GEORGE MASON UNIVERSITY
COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT
GRADUATE SCHOOL OF EDUCATION
Elementary Education Program

ELED 453: 001- Science Methods for the Elementary Classroom
3 Credits - Spring 2024
Mondays 10:00-12:40**,** 2020 Thompson Hall – Fairfax Campus
In person, Jan 22nd to April 29th

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This course is only open to students in the Elementary Education program.

COURSE DESCRIPTION

Prerequisites/Corequisites

Admission to the Elementary Education program.

University Catalog Course Descriptions

Develops skills and abilities in science teaching methods, applications of technology, safety practices, and creation of integrated science curricula. Examines science teaching based on contemporary theory, practice, and standards. Prerequisite(s): Admission to elementary education licensure program. **Notes:** Requires field experience in public schools.

Expanded Course Description

The primary goal of this course is to provide you with practical experience, theoretical background, and pedagogical skills that will allow you to be successful in your future career. To this end, there will be two main themes stressed over the duration of the course: 1) to facilitate the development of pedagogical approaches to inquiry-based teaching practice, and 2) to develop confidence and understanding for science content. With respect to content, the course will develop your background knowledge with the goal of successful teaching in an elementary science context, meaning that you will need to have a solid understanding of large-scale science topics beyond what is expected of elementary children. We will also wrestle with engaging with technology in ways that will helps us develop our vision of effective science practices. The course will also consider the intersection of science, self, and society to investigate elements of health-related content such as human body systems, nutrition, and emotional health.

Most children come to school with a keen interest in the world around them, but often by the end of elementary school only a small percentage of students have retained this interest in science content. This is generally attributed to the ways in which "school science" often ignores the beauty and joy that can come from engaging with science and connecting scientific understanding to the everyday experiences of children. Consequently, we will conceptualize science as a verb where we consider our *wonders, build new knowledge* and *discover* as opposed to the memorization of 'science facts.' For this reason, we will utilize constructivist approaches to learning and those approaches should help you scaffold science content that is too often presented as an exercise in the acquisition of vocabulary.

This course will provide multiple opportunities for students to enjoy and embrace the ideas that make us wonder about the world and our role within it. In many respects, science can be intimidating to learn in the ways it is presented in schools, media and the general public. Our goal is to unpack those social constructions of science to present science in a more realistic light where scientists are presented as humans struggling to better understand the world (just like the rest of us) as opposed to omnipotent, infallible heroes that society and textbooks wish to portray. This class experience is merely a first step in your evolution toward becoming the kind of educator you wish to be. Lastly, you will be required to bring your curiosity to class for each session. Please make sure to nurture and feed it as we move through our work together.

Course Delivery Method
Face to face. This course will take place in a face-to-face weekly meeting format and will utilize Blackboard Learning Management system (LMS) through the MyMason portal. Please check email and course Bb site regularly as those are the main communication platforms for the course.

Workload: Please be aware that this course is not self-paced. Students are expected to meet specific deadlines and due dates listed in the Class Schedule section of this syllabus. It is the student's responsibility to keep track of the weekly course schedule of topics, readings, activities and assignments due.

Instructor Support: Students may schedule a one-on-one meeting to discuss course requirements, content or other course-related issues. Those unable to come to a Mason campus can meet with the instructor via telephone or web conference. Students should email the instructor to schedule a one-on-one session, including their preferred meeting method and suggested dates/times.

Classroom Etiquette: The course environment (including when online) is a collaborative space meant to foster independent thought and critical analysis of complex ideas. Be open to the thoughts of others, particularly when they may be different from your own. Seek first to understand another's perspective from their point of view. Do not be afraid to ask one another difficult questions, but be positive in your approach and thoughtful with your words. Remember that you are not competing with classmates, but sharing information and learning from others. All faculty are similarly expected to be respectful in all communications.
*Under no circumstances, may candidates/students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face class meeting, such online participation requires undivided attention to course content and communication.

Accommodations: Students who require effective accommodations to ensure accessibility must be registered with George Mason University Disability Services.

