

BIOL 303-001 Life Science, Spring 2020

MW 12:30-2:20 Smith 209

INSTRUCTOR

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COURSE OVERVIEW

This instructional methods course is designed for the preparation of elementary science teachers. You will be actively engaged in an intensive experience that involves doing science and reflecting on science teaching and learning. You will also expand upon your biology knowledge as it relates to elementary classrooms. In sum, you will engage in study, writing, laboratory, and discussion that simulate situations and experiences you are likely to encounter in as an elementary science teacher.

We will examine ways to plan, facilitate, and assess learning; the nature of the science learner; ways to motivate students; models of instruction and the utilization of resources; scientific inquiry and problem solving; and the influence of teachers' personal beliefs and professional roles. This will be a course of many questions and varied answers. THERE IS NOT ONE SINGULAR CORRECT METHOD FOR TEACHING SCIENCE. A master teacher has a broad repertoire of strategies and techniques based upon practice and reflection. If you have not already done so, you will undergo a shift in your concept of teaching from the usual traditional objectivist approach to a more non-traditional constructivist approach, or at the very least, you will carefully examine your options.

REQUIRED MATERIALS

1. The Cartoon Guide to the Environment; Larry Gonick & Alice Outwater ISBN 0-06-273274-9
2. Project Learning Tree (Please bring \$28.00 to class to purchase book)

COURSE LEARNING OUTCOMES Upon completion of this course, you will be able to:

Content	Pedagogy
1. Describe some of the major sources of watershed pollution 2. Explain how the watershed is impacted by humans 3. Define each of these biological concepts and recognize or supply examples: producer consumer decomposer mutualism food chain parasitism food web commensalism succession 4. Identify and define each of the ecological units from organism to biosphere. 5. Identify taxonomic levels of living organisms. 6. Identify primary and secondary ecological succession and place the stages in the processes in order. 7. Explain and illustrate a food chain versus a food web. 8. Explain basic functions of a wetland, as well as the importance and benefits of wetlands to plants, animals, and humans. 9. Explain and illustrate (or demonstrate) the water cycle, carbon cycle, and nitrogen cycle 10. Describe the ecological importance of trees	1. Explain the rationale for including EE in the elementary curriculum 2. Effectively use the Maryland E-Lit Standards in lesson planning 3. Identify and integrate appropriate Next Generation Science Standards into lessons 4. Define the components of a MWEE and create an elementary level MWEE that contains those components 5. Develop lessons which effectively integrate science with other subjects such as reading, writing, and math. 6. Identify or construct components of a 5E lesson plan when science concepts are given. 7. Identify Piaget's stages of cognitive development and describe the attributes of a child in each stage. 8. Use Bloom's Taxonomy theory to write effective classroom questions.

11. Describe the characteristics of organisms belonging to each major phylum
12. Name some of the sources and impacts of ocean plastics pollution
13. Describe some of the causes and effects of global climate change
14. Explain the role of SAV in aquatic ecosystems
15. Name the major plant divisions and the characteristics of those plants
16. Describe how gymnosperms, angiosperms, and bryophytes reproduce
17. List the general characteristics of bacteria, fungi, and protists and describe how they can be harmful or beneficial to humans

CAEP TEACHER PREPARATION

This course is aligned with the following standards for teacher preparation:

NSTA Science Content Recommendations

A.1. *Elementary teachers without a science specialization should be prepared to teach science with a strong emphasis on observation and description of events, manipulation of objects and systems, and identification of patterns in nature across subjects. They should be prepared to effectively engage students in concrete manipulative activities that will lead to the development of desired concepts through investigation and analysis of experience. Elementary generalists should be prepared to lead students to understand the unifying concepts of science, including:*

1. Multiple ways we organize our perceptions of the world and how systems organize the studies and knowledge of science
2. Nature of scientific evidence and use of models for explanation
3. Measurement as a way of knowing and organizing observations of constancy and change
4. Evolution of natural systems and factors that result in evolution or equilibrium
5. Interrelationships of form, function, and behaviors in living and nonliving systems

A.2. *At the elementary level in particular, the sciences should be interwoven to develop interdisciplinary perspectives. In relation to biology, elementary generalists should be prepared to lead students in understanding:*

6. Features distinguishing living from nonliving systems
7. Characteristics distinguishing plants, animals, and other living things
8. Multiple ways to order and classify living things
9. Ways organisms function and depend on their environments
10. Ways organisms are interdependent
11. Reproductive patterns and life cycles of common organisms
12. Growth, change, and interactions of populations to form communities

InTASC Model Core Teaching Standards

Standard 1

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.

