

**BIOL 410 - Principles and Methods of Teaching Biology**  
UNC-Baccalaureate Education in Science and Teaching (UNC-BEST)  
Spring 2019

Instructor: Jennifer Coble

E-mail: [jcoble@bio.unc.edu](mailto:jcoble@bio.unc.edu)

Phone: 919-210-5161 (cell). Please feel free to text or call before 9:00 pm. I do not check e-mail often on evenings or weekends so if you have a pressing question, feel free to send it via a text.

Office: 110 Wilson Hall

Office hours: My regular availability is Tuesday and Thursday 2:00-4:00pm, but please make an appointment for these times as I do schedule other meetings during this time. If these times do not work for you, we can set up another time to that works for your schedule.

**COURSE DESCRIPTION:**

This course will help you develop the knowledge and skills needed to implement student-centered science instruction. First, we will explore why we teach science to all students and how our science education experiences impact our view of good science teaching. Next, we will examine multiple views on how students come to understand science, the teaching strategies research has identified as most effective and how these strategies can be implemented within the contexts of current high school classrooms. In addition to learning how to teach biology to a diverse group of students, we will reconstruct our knowledge of biology to make it more contextual and conceptual. Finally, we will explore what it is like to be a science teacher and what type of science teacher each of you would like to be. To demonstrate your ability to design student-centered instruction you will design biology lessons and make accompanying manipulative models that will serve as resources for your peers, UNC-BEST alumni and our science teacher partners. To help us meet the above goals, there is also a fieldwork component of the course, which will provide you the opportunity to volunteer in a local high school science classroom each week.

**DRIVING QUESTIONS**

At the end of the course, you should be able to answer the following driving questions:

- Why do you want to be science teacher?
- What science should be school science?
- What are the big ideas of biology?
- What is good science teaching?
- What are the implications of traditional science teaching practices?
- How do students learn science?
- What is student-centered science instruction and what does it look like?
- How can we implement student-centered science in current school contexts?
- How can we assess student understandings of science?
- How do you plan a series of lessons to support deep understanding?
- What are the realities of being a high school science teacher?

**ATTENDANCE POLICY**

Attendance in this class is essential as all classes include activities you can only benefit from by being present and involved. I am aware, however, that life and pathogens happen. Therefore, I allow one class absence without penalty. Know that you are still required to submit assignments due that day unless you contact me before the due date for an extension. Please e-mail me when you know you will be absent so I can let you know how you can meet class goals. Missing more than one class and failing to demonstrate you have achieved the learning goals for a missed class will result in a reduction of your participation grade.

**PARTICIPATION POLICY**

To reap the full benefits of this course everyone must fully participate in class activities and discussions. Many classes will involve you working in pairs or groups where your learning and the learning of your group members relies on your thoughtful participation. To reward you for your consistent hard work, effort and focus, participation in class activities counts for 20% of your final grade. I pay close attention to participation during each class and will collect and evaluate class work on a regular basis. To earn all participation points, please be on time for class, come prepared to discuss and apply readings, think deeply about the challenges posed during class and volunteer to share your ideas. Please do not talk about non-class related topics during group discussions, text, or engage in other activities during class. Finally, do not mistake my laid back personality for being laid back about my course expectations. I work hard to make classes engaging and expect the same effort from my students.

## COURSE ASSIGNMENTS

### Science Education Inquiry Assignments

You will have assignments due each class session or each week and all assignments will be posted on Sakai. Since assignments often build on your ideas, questions and needs, I do not have a predetermined schedule of topics and assignments. Many assignments will be given at the end of class and will be due by the next class. Some assignments will challenge you to think deeply about an issue, question or real world context and its implications for science teaching topic Other assignments will challenge you to design an instructional strategy and/or a model to support learning for a particular biology. I expect you are working on out of class assignments for approximately 4-5 hours each week. For many of the reading reflections and writing prompt assignments you will complete at the beginning of the semester, I will use the following rubric to provide feedback on your efforts.

<b>Exemplary (3 pts)</b>	<b>Proficient (2 pt)</b>	<b>Poor (1 pt)</b>
Product clearly answers the driving questions or completes tasks and demonstrates deep thought and exemplary effort.	Product answers the driving questions or completes required tasks and demonstrates significant thought and effort.	Product only partially answers driving question or completes task and does not demonstrate significant thought or effort.

### Biology Models and Lesson Plans

Over the course of the semester, you will work in teams to design hands on and inquiry based lessons that allow students to explain a real world topic within the North Carolina Biology Standard Course of Study. Specifically, the lessons will involve students in analyzing and manipulating hand on models your team will design and make in the Makerspace. The curriculum products you design will be shared with your classmates, UNC-BEST alumni and partner science teachers. A detailed description of each component of the assignment will be available on Sakai.

### Final Exam

The final exam will be held on Friday, May 3<sup>rd</sup> at 12:00 pm and will allow you to demonstrate your ability to create higher order learning goals, assessments that provide evidence of students meeting these and design student centered and inquiry based instruction that allows. You will draft a higher order learning goal for a topic in the N.C. Standard Course of Study, design an assessment that would provide evidence of achieving this learning goal and outline a series of hands on and inquiry based lessons that would allow students to be successful in the assessment.

