggs exclusively on hawthorn fruit, while another population lays eggs only on apples. Apple trees were introduced 400 years ago in the eastern United States in the same region where hawthorn trees are present. Scientists believe that these fly populations will eventually become two distinct species. This is an example of:
    A. Geographic isolation
    B. Allopatric speciation
    C. Sympatric speciation
    D. Temporal isolation

9. Fossil remains of *Cynognathus*, a Triassic land reptile have been found in southeast Africa and central South America. The two continents are separated by nearly 2,000 miles of ocean. Explain how it is possible that *Cynognathus* existed on both continents if it could not fly or swim? (1-2 sentences)

10. Giraffes have long necks, which they use to reach leaves and other vegetation high off the ground. Explain how natural selection could have caused the evolution of long necks in giraffes; assuming their ancestors had shorter necks. (HINT: what are the requirements of natural selection?) (2-5 sentences)

PART II: Learning Assessment

1. Why are you taking BIOL 280?

2. Please rank your Top 3 questions of interest (i.e. questions you would like to learn the answers to during this course). Also, indicate all other questions of interest using a check mark.

_____ What will my children inherit?
_____ Why do some species have giant genomes, while others have small ones?
_____ Why aren't antibiotics and vaccines 100% effective?
_____ Why hasn't sickle cell anemia disappeared if its so detrimental?
_____ Why do males and females of some species look so different?
_____ Why do some organisms produce hundreds of offspring while others produce only a few?
_____ Why do women stop having children? Why menopause?
_____ What is the origin of snake venom?
_____ Can acquired characteristics actually be inherited!?
_____ Can a behavior evolve?
_____ How do you even read a phylogenetic tree?
_____ Where do new species come from?
_____ Why is the living world so diverse?
_____ How can two species become one?
_____ What was the first living thing and where did it come from?
_____ How can we estimate when a species diverged?
_____ How is it that whales are more closely related to us than to fish?
_____ What is the evolutionary history of humans?

Do you have any other questions related to evolution that you would like answered during this course if time permits?

3. Please describe if and how you have studied for biology exams in the past. In your answer indicate whether or not your strategies were successful, and if they were unsuccessful what you could have done differently.

4. What academic or non-academic accomplishment are you most proud of?

Sample Assignment: Final Paper given in BIOL 280, Evolution

This paper was assigned after 3 class discussions that required students to read an assigned scientific article and its corresponding public interest article.

FINAL PAPER GUIDELINES
BIOL 280: Evolution

Overview: Write a public interest piece (e.g. ScienceDaily article) for a scientific article on the evolutionary consequences of invasive species or climate change.

Purpose: To synthesize, summarize, and simplify content from a science research article to illustrate your understanding of the study and to gain an appreciation for the importance and sometimes challenging aspect of communicating science to the general public.

Articles: Choose <u>one</u> of the following articles to write a public interest piece for.

<u>Options related to climate change:</u>

- Phenotypic plasticity and adaptive evolution contribute to advancing flowering phenology in response to climate change (Anderson et al. 2012)
- Antagonistic coevolution limits population persistence of a virus in a thermally deteriorating environment (Zhang & Buckling 2011)
- Adaptive evolution of a key phytoplankton species to ocean acidification (Lohbeck et al. 2012)

<u>Options related to invasive species:</u>

- Can things get worse when an invasive species hybridizes? The harlequin ladybird *Harmonia axyridis* in France as a case study (Facon et al. 2011)
- Patterns of DNA methylation throughout a range expansion of an introduced songbird (Liebl et al. 2013)

**I strongly encourage you to read the supplementary material associated with your article (see link at end of article)*

Stipulations: Your paper should be written <u>individually</u> and be of <u>publishable quality</u> (see "Example" on Blackboard). Limit your paper to no more than 1,000 words (~3 pages, double spaced, 12 pt. Times New Roman font), but no less than 500 words (excluding journal reference).

A note on plagiarism: EVERYTHING must be in your own words. <u>*No quotes.*</u> For public interest articles you do not need to provide an in-text citation every time you reference the authors' ideas, but make sure you provide the full citation for the

article at the end (see formatting in "Example"). You will be submitting via SafeAssign on Blackboard, which will highlight any plagiarized phrases from published sources or from the papers submitted by your peers.

Submission: Please change your file name to "lastname_paper.docx" before uploading to Blackboard. Only 1 attempt permitted. No hardcopies will be accepted. **DUE by 8 AM April 30th.**

Tentative Rubric: You will be graded on the content, accuracy and quality of your writing.

	Possible Points	Points Earned
Title (encompasses essence of paper's take-home message and is creative)	3	
Photo (relevancy, photo credit shown, caption)	2	
Introduction paragraph (intriguing to broad audience and introduces topic / context of study)	2	
Body (Objective and purpose of research clearly stated; links study to one or more general evolutionary theories / principles)	4	
Body (Interesting life history characteristics of study organisms or unique features of study system mentioned)	3	
Body (Important results are highlighted)	5	
Conclusion paragraph (Implications of research summarized)	5	
Conclusion paragraph (Proposed future studies inspired by the findings of this research stated)	3	
Journal reference (correct citation format)	2	
Style (study is made interesting without compromising accuracy and easily understood by the educated public)	4	
Writing (clear organization, smooth transitions between ideas, proper grammar, etc.)	5	
Format (obeyed stipulations of assignment and did not use direct quotes unless referencing an interview with the authors)	2	
TOTAL	40	

**This rubric is subject to change as deemed necessary by the professor*

Current Teaching Related Research

Title: Read The Room: Are instructor assumptions about student perceptions accurate?

Collaborators: Joel Corush (University of Tennessee); Cedric Landerer (University of Tennessee)

Brief Overview: Our ability as instructors to "read" a classroom allows us to assess how well implemented teaching practices facilitate student learning. Such a skill is particularly valuable as each student may have different learning needs. Our research objectives are to (1) determine if instructor assumptions about student perceptions are accurate, (2) explore potential patterns in the ability of instructors to predict student perceptions, and (3) develop a summary report of results for individual instructors as a professional development tool. *Currently in the data collection phase.*

**See nidda.bio.utk.edu for more information*

Title: Comparison of student engagement and learning outcomes among three commonly used active learning approaches

Collaborators: Elisabeth Schussler (University of Tennessee) and Jennifer Brigati (Maryville College)

Brief Overview: Substantial evidence supports the use of active learning over traditional lecturing to facilitate cognitive student engagement and learning, yet few studies have compared the relative effectiveness of individual active learning approaches. We compared three commonly used active learning approaches (verbal questions, clicker questions, and worksheet questions) and asked which method promotes the highest student engagement and highest assessment performance. *Currently in the manuscript submission phase.*

Title: Likert, does it scale?

Collaborators: Cedric Landerer (University of Tennessee)

Brief Overview: The Likert-type scale is the most commonly used scaling method, particularly in questionnaires designed to characterize respondent attitudes and opinions. Often, a mean Likert-scale value is calculated from a given number of respondents; however, the mean of discrete categories can be misleading if the "distance" between each category is unequal. We calculated perceived distances between five scale points for multiple survey questions answered by undergraduate students about their introductory biology course. Our findings will reveal whether our long-held assumptions about the Likert-scale are appropriate. *Currently in the data analysis phase.*