Technical Requirements

To participate in this course, students will need to satisfy the following technical requirements:

- High-speed Internet access with standard up-to-date browsers. To get a list of Blackboard's supported browsers see: https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#supported-browsers

To get a list of supported operation systems on different devices see:

https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support#tested-devices-and-operating-systems

- Students must maintain consistent and reliable access to their GMU email and Blackboard, as these are the official methods of communication for this course.
- Students may be asked to create logins and passwords on supplemental websites and/or to download trial software to their computer or tablet as part of course requirements.
- The following software plug-ins for PCs and Macs, respectively, are available for free download:
    - Adobe Acrobat Reader: https://get.adobe.com/reader/
    - Windows Media Player: https://support.microsoft.com/en-us/help/14209/get-windows-media-player
    - Apple Quick Time Player: www.apple.com/quicktime/download/

- "Under no circumstances, may candidates/students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face class meeting, such online participation requires undivided attention to course content and communication."

Learner Outcomes

This course will enable students to:

A. Build a pedagogical content knowledge base in science and understand the systems of nature in Earth science, biology, chemistry and through inquiry-based investigation

B. Conceptualize core principles regarding the Nature of Science, i.e., how wonder, creativity experimentation, and evidence frame scientific thinking, as well as how theory is used in predicting and explaining phenomena.

C. Engage in and use scientific practices such as data collection, analysis, modeling, use of evidence, construction of explanations, reliability, self-checking, and identification of limitations to conduct research experiments.

D. Understand the historical development of scientific concepts and the social, cultural, and economic significance of science.

E. Understand and use knowledge, skills, and practices of the four core science disciplines of Earth science, biology, chemistry, and physics to develop lesson plans demonstrating inquiry-based principles in science and health education including the incorporation of technology

F. Demonstrate age-appropriate safety standards when designing hands-on classroom experiences

G. Examine science and health curricula and methods with respect to “Science for All” and standards documents at local, state, and national levels

H. Develop viable assessment tools for science and health contexts

I. Understand the relationship of science to math, the design process, and technology.

J. Understand, possess, and integrate the knowledge, skills, dispositions, and processes needed to support learners’ achievement in an interdisciplinary manner in Virginia's Foundation Blocks for Early Learning: Comprehensive Standards for Four-Year-Olds and the Virginia Standards of Learning in English, mathematics, history and social science, science, and computer technology.

Professional Standards

INTASC: *Interstate Teacher Assessment and Support Consortium*, Model Core Teaching Standards

Upon completion of this course, students will have met the following professional standards:

#4. Content Knowledge. The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and creates learning experiences that make the discipline accessible and meaningful for learners to assure mastery of the content.
#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.
#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's and learner's decision making.
#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.
#8. 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.

Technology (ISTE NETS): *International Society for Technology in Education / National Educational Technology Standards*

Standard I. Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.

REQUIRED TEXTS & READINGS

Bryson, B. (2004). A short history of nearly everything. New York, NY: Broadway Books
(Any edition is fine...just don't buy the abridged version...)

Other required readings will be provided via electronic chapters via Blackboard.

Articles and other materials will be provided throughout the course.

COURSE ASSIGNMENTS/ASSESSMENTS

1. **Wonder Journal [Course outcomes: A & B] 10%**
   Think about the science that you see in the everyday. Ask yourself questions, feel the movements and forces while you drive, look at the sky, watch your pet, engage with another human, think about your place in this world, go for a long walk and just think...no phone, no worries, just get lost in your thoughts. Remember, this is homework so you have an excuse.
   Over the course of the semester…use a composition book/journal to make note of various things that you observe in the natural world around you and list, sketch, question, observe and record those things that capture your attention and imagination.
   These wonderings about the natural world are just that…what do you see, feel and think about those things that fascinate and/or confuse you, questions or thoughts that move into and out of your mind. There may be elements from the Bryson reading that trigger your thinking or it might be watching the clouds move while walking your dog…the inspiration doesn't matter, but we will engage deeply with those thoughts we usually discard because

we live our lives in a hurry. We will intentionally slow down and use old technology (paper and pen/pencil) to engage with our wonders.

Please see the Wonder Journal template headings handout on Bb.