Standard 2

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.

Standard 3	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.
Standard 4	Content Knowledge The teacher understands the central concepts, tools of inquiry, and structure of the discipline(s) he or she teaches and creates learning experiences that make these aspects of the discipline accessible and meaningful for learners to assure mastery of the content.
Standard 5	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.
Standard 6	Assessment The teacher understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher and learner's decision-making.
Standard 7	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.
Standard 8	Professional Learning & Ethical Practice The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet learners' needs.
Standard 9	Leadership & Collaboration The teacher seeks appropriate leadership roles and opportunities to take responsibility for student learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth, and to advance the profession.
Standard 10	Technology The teacher uses available technology not as an end in itself, but as a tool for learning and communication, integrating its use in professional practices, and for adapting instruction to meet the needs of learners.

STUDENT RESPONSIBILITIES

As a future educator, you should model the behaviors and dispositions of a professional. These include:

PROFESSIONALISM

As part of your preparation for becoming a teacher, you will be expected to behave in a professional manner. This includes:

Attendance & Punctuality: You will earn points for attendance. Class time is used to clarify and extend concepts. Class will be interactive in nature and it will be difficult to make up in the event of an absence. Be on time and do not leave early. Students are expected to attend every class. Genuine documented emergencies may be excused with documentation; each unexcused absence results in the loss of points from the total participation grade. Each incidence of unexcused lateness will result in the loss of points from the total participation grade (see grading below).

Participation. You are expected to take initiative during classroom discussion and practice classroom etiquette that gives full attention to the professor or peer who is speaking. Inattention during class time will result in deductions to your participation grade. Participation doesn't mean simply attending class. Participate in the class

discussion and activities by making meaningful comments. Ask questions!! Each incidence of nonparticipation results in the loss of points from the total participation grade. (see grading below).

Class Behavior: Free discussion, inquiry, and expression is encouraged in this class. Classroom behavior that interferes with either (a) the instructor's ability to conduct the class or (b) the ability of students to benefit from the instruction is not acceptable. Examples may include routinely entering class late or departing early; cellular telephones, or other electronic devices; repeatedly talking in class without being recognized; talking while others are speaking; or arguing in a way that is perceived as "crossing the civility line." **In the event of a situation where a student legitimately needs to use a cellular telephone during class, prior notice and approval of the instructor is required.** Classroom behavior which is determined to be inappropriate and cannot be resolved by the student and the faculty member may be referred for administrative or disciplinary review and the student will be barred from attending class.

Preparation: Complete assignments on time and be ready to participate fully in class activities.

Respect: Be considerate of others. Behave in a professional, ethical manner.

Attitude: Be curious, flexible, organized, and patient - all characteristics of good teachers.

Correspondence policy: The best way to contact me outside of office hours is by email. I will respond to any email within 48 hours, sooner if it is time sensitive.

Email etiquette: Remember that our correspondence is of a professional nature so you need to be both respectful and professional in your written correspondence. This means use proper grammar, punctuation, capitalization, address me by my title at the start of the email and sign your full name at the end. Please put the course (BIOL303) and your name in the Subject line. Emails should be sent from your TU email account. Emails that do not meet these requirement may not be answered.

Academic Work: Given the interactive nature of this course, you are expected to complete assignments and readings by the due date. You are expected to demonstrate the ability to effectively process information and experiences using high level thinking processes, including analysis, synthesis and evaluation.

- All written assignments must be typed, **12-point font, double-spaced, 1 inch margins on all sides**. Professional writing demonstrates the conventions of Standard English, including clarity of expression and attention to grammar, sentence structure, and spelling (points will be deducted if not).
- All assignments are to be submitted via Blackboard by 10:00 AM on the due date unless otherwise noted.
- Grades for **late assignments will be lowered by 5% per day**. Every effort will be made to accommodate legitimate reasons for delays if requests are made in writing in advance of the due date.
- **Exams and quizzes** – There will be no make-up exams/quizzes except in the case of a documented emergency or illness. You should contact your instructor **in advance** if you anticipate missing class when an assessment is scheduled. Do NOT expect to take an exam during a subsequent class period unless you have contacted your instructor in advance and received permission.

