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

ELED 553.001: SCIENCE METHODS FOR THE ELEMENTARY CLASSROOM

Summer C03, 2024
June 25th – July 30th, T and TH, 9:00 AM –1:10 PM;
3 Credit hours- Fairfax Campus

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Course Location: 2020 Thompson Hall – Fairfax Campus

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 and health 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. 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, emotional health, as well as conceptions of gender and identity.

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 are 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 plans to provide 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
In person 90%+ (There may be one or two online session/s)

Expectations

- Course Week: Tuesdays and Thursday will be in-person sessions be aware of some exceptions indicated on the Schedule of Classes (Syllabus p. 12).

- Log-in Frequency: Students must actively check the course Blackboard site and their GMU email for communications from the instructor, class discussions, and/or access to course materials at least 5 times per week. In addition, students must log-in for all scheduled online synchronous meetings.

- Participation: Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and participating in course discussions and group interactions (See further description P. 8-9 syllabus).

- Technical Competence: Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services.

- Technical Issues: Students should anticipate some technical difficulties during the semester and should, therefore, budget their time accordingly. Late work will not be accepted based on individual technical issues.

- 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.

- Netiquette: The course environment is a collaborative space. We will only have a few sessions online, but be aware for the issues related to communication in an online space. *Be positive in your approach with others and diplomatic in selecting 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.

- Accommodations: Online learners who require effective accommodations to insure accessibility must be registered with George Mason University Disability Services. 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.

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 will need a headset microphone for use with the Blackboard Collaborate web conferencing tool. [Delete this sentence if not applicable.]
- 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: [Add or delete options, as desire.]
  - 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

Required readings will be provided via electronic chapters via Blackboard.

Articles and other materials will be provided throughout the course.

Optional Texts:
Laws, J. & Lygren, E. (2020). How to Teach Nature Journaling: Curiosity, Wonder, Attention. Heyday Publishing.

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. **Get a bound or spiral notebook for the summer class**, bring it to each class session. You will use the front half for our class notes and observations, thoughts, and ideas. The back half will be used for your wonder journal.

   Over the course of the semester…use your 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. 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 pencil) to engage with our wonders.
   There are no real rules here. Well, I lied, there are some rules…1) you will need to complete at least 6 entries total (more is fine). 2) I expect you to engage with your thinking and use some principles of sketching and/or drawing to express your thinking. A visual for each entry is a must. 3) Lastly, we will turn in our journals at some point near the end of the semester.

Your wonders are yours and unique to how you envision the world around you. "Dance like nobody is watching" while you build your entries.

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…consider three to four strong sentences for each section.
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 and 2	Ready, Set, Science *and* Simplifying inquiry
Reading Log #3 and 4	Choose two of the four articles posted in the "5E readings" folder on Bb
Reading Log #5 and 6	Read one article from the "collecting and observing" folder on Bb and one from the "modeling and representations" folder on Bb

3. Synthesis of course readings [course outcome: A & B] 15%

This serves as a description for your understanding of learning theory and rationale for an inquiry teaching approach to teaching. It should clearly relate to student learning and approaches to inquiry that we read for this course. *Must include references from at least 5 of the pieces we read for the course to support of your claims for inquiry.* The goal is to synthesize the ideas from the readings to build a vision for inquiry teaching that would be accessible for other teachers and/or parents to make sense of the approach in the classroom (two pages double spaced).

4. Inquiry-Based Mini-Unit Project (PBA) [Course goals: A-F] 40%

The goal of this project is to construct an inquiry-based unit designed for your field site (and teach if possible). We will build this work around the 5E model of lesson planning. The unit will entail building a detailed and well-supported narrative description for the approach that will be employed. The 5E 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.

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.

Description of Students:

Provide brief overview, describing the audience for which the unit is designed.

B. The inquiry Synthesis paper from the Readings will count for this section…

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 or two "Es" per lesson and would require at least 3 detailed lessons for the unit (*See Bb site for lesson template*). However, in some cases you may get more or less time and the enactment of the unit is up to the amount of time you have allotted in your class context. We will discuss this more in class. The unit should include a final assessment that would evaluate whether your students achieved the objectives at the end of the unit. This final assessment should include the questions/tasks the students are required to do and indicate what objectives are being assessed and how they are being assessed. For instance, posters, investigations, debates, etc. should align with original unit objectives.