* Essential note about journals: Your wonders are yours and unique to how you envision the world around you. "Dance like nobody is watching" while you build your entries. **There is no wrong way** to do these journal entries – that said, it should be apparent that you go beyond a cursory effort and reflect your deep thinking on the issue or phenomena. Your grade for this project will reflect effort and completion rather than whether you generated right answers although after wrestling with your thoughts…feel free to try and find answers, but that is necessarily required.

2. Reading Logs [Course goals: A, B, E, F] 15%

You will analyze each Science reading in terms of the reading and its connection to your school site and your unit. Record these responses in your longitudinal reading log for the readings below. Use the template provided in Bb. Your reflection should…

1. to be completed before the class period begins on days those readings are due
2. provide thoughtful and genuine consideration of the texts
3. be accessible during each class session.

These will help in the construction and support for your science unit. Complete a log for each of the following readings:

Reading Logs are only needed for the following readings posted on Bb

Reading Log #1	Simplifying inquiry posted on Bb
Reading Log #2 and 3	Read the two articles posted in the "5E readings" folder on Bb
Reading Log #4 and 5	Read the two articles "observing & modeling" folder on Bb

3. Generative AI assignment [Course goals: A-F] 10%

Whether we like it or not AI is here and not going anywhere. We will read an article that will help us conceptualize the use of AI for teaching and idea generation, while also critiquing and analyzing responses based on research regarding excellent inquiry science teaching. These will be the basis for helping us think through our mini unit approaches and better understanding how AI can improve and support our role as teachers. More details will be provided during the course.

4. Inquiry-Based Lesson Series / Mini-Unit Project (PBA) [Course goals: A-F] 35%

The goal of this project is construct and teach an inquiry-based unit within your field site. We will design this work around the 5 E model of lesson planning. The unit will entail building a detailed and well-supported narrative description for the approach that will be employed. The five-E sequence (generally taught over three class sessions) will build science content understanding in engaging and dynamic ways for students within your field site and provide some key theoretical and research-based support for the content, approach and activities constructed. The unit will be comprised of the following components and scored via the rubric provided later in the syllabus.

All unit plans will include:

A. Overview

Theme/Topic:

Give insight into the overall content concepts and provide an overarching description of the unit and goals. Consider it the "movie trailer" of the unit where you set the stage and excite the reader for what lies ahead. (1-2 paragraphs)

Teacher Background knowledge:

This section highlights the facts that teachers should be familiar with this can/should include some resources and/or sources…also list some common misconceptions (or naïve conceptions) children and adults may hold concerning the topic. (2-3 paragraphs)

Description of Students:

Provide brief overview, describing the audience for which the unit is designed. (1-2 paragraphs)

B. Theoretical Framework for Science Instruction

Describe your approach to teaching your series of lessons, based on modern developmental theory and learning theory using your course readings to support your instructional choices. (2 paragraphs and at least 4 references)

C. Detailed Lesson Plans

The unit will follow the 5 E model and as such your lessons should span the 5E process. These will generally be one E per lesson and would require 5 detailed lessons for the unit (*See Bb site for lesson template*). These will include: SOL standards, lesson objectives, detailed procedures, supporting materials, and assessment strategies.

- These approaches should work to innovatively engage children in meaningful approaches that also comprise the spirit of inquiry and investigation as depicted in the readings.
- See lesson template and this will be discussed on multiple occasions over the course.

5. Bryson Text [course outcome: A & B] 10%

Introduction
Chapter 1 - How to Build a Universe
Chapter 2 - Welcome to the Solar System
Chapter 9 - The Mighty Atom
Chapter 12 - The Earth Moves
Chapter 24 - Cells
Chapter 21 - Life Goes On
Chapter 26 - The Stuff of Life

After reading these chapters (there will be classroom discussions as well). We will create a **2 page synthesis** regarding the ideas, context, approach and nature of inquiry in regards to Science. Details will be provided in class.