## BIOL 410 FIELDWORK

This semester, you will be serving as a TA in a local high school biology classroom. The expectation is for you to observe and support a high school science classroom for one 90-minute block class period or two 45-minute class periods each week. At the beginning of the semester, you will let me know your availability, your preference for what type of school and classroom you would like to observe and your transportation needs. I will arrange a fieldwork placement that meets your schedule, travel requirements and school preference.

Your first fieldwork visits will likely start the week of January 28<sup>th</sup>. Each week, you will support a local high school teacher and his/her students while developing your understanding of the complexities of teaching science in today's high schools. There are two goals for fieldwork. One is to serve as a teaching assistant, offering help to the classroom teacher and his or her students. This could involve grading assignments, working one-on-one with a student, setting up for a lab or even teaching a lesson. A second goal is to be a participant observer, paying careful attention to the events and interactions in your classroom. For this second goal, you will collect information on many things in your classroom including: how your teacher organizes the lesson, what he or she prioritizes, what the students say, how they react to the lessons, how they interact with one another, how they communicate their ideas, what questions they ask, etc. You will take notes on what you observe to help you write your reflections.

### Fieldwork Reflections

You will share how your experiences in your fieldwork classroom help you answer key BIOL 410 driving questions by writing and posting one reflection on Sakai for every two weeks of fieldwork. Each reflection should focus one a specific BIOL 410 driving questions (see Sakai for fieldwork syllabus, which contains the list of reflection questions) that is most pertinent to the lesson/s you observed in that two week period. You can focus on only one of the classes you observed in that two week period or more than one. The goal is to focus on whatever lesson or interaction you observed that is most relevant to a particular driving question or particularly interesting to you. Due dates for reflections will be provided once fieldwork placements and schedule are finalized. Each reflection should be approximately one page single spaced.

Each reflection should be about one page single spaced and:

- provide *specific* details on what in the lesson aligned or failed to align with the teaching standard addressed in the driving question and,
- include *specific* ideas for how the lesson could be revised to meet the teaching standard addressed in the driving question and be more student-centered overall.

**GRADING**

Assignment Category	Percentage of total grade
Biology Lesson Plan and Models	40%
In class participation and class work	20%
Science Education Assignments and Reflections	10%
Fieldwork Reflections	10%
Final Exam	20%

The grading policy for this class is unique as the lesson plans and models will be shared with fellow UNC-BEST alumni and practicing teachers. Since high school students deserve exemplary lessons, the only products that will earn credit are those that are exemplary. Any lesson products that do not earn exemplary ratings will be recorded as incomplete and returned for revision with feedback on revisions required to earn an exemplary rating. While revisions will be requested for nearly every lesson product you submit, submitting assignments that do not meet expectations due to lack of effort will result in a reduced grade even after needed revisions have been completed. It is much better to request an extension if you are struggling to complete an assignment than submit one that represents partial effort. Students that meet the following criteria will earn an A in the course:

- Submit assignments on time (unless an extension is granted) that consistently meet and exceed expectations.
- Participate fully in all class tasks and discussions and regularly contribute thoughtful ideas.
- Have one or no absences and arrive to class on time.

Students that meet the following criteria will earn a B in the course:

- Submit 1-2 assignments that do not meet criteria due to lack of effort but meet exemplary ratings with revisions.
- Participate fully in all class tasks or discussions and regularly contribute thoughtful ideas.
- Miss more than one class or are late to class more than once.

Students that meet the following criteria will earn a C in the course:

- Submit 2-3 assignments that do not meet criteria or are late, but meet exemplary ratings with revisions.
- Partially participate in class discussions and/or engage in off-topic discussions.
- Miss more than two classes or are late to more than two classes.

Students that meet the following criteria will earn a IN in the course

- Failure to revise assignments to meet exemplary ratings.

#### **Disability Services Information**

If you have a medical condition/disability that may require reasonable accommodation to ensure equal access to this course, please contact the Department of Disability Services at 919.962.8300, on the internet at <http://disabilityservices.unc.edu/eligibility> or via email at [disabilityservices@unc.edu](mailto:disabilityservices@unc.edu)

#### **Honor Code Information**

The University of North Carolina at Chapel Hill has had a student-administered honor system and judicial system for over 100 years. The system is the responsibility of students and is regulated and governed by them, but faculty share the responsibility. If you have questions about your responsibility under the honor code, please bring them to your instructor or consult with the office of the Dean of Students or the Instrument of Student Judicial Governance. If you require further information on the definition of plagiarism, authorized vs. unauthorized collaboration, unauthorized materials, consequences of violations, or additional information on the Honor Code at UNC, please visit <http://honor.unc.edu>.

#### **The University's Policy on Prohibited Harassment and Discrimination**

(<http://www.unc.edu/campus/policies/harassanddiscrim.pdf>) prohibits discrimination or harassment on the basis of an individual's race, color, gender, national origin, age, religion, creed, disability, veteran's status, sexual orientation, gender identity or gender expression. Appendix B of this Policy provides specific information for students who believe that they have been discriminated against or harassed on the basis of one or more of these protected classifications. Students who want additional information regarding the University's process for investigating allegations of discrimination or harassment should contact the Equal Opportunity /ADA Office for assistance at 919.966.3576 or via email at [equalopportunity@unc.edu](mailto:equalopportunity@unc.edu) or to:

Equal Opportunity/ADA Office  
The University of North Carolina at Chapel Hill  
100 East Franklin Street, Unit 110  
Campus Box 9160  
Campus Box 9160 Chapel Hill, NC 27599