

Understanding Evolution: A Classroom Perspective
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Rutgers, The State University of New Jersey
The Graduate School of Education
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3 Credits

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Office Hours: <i>7:30 pm Monday</i>	Prerequisites or other limitations:
Mode of Instruction: ¹ <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Hybrid <input type="checkbox"/> Online <input type="checkbox"/> Other	Permission required: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes Directions about where to get permission numbers:

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Learning goals:

New Jersey Professional Standards for Teachers (2014)¹

Standard One: Learner Development. The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.

ii. Essential Knowledge:

- (1) The teacher understands how learning occurs--how learners construct knowledge, acquire skills, and develop disciplined thinking processes--and knows how to use instructional strategies that promote student learning;
- (3) The teacher identifies readiness for learning, and understands how development in any one area may affect performance in others; and

iii. Critical Dispositions:

- (1) The teacher respects learners' differing strengths and needs and is committed to using this information to further each learner's development;
- (2) The teacher is committed to using learners' strengths as a basis for growth, and their misconceptions as opportunities for learning;
- (4) The teacher values the input and contributions of families, colleagues, and other professionals in understanding and supporting each learner's development.

Standard Two: Learning Differences. The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.

ii. Essential Knowledge:

(1) The teacher utilizes resources related to educational strategies for instruction and methods of teaching to accommodate individual differences and to employ positive behavioral intervention techniques for students with autism and other developmental disabilities;

(2) The teacher understands and identifies differences in approaches to learning and performance and knows how to design instruction that uses each learner's strengths to promote growth;

(5) The teacher understands that learners bring assets for learning based on their individual experiences, abilities, talents, prior learning, and peer and social group interactions, as well as language, culture, family, and community values; and

iii. Critical Dispositions:

(1) The teacher believes that all learners can achieve at high levels and persists in helping each learner reach his or her full potential;

(2) The teacher respects learners as individuals with differing personal and family backgrounds and various skills, abilities, perspectives, talents, and interests;

(3) The teacher makes learners feel valued and helps them learn to value each other; and

(4) The teacher values diverse languages, dialects, and cultures and seeks to integrate them into his or her instructional practice to engage students in learning.

Standard Three: Learning Environments. The teacher works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self motivation.

ii. Essential Knowledge:

(1) The teacher understands the relationship between motivation and engagement and knows how to design learning experiences using strategies that build learner self-direction and ownership of learning;

(2) The teacher knows how to help learners work productively and cooperatively with each other to achieve learning goals;

iii. Critical Dispositions:

(1) The teacher is committed to working with learners, colleagues, families, and communities to establish positive and supportive learning environments;

(2) The teacher values the role of learners in promoting each other's learning and recognizes the importance of peer relationships in establishing a climate of learning;

(3) The teacher is committed to supporting learners as they participate in decision making, engage in exploration and invention, work collaboratively and independently, and engage in purposeful learning; and

(4) The teacher seeks to foster respectful communication among all members of the learning community.

Standard Four: Content Knowledge. The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches, particularly as they relate to the Common Core Standards and the New Jersey Core Curriculum Content Standards and creates learning experiences that make these aspects of the discipline accessible and meaningful for learners to assure mastery of the content.

ii. Essential Knowledge:

(2) The teacher understands common misconceptions in learning the discipline and how to guide learners to accurate conceptual understanding;

(4) The teacher knows how to integrate culturally relevant content to build on learners' background knowledge;

(5) The teacher has a deep knowledge of student content standards and learning progressions in the discipline(s) he or she teaches;

iii. Critical Dispositions:

- (2) The teacher appreciates multiple perspectives within the discipline and facilitates learners' critical analysis of these perspectives;
- (3) The teacher recognizes the potential of bias in his or her representation of the discipline and seeks to appropriately address problems of bias;
- (5) The teacher shows enthusiasm for the discipline(s) they teach and is committed to making connections to everyday life.

Standard Five: Application of Content. The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.

ii. Essential Knowledge:

- (1) The teacher understands the ways of knowing in his or her discipline, how it relates to other disciplinary approaches to inquiry, and the strengths and limitations of each approach in addressing problems, issues, and concerns.
- (5) The teacher understands critical thinking processes and knows how to help learners develop high level questioning skills to promote their independent learning;
- (7) The teacher understands creative thinking processes and how to engage learners in producing original work; and

iii. Critical Dispositions:

- (2) The teacher values knowledge outside his or her own content area and how such knowledge enhances student learning; and
- (3) The teacher values flexible learning environments that encourage learner exploration, discovery, and expression across content areas.

Standard Six: Assessment. The teacher understands and uses multiple methods of assessment to engage learners in examining their own growth, to monitor learner progress, and to guide the teacher's and learner's decision-making.

ii. Essential Knowledge:

- (1) The teacher understands the differences between formative and summative applications of assessment and knows how and when to use each;
- (5) The teacher understands the positive impact of effective descriptive feedback for learners and knows a variety of strategies for communicating this feedback;

iii. Critical Dispositions:

- (2) The teacher takes responsibility for aligning instruction and assessment with learning goals;
- (4) The teacher is committed to using multiple types of assessment processes to support, verify, and document learning;

Standard Seven: Planning for Instruction. The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context

ii. Essential Knowledge:

- (1) The teacher understands content and content standards and how these are organized in the curriculum;
- (3) The teacher understands learning theory, human development, cultural diversity, and individual differences and how these impact ongoing planning;
- (4) The teacher understands the strengths and needs of individual learners and how to plan instruction that is responsive to these strengths and needs;
- (7) The teacher knows when and how to access resources and collaborate with others to support student learning (for example, special educators, related service providers, language learner specialists, librarians, media specialists, and community organizations).

iii. Critical Dispositions:

- (1) The teacher respects learners' diverse strengths and needs and is committed to using this information to plan effective instruction;

(4) The teacher believes that plans must always be open to adjustment and revision based on learner needs and changing circumstances.