6. Wonder Investigation [Course goals: A, B, E, F] 10%

This project is designed to evoke and engage future teachers in the possibilities that science content holds for elementary contexts as well as for yourselves. Science often generates negative feelings associated with memorization and mind-numbing procedural approaches (think about lab reports or 'if – then' statements), which is not the norm in typical/real science contexts. The goal of this project is to pursue an idea that **you** find interesting.

You will choose a topic from your wonder journal (or a new and different wonder) and pursue some answers, ideas and most importantly further questions related to that wonder.
The goal is not necessarily to prove one single answer, but to understand something to a greater degree and then consider all the new questions that come along with that wondering and investigating.

The project will entail the following:
- a public presentation (preferably a poster, museum display or other visual of some sort) that will highlight:
a) the wonder itself
b) the information identified to make more sense of that wonder (diagrams, sketches, etc.)
c) create a wonder map
d) list key scientific concepts behind that wonder (definitions, models, etc.),
e) list further questions and hypotheses related to that wonder,
f) what testable questions arose from your wonder? … how might you design an experiment or process to answer those further wonders,
g) and lastly be provided a few ways you might consider using wonder in a classroom context, if possible.

7. Participation [Course goals: A-F] 10%

Success in the course is predicated on being an active participant in the learning process.
To this end, there will be a number of class-based assignments, discussions and activities over the duration of the course that will also be included in your overall participation. My expectation is that active and engaged students stand the most to gain from the approaches we will use in class. Consequently, you are expected to *be present, actively* involve yourself in class activities, and treat classmates with respect.
We will intentionally unplug ourselves and engage with our thoughts and ideas while avoiding the temptation for quick answers via the Internet. I have found this approach leads to increased science confidence and builds classroom community. The hope is to create a joyful context where laughing, lively discussion, raising questions and engaging with your group members are the norm. I strongly encourage you to consider how your individual role can positively impact our time together. I fully expect that each participant will attend every class and communicate ahead of time if that is going to be impacted. Lastly, there is a professional expectation that students will not work on other classroom projects, browse the web or send/check text messages during our class time.

COURSE GRADING SCALE:

Grade	Grading Scale	Interpretation
A+	**97-100**	**Represents mastery of the subject through effort beyond basic requirements**
A	**93-96**	
A-	**90-92**	
B+	**87-89**	**Reflects an understanding of and the ability to apply theories and principles at a basic level**
B	**83-86**	
B-	**80-82**	
C+	**77-79**	

C	**73-76**	
C-	**70-72**	**Denotes an unacceptable level of understanding and application of the basic elements of the course. Grade does not meet the minimum requirement for licensure courses.**
D	**60-69**	
F	**<59**	

Note: "C" is not satisfactory for a licensure course
"F" does not meet requirements of the Graduate School of Education

WORK TIMELINESS EXPECTATIONS:

It is expected that all class assignments will be submitted on time. Therefore, **All assignments are to be completed by the date listed in the syllabus. Written work will not be accepted after the due date unless prior arrangements have been made with the instructor.** All assignments must be submitted by the beginning of class (Eastern standard time) on the due date stated within the syllabus (see below) and should only be submitted via **Blackboard**.

If you are unable to complete an assignment due to an emergency or difficult circumstance, communication must be made with the instructor via email or in person. In situations that are deemed an emergency or a difficult circumstance, I will work with you to set a new submission date that will not be considered late.

Attendance:
1. In accordance with the GMU Attendance Policies (University Catalog, 2023-2024), "Students are expected to attend the class periods of the courses for which they are registered. In-class participation is important not only to the individual student, but also to the class as a whole. Because class participation may be a factor in grading, instructors may use absence, tardiness, early departure, or failure to engage in online classes as de facto evidence of nonparticipation." See https://catalog.gmu.edu/policies/academic/registration-attendance/#ap-1-6.
2. If you must be absent from class, inform the instructor prior to the beginning of the class session. Missed classes (or portions of classes) will result in loss of participation points. Unless there are extenuating circumstances that have been shared with the instructor, more than two missed classes will result in a failing grade, and you must retake the course if you wish to earn credit.
3. Absence from class to observe a religious holiday, to serve jury duty, to participate in a university-sponsored event, or to participate in required military service are exemptions to the above policy. If you anticipate being absent for any of these reasons, please make arrangements at least 48 hours in advance. See https://catalog.gmu.edu/policies/academic/registration-attendance/#ap-1-6-1
4. In addition, **you are expected to be on time to class** each week unless 48 hours advance notice has been provided to the instructor. Your instructor will define their policy for tardiness as it relates to class participation points and absences.