ACADEMIC HONESTY: Any form of cheating (including on exams, quizzes, or plagiarism of laboratory assignments and term papers) will not be tolerated. Cheating and plagiarism are defined in the Student Academic Integrity Policy (<http://www.new.towson.edu/provost/resources/studentacademic.asp>) and should be reviewed by each student. The consequences of violating this policy may result in the assignment of zero points for an examination or quiz up to assignment of a failing grade for the course, at the discretion of the instructor.

Academic integrity policy as it relates to grades for this course, consistent with TU Academic Integrity Policy available at <http://www.towson.edu/studentaffairs/policies/>. The relevant section for grade penalties reads:

The penalties that may be assessed by a faculty member for a course- related violation may include the following:

1. revision of the work in question and/or completion of alternative work, with or without a grade reduction;
2. reduced grade (including "F" or zero) for the assignment;
3. reduced grade (including "F") for the entire course.

AMERICANS WITH DISABILITIES ACT: If you are a qualified student with a disability seeking accommodations under the Americans with Disabilities Act, you are required to self-identify with Disability Student Services in the Administration Building and present a letter to me from DSS. This should be done during the first week of class.

DIVERSITY STATEMENT:

In accordance with the [Towson University Strategic Plan](#), the [Fisher College of Science and Mathematics Diversity Action Plan](#), and the [Department of Biological Sciences Diversity Action Plan](#), everyone participating in this course is expected to be respectful of each other without regard to race, class, linguistic background, religion, political beliefs, sex, gender identity or expression, sexual orientation, ethnicity, age, veteran's status, or physical ability and characteristics. If you feel these expectations have not been met, please speak with your instructor or the designated diversity liaison, Dr. Colleen Winters, cwinters@towson.edu.

GRADING

Grades in this course will be calculated as follows:

	A	A-	B+	B	B-	C+	C	D+	D	F
%	95-100	90-94.9	87-89.9	83-86.9	80-82.9	78-79.9	70-77.9	68-69.9	60-67.9	<60

Assignments	Total Points
Attendance and Participation (5%)	180
Chapter Summaries/Questions (5%)	60
Reading Reflections (10%)	120
Out of Class Seminar Summaries (5%)	40
Unit Plan Draft Lessons 1 & 2 (5%)	20
Final MWEE Project (20%)	275
MWEE Presentation (10%)	50
Water Quality Brochure (10%)	100
Exam 1 (10%)	200
Exam 2 (10%)	200
Exam 3 (10%)	200
TOTAL	1445

Attendance/participation: You will earn points for attendance and for participating in class. Each unexcused absence results in the loss of six points from the total class grade. Each incidence of unexcused lateness will result in the loss of two points from the total class grade. If I see that you are not prepared for class, (i.e., you have not read the assigned material), 6 points will be deducted from the total class grade. Each incidence of nonparticipation results in the loss of 1 point from the total participation grade. ***Use of cell phones in class will result in the loss of all participation points for that class period.***

Chapter Summaries/Questions: You will write brief summaries and/or answer questions based on assigned readings.

Reading Reflections: You will write thoughtful reactions to what you read in assigned course readings and apply the content to classroom teaching.

Exams: Each exam (3) will have a variety of question types that are appropriate to the content covered, including both biology content and pedagogy. Material from course readings will be included.

Out of Class Seminars: This semester, the University is hosting artist Stacy Levy. Her work focuses on watersheds and water quality, which are emphasized in this class. You are required to attend two out of three of these seminars, which are based on our course content and also coincide with Stacy Levy's Chesapeake Bay watershed exhibit in the Center for the Arts building:

January 30 6:30 pm Lecture and reception by Stacy Levy **(REQUIRED OF ALL)**

March 5 6:30 pm Lecture by Tom Pelton, Environmental Journalist and Host of WYPR "The Environment in Focus"

April 23 6:30 pm Mr. Trash Wheel and the Baltimore Harbor

You will write a short summary regarding how the topics of the two seminars you attended are related to class content, and how you might apply what you learned to your classroom teaching.