Standard Eight: Instructional Strategies. The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.

ii. Essential Knowledge:

(1) The teacher understands the cognitive processes associated with various kinds of learning (for example, critical and creative thinking, problem framing and problem solving, invention, and memorization and recall) and how these processes can be stimulated;

(3) The teacher knows when and how to use appropriate strategies to differentiate instruction and engage all learners in complex thinking and meaningful tasks;

iii. Critical Dispositions:

(1) The teacher is committed to deepening awareness and understanding the strengths and needs of diverse learners when planning and adjusting instruction;

(2) The teacher values the variety of ways people communicate and encourages learners to develop and use multiple forms of communication.

Council for the Accreditation of Education Professionals (2013)²:

Standard 1: Candidate Knowledge, Skills, and Dispositions

1.1 Content Knowledge and Pedagogical Knowledge

1.2 Instructional Practice

- Learning Experiences

1.6 Learner and Learning

- Learning Experiences

1.8 Learner and Learning

- Relationships and Communication

¹<http://www.state.nj.us/education/code/current/title6a/chap9.pdf>

²http://caepnet.files.wordpress.com/2013/09/final_board_approved1.pdf

Course catalog description:

Helps pre- and in-service life science teachers see evolution from the perspective of the classroom. Presents an overview of evolution from a variety of perspectives encompassing molecular processes as well as those that occur in populations, both in time and space. Particular emphasis given to the central role of the species as the unit of evolutionary change. Within the context of species, adaptation, natural selection, speciation, classification, and phylogeny explored, and also the contemporary issues of meeting creationism head-on.

Other description of course purposes, context, methods, etc:

The format of the class will involve discussion, activities and readings. Therefore, participation is essential.

Grading policy:

Attendance and Participation 10%

Book Review 15%

Textbook Review 10%

Field Trip Activity 20%

*Lessons 15%

Midterm 15%

Final 15%

*Submit to Sakai Teacher Education Portfolio Site- Late Phase Lesson Plan and Unit Plan.
Submission of the appropriate artifacts is critical for successful completion of the course and degree program.

Academic Integrity:

Please refer to the Policy on Academic Integrity for Undergraduate and Graduate Students at <http://academicintegrity.rutgers.edu>. I will follow the policy strictly.

The University Code of Student Conduct can be accessed at:

<http://rci.rutgers.edu/%7Epolcomp/judaff/ucsc.shtml>

For information on the academic integrity policy, please go to:

<http://academicintegrity.rutgers.edu/integrity.shtml#I>

A multimedia presentation on plagiarism can be found at:

<http://www.rci.rutgers.edu/~polcomp/integrity/realifeexamples.html>

Related regulations may also be found in the Rutgers Graduate School of Education Catalog. For any and all assignments and class activities, including in-class quizzes, take-home quizzes, tests, papers, field projects, PowerPoint, and any other class related work, no copying of any kind is allowed, unless copied text is placed within quotations and author/source is appropriately cited. Clear evidence of extensive plagiarism will likely result in a grade of F for the assignment AND course.

Tentative Course Schedule

This is a tentative schedule; therefore, activities, topics, and articles may be changed to reflect the needs of the class.

Week 1 1/26

Nature of Science

Major Unifying Themes in Biology

Intelligent Design/Legal Issues

Reading: Evolution and the Nature of Science (Chapter One)

Week 2 2/2

Darwin's dangerous Idea (DVD) excerpts.

Darwin & Evolution, *Natural History*, November, 2005.

Reading: The Evidence for Biological Evolution (Chapter Two)

Creationist perspectives (Chapter Three)

Week 3 2/9

Natural Selection

Variation, Mutation and Adaptation.

Population genetics, Hardy-Weinberg Equilibrium

Reading: *Darwin & Evolution; Evolution in Action, The Illusion of Design, Natural History Magazine*, 2005.

Week 4 2/16

Molecular evolution activity (L-gulonolactone oxidase).

K-T Boundary

Reading: *Darwin & Evolution; Darwin's Shrink, The Origins of Form, The Perimeter of Ignorance, Natural History Magazine*, 2005.

Resource: [Understanding Evolution](#)

Textbook Review Due

Week 5 2/23

Speciation.

Cladograms

Week 6 3/2

Human evolution.

Week 7 3/9

Evolution of the eye and Irreducible Complexity (PBS.org)

Midterm Review

Week 8 3/16

Spring Recess

Week 9 3/23

Midterm

Case Study: Ken Bingham High School Biology Class, Evaluating student misconceptions. (PBS.org)

Student Lesson

Week 10 3/30

Student Lessons

Week 11 4/6

Student Lessons

Book Review Due

Week 12 4/13

Student Lessons

Week 13 4/20

Student Lessons

Field Trip Activity Proposals

Week 15 4/27

No Monday Night Class**

*****Field Trip to the American Museum of Natural History on Saturday, May 2nd. 79th St. at Central Park West, New York, NY.***

Week 16 5/4

Final Review

Final Exam 5/11

Field Trip Activities Due