AI Policy:
Use of Generative-AI tools should be used following the fundamental principles of the Honor Code. This includes being honest about the use of these tools for submitted work and including citations when using the work of others, whether individual people or Generative-AI tools.

When explicitly stated by the instructor, Generative AI tools are allowed on the named assignment. Students will be directed if and when citation or statement-of-usage direction is required. Use of these tools on any assignment not specified will be considered a violation of the academic integrity

policy. All academic integrity violations will be reported to the office of Academic Integrity. Some student work may be analyzed using an originality detection tool focused on AI tools. Generative AI detection tool use will be revealed when the assignment directions are provided to students.

There will be times in the education field that use of AI tools will be needed for you to do well at the job and there will be times where you will need to be able to do the work without support from these tools. This course aims to provide you with experience in the real-world scenarios that you may encounter once you leave the university.

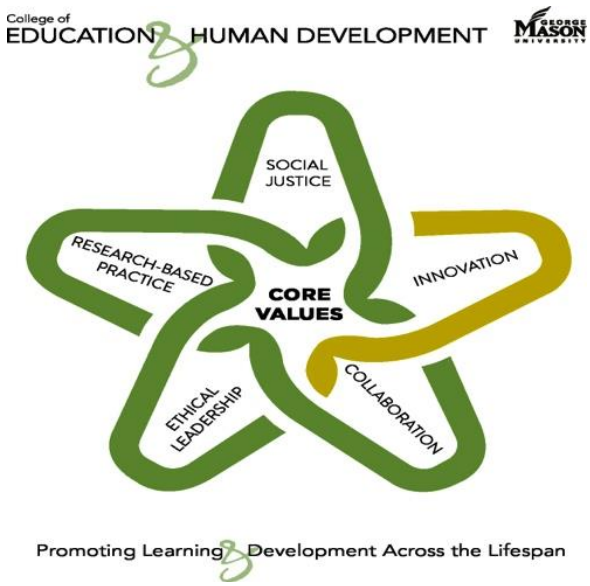
OTHER EXPECTATIONS

All written papers are **expected to be double-spaced, with 1" margins, and in 12-point font** (Times New Roman, Calibri, or Arial). **APA format is expected**. If you do not have a 6th Edition APA manual, the OWL at Purdue is an excellent resource: http://owl.english.purdue.edu/owl/resource/560/01/

***Please Note:** The GMU Writing Center offers online support via email. They will provide feedback on your writing within one hour. Graduate and professional writing can be difficult; I encourage you to take advantage of this service. http://writingcenter.gmu.edu/?page_id=177

Professional Dispositions

Students are expected to exhibit professional behaviors and dispositions at all times (See Elementary Education Program Handbook).



Core Values Commitment

The College of Education and Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles: http://cehd.gmu.edu/values/.

GMU Policies and Resources for Students

Policies

- Students must adhere to the guidelines of the Mason Honor Code (see http://oai.gmu.edu/the-mason-honor-code/).

- Students must follow the university policy for Responsible Use of Computing (see http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/).

- Students are responsible for the content of university communications sent to their Mason email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students **solely** through their Mason email account.

- Students with disabilities who seek accommodations in a course must be registered with George Mason University Disability Services. Approved accommodations will begin at the time the written letter from Disability Services is received by the instructor (see http://ods.gmu.edu/).

- Students must follow the university policy stating that all sound emitting devices shall be silenced during class unless otherwise authorized by the instructor.

Campus Resources

- Support for submission of assignments to Tk20 should be directed to tk20help@gmu.edu or https://cehd.gmu.edu/aero/tk20. Questions or concerns regarding use of Blackboard should be directed to http://coursessupport.gmu.edu/.

- The Writing Center provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing (see http://writingcenter.gmu.edu/).