D. Assessment

Your assessment efforts across your unit should include diagnostic, formative and summative assessments that are directly linked to your unit goals and daily objectives. 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.

E. Support Materials *(all materials for the daily lesson plans)*

For the daily lesson plans, you will develop all support materials that the teacher and students will use. For teaching and learning activities **include each sheet of paper distributed to the students to carry out the daily lesson plans - laboratory experiments, activities, worksheets, instructions, assessments, rubrics, etc.** Attach these to the appropriate lesson plan. **Other teaching aids** (ie. instructions for teacher demo or photos of experiment set up, etc.) used during the unit should also be included. Be sure that your unit plan can illustrate the following three aspects of teaching: **introducing new content, hands-on assignments, and assessment of student learning**. These activities should focus on the essential science concepts and connections, assess higher order thinking skills, and target different learners. Checking for understanding should be included daily. Include diagnostic, formative, and

summative assessment. Your 'evaluation' portion of the unit should **include major assessment instruments and grading criteria for the unit**.

F. References Cited section

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 (these could include a poster, museum display, children's book, or other audio/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) 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.

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). See https://cehd.gmu.edu/students/polices-procedures/

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

Tentative Schedule…note: the schedule will change as/if needed

6/25:

Time	Course Topics	Readings and Assignments Due
9:00-1:10	• Introduction • What is elementary science? • Nature of science • Wonder • Nature journaling • The joy of paying attention	Begin wonder journal…(need 6 entries total by end of course)

6/27:

Time/Location	Course Topics	Readings and Assignments Due
9:00-1:10	• What's up with water • Properties of water • Water on a coin • Intro 5 E's and inquiry thinking • Discussion of readings: Designing inquiry experiences	**Reading log #1 and 2, Due** **Continue wonder journaling**

7/2:

Time/Location	Course Topics	Readings and Assignments Due
9:00-1:10	• Mystery of the cans • 5 E's, wonder and learning and thinking in science • Warm and Cold fronts • Journal Progress	**Reading log #3 and #4 due**

7/4: No Class

7/9:

Time/Location	Course Topics	Readings and Assignments Due
9:00-1:10	• Conceptual clarity (nature of matter, recapping week one science) • Designing and enacting a 5E process • Building lessons • Building and designing 5 E units, using and collecting data • Aluminum Foil boats	**Reading log #5 and 6 due**

7/11:

Time/Location	Course Topics	Readings and Assignments Due

9:00-1:10	• Building and designing 5 E units, representing thinking • Air is all around us • Conceptual clarity and cross-cutting concepts • Sound	**Reading Synthesis Due…** Before our class begins. Post anytime before 9AM.

7/16:

Time/Location	Course Topics	Readings and Assignments Due
9:00-1:10	• Mini unit proposal/outline … preparation and design • Online meetings with your critical friend	Share outline and all unit materials (that you are designing) and ideas to class session. - **Post meeting notes on discussion board by 1 PM, June 8.**

7/18:

Time/Location	Course Topics	Readings and Assignments Due
9:00-1:10	• Fossils • Earth History • Distance, Scale and Ratios • Unit construction	Work on units…and wonder fair

7/23:

Time/Location	Course Topics	Readings and Assignments Due
9:00-1:10	• Distance, Scale and Ratios, continued • Moon, Sun and Earth • Unit construction • Sharing and presenting our progress on both unit and wonder fair project	Work on units…and wonder fair **Wonder Journals Due**

7/25:

Time/Location	Course Topics	Readings and Assignments Due
9:00-1:10	• TBD in person or online working session	

7/30:

Time/Location	Course Topics	Readings and Assignments Due
9:00-1:10	• Wonder Fair	**Mini-unit and Wonder Fair – Due**

ASSESSMENT RUBRIC:

PBA TASK: Science Unit Rubric (40% 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 – 4**	**Meets Expectations – 3**	**Does Not Meet Expectations – 2**	**Does Not Meet Expectations – 1**
A. Overview (Background; content and