Course Projects

(A) **MWEE Project:** You will create 5-E unit plan that satisfies that Maryland State MWEE requirement and present your plan to the class.

(B) **Water Quality Brochure/Pamphlet:** In conjunction with the *Stacy Levy: Watershed Collection* exhibit, the library is creating a display a water related information and books. You will create a brochure to be placed in this display that will educate the campus on water quality issues that affect the Chesapeake Bay watershed.

TENTATIVE COURSE SCHEDULE*			
Class Date	Topics	Readings (to be completed before class)	Course Assignments (due on Blackboard at beginning of class)
1/27	Go over Syllabus/Assignments Rationale for EE, MD Environmental Literacy Standards Next Generation Science Standards – Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas		
1/29	What is a MWEE? MWEE projects Chesapeake Bay Watershed/Water Pollution Who Polluted	Ansberry & Morgan (2010) <i>BSCS 5E Instructional Model</i>	Reading reflection: <i>BSCS 5E Instructional Model</i>
2/3	5E Model of Instruction Water Cycle & Trees- what's the connection? Stream sampling Part I	Cartoon Guide Chapter 1	Chapter 1 short summary
2/5	Stream sampling Part II		Out of Class Seminar Summary #1 Due
2/10	Marine debris/plastics Part I Bloom's Taxonomy	Cartoon Guide Chapters 13 and 14	Cartoon Guide Chapters 13 and 14 short summary
2/12	Marine debris/plastics Part II	Science & Children Editorial: <i>Addressing Common Questions About 21st Century Science Teaching</i>	Reading Reflection: <i>Addressing Common Questions About 21st Century Science Teaching</i>

2/17	Nutrient cycling Water Quality Brochures work time/MWEE project work time	Cartoon Guide Chapter 2	Cartoon Guide Chapter 2 short summary
2/19	Project WET activities	Sobel (1998) <i>Beyond Ecophobia</i>	Reading Reflection: <i>Beyond Ecophobia</i>
2/24	Project WET activities	Reubon (2019) <i>Nature RX</i>	Reading Reflection: <i>Nature RX</i>
2/26	EXAM 1		
3/2	MWEE Projects		Water Quality Brochure Due
3/4	Taxonomy: Domains, Kingdoms, Phyla Phylum Porifera; Phylum Cnidaria Population Ecology		Lesson 1 draft due
3/9	Worms: Phylum Platyhelminthes, Nematoda, Annelida Population Ecology	Cartoon Guide Chapter 3	Cartoon Guide Chapter 3 short summary
3/11	Phylum Mollusca Community Ecology	Cartoon Guide Chapter 6	Cartoon Guide Chapter 6 short summary
3/23	Phylum Arthropoda Wetlands activities		Out of Class Seminar Summary #2 Due
3/25	Phylum Chordata- jigsaw Wetlands activities	Sobel (2018) <i>Look, Don't Touch</i>	Reading Reflection: <i>Look, Don't Touch</i>
3/30	MWEE Projects Revisited		
4/1	Biodiversity of a sample: Field, Forest, Stream		Lesson Plan 2 draft due
4/6	Phylum Echinodermata Biomes/Biosphere: Global Climate Change	Cartoon Guide Chapters 4 & 5	Cartoon Chapter 4 and Chapter 5 short summaries
4/8	EXAM 2		
4/13	MWEE Projects	Yates & Brussoni: <i>The Importance of Children's Risky Play</i>	Reading reflection: <i>The Importance of Children's Risky Play</i>
4/15	MWEE Projects		MWEE Presentations Due
4/20	MWEE Presentations Plant Kingdom Introduction		
4/22	MWEE Presentations Plants: Leaves and Leaf Structure		
4/27	MWEE Presentations Plants: Reproduction & Seeds		
4/29	Archaea & Eubacteria		
5/4	Protists & Fungi Piaget's stages of cognitive development		Out of Class Seminar Summary #2 Due

5/6	Lower elementary concepts/activities: Growing Up WILD		Final MWEE Projects Due: Rationale, Lesson Plans, Assessment
5/11	Lower elementary concepts/activities: Getting Little Feet Wet		
5/18	FINAL EXAM 12:30-2:20		

* PLEASE NOTE: The schedule of activities is tentative and will change based on the needs of students and the progress of learning in the course.