- The Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance (see http://caps.gmu.edu/).

- The Student Support & Advocacy Center staff helps students develop and maintain healthy lifestyles through confidential one-on-one support as well as through interactive programs and resources. Some of the topics they address are healthy relationships, stress management, nutrition, sexual assault, drug and alcohol use, and sexual health (see http://ssac.gmu.edu/). Students in need of these services may contact the office by phone at 703-993-3686. Concerned students, faculty and staff may also make a referral to express

concern for the safety or well-being of a Mason student or the community by going to http://ssac.gmu.edu/make-a-referral/.

- For information on student support resources on campus, see https://ctfe.gmu.edu/teaching/student-support-resources-on-campus

Notice of mandatory reporting of sexual assault, interpersonal violence, and stalking: As a faculty member, I am designated as a "Responsible Employee," and must report all disclosures of sexual assault, interpersonal violence, and stalking to Mason's Title IX Coordinator per University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason's confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-380-1434 or Counseling and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance from Mason's Title IX Coordinator by calling 703-993-8730, or emailing titleix@gmu.edu.
For additional information on the College of Education and Human Development, please visit our website http://cehd.gmu.edu/.
For additional information on the College of Education and Human Development, Graduate School of Education, please visit our website [See **http://gse.gmu.edu/**]
http://cehd.gmu.edu/values/

EMERGENCY PROCEDURES
You are encouraged to sign up for emergency alerts by visiting the website https://alert.gmu.edu. There are emergency posters in each classroom explaining what to do in the event of crises. Further information about emergency procedures exists on http://gmu.edu/service/cert

PROPOSED SPRING 2023 CLASS SCHEDULE
TENTATIVE CLASS SCHEDULE

Session	Topic/Learning Experiences	Readings & Assignments
Spring 2024	**Mondays, 10:00 AM – 12:40 PM**	
1/22	• Who are we? What drives us? Why teach? • What is Science? Nature of Science? • What do you wonder about?	--Begin wonder project --wonder journal
1/29	• Discussion on inquiry • Details on wonder journals • Properties of water	**Reading log due #1:** Simplifying inquiry *Post reading log on Bb by start of class*
2/5	5E process – video highlighting process How might we best teach science to children?	**Reading log due #2 and 3:** Articles posted in "5E readings" folder on Bb

	• Virginia SOL's • Mystery of the cans	
2/12	• Unit construction…**bring unit topic to class** • Using AI to help us think through our teaching: https://educational-innovation.sydney.edu.au/teaching@sydney/prompt-engineering-for-educators-making-generative-ai-work-for-you/ • Writing learning objectives, planning for inquiry • Aluminum foil boats / Integrated STEM	**Reading log due #4 and 5:** Articles posted in "observing & modeling" on Bb
2/19	• The role of wonder in science • Lesson planning and sequencing • Discussion on unit progress • Air pressure	**AI discussion and reflection statement due**
2/26	• Discussion on unit progress • Wonder journal progress & wonder project • Sound – Physical science	
3/4	• Spring break	Work on units…
3/11	• Meet with peer partner…planning and revisions • Meet individually with Dr. G for feedback	**Bring copy draft of unit to class.**
3/18	• Notions of scale • Earth History - Earth Science • Wonder discussions	**Final units due on Blackboard <u>before class</u>.**
3/25	• Conceptualizing wonder projects; discussion of wonders • Fossils - Earth Science/Biology	**Complete Reading** Bryson Intro (*no reading logs for Bryson*) Ch. 1 & Ch. 2
4/1	• Class discussion on Bryson • Earth History	**Complete Reading** Bryson Ch. 9 & 12 --work on wonder investigation
4/9	Discussing wonder project ideas…bring idea for final to class • Seasons - Earth Science	**Complete Reading** Bryson Ch. 21 & 24

	• Sun, Moon and Earth - Earth Science	-- work on wonder investigation
4/15	• Rollercoasters	**Complete Reading** Bryson Ch. 26 **Bryson synthesis paper due…**post to blackboard
4/22	• Nutrition - Health (Co-taught with Deanna Lavanty - Registered Dietitian) • Constructions of gender	--work on wonder investigation -- **Wonder Journals due**
4/29	Presentations of wonder projects	**--Wonder Investigation project due**

Note: Calendar is tentative. It will be modified in line with course needs, student expertise, and interest in terms

ASSESSMENT RUBRICS:

PBA TASK: Science Unit Rubric (35% of total grade)

Assessment Summary: The project is meant to facilitate your understanding for the design and teaching of an inquiry-based science unit. This will require research into both inquiry-based lesson planning and science content. The goal is bring powerful learning theory to life in classrooms and design science experiences that both excite and engage elementary children.

Description and standard addressed	**Exceeds Expectations 5**	**Meets Expectations 4 points**	**Does Not Meet Expectations 2 points**	**Does Not Meet Expectations 1 point**
Overview (Summary, content knowedge, and context description) INTASC: #4, 5, 7; (5 pts)	Provides a powerful and engaging overview of the topic, series of lessons, and overall unit goals. Includes very detailed and specific content knowledge needed to teach the topic well, including multiple resources. Excellent description of the specific students the unit is designed for and how it is expected they will respond to the unit.	Gives a good basic overview of the topic, series of lessons, and overall unit goals. Lists the basic content knowledge teachers would need to know to carry out the lesson goals, including resources. Provides a solid description of the students that the unit is designed for. Overall sufficiently composed, but may rise to the level of detailed excellence in one or more areas.	Does not provide a complete overview of the topic, series of lessons, and overall unit goals. Some information is provided, but much is missing. Some content knowledge is included, but it lacks detail and/or resources. Provides little or no information about a specific group of students for whom the lessons are designed.	Missing or very minimal attempt.
Theoretical Framework for Science Instruction INTASC: #8, 6 (5 pts)	Utilizes inquiry-based lesson model (5Es), clearly describes pedagogical process that embodies inquiry. Uses at least 3 references from our class readings to support the approach. Describes excellent plans for diagnostic, formative and summative assessments throughout the unit.	Utilizes inquiry-based lesson model (5Es), and describes pedagogical process that embodies inquiry, but not necessarily in a clear manner. Uses 1 or 2 references from our class readings to support the approach. Describes adequate diagnostic, formative and summative assessments throughout the unit.	Does not provide complete descriptions and/or theoretical background; and/or is not self-explanatory. Does not utilize resources. Does not include all three types of assessment.	Missing or very minimal attempt.

Detailed Lesson Plans INTASC: #4, 5, 6, 7, 8 (25 pts)	Standards (process *and* content), objectives, detailed procedures for each lesson activity (including teacher statements and questions and anticipated student responses), formative and summative assessments, and all supporting materials are included and seamlessly aligned and interwoven with one another. All aspects of the lessons are firmly grounded in an EBE instructional approach, and thus clearly begin with the interests, experiences, and hands-on explorations of students, in support of their development of increasingly sophisticated understanding of science concepts and practices. Everything included is clearly described, highly usable, and includes creative connections and innovative thinking. Copies of and/or links to all assessments and support materials are included. Support materials are multiple, varied, creative, and extensive, representing a great deal of research, time, and effort toward providing rich and meaningful opportunities for student learning and engagement. Safety is clearly and adequately addressed.	All required elements are included with visible efforts to integrate and align them with one another. A clear attempt to ground all aspects of the lessons in an EBE approach is evident. Children's interests, experiences, and ideas are incorporated. Explanations are provided after students have had adequate time to wonder about and explore with materials and develop their own ideas. Copies of and/or links to all assessments and support materials are included. Safety is clearly and adequately addressed.	Some of the required lesson elements are present, and some are missing. And/or some of the elements are either not well developed and/or not well aligned with one another. The lessons are not yet grounded in an EBE approach. There is little or no evidence that the interests, experiences, or ideas of the students have been considered. Explanations are provided before students have had an opportunity to have shared experiences exploring phenomena. Lesson elements are either missing, not clearly described, and/or appear difficult to use. Few copies and/or links to assessments and support materials are provided. Safety is not adequately addressed.	Missing or minimal attempts to address the basic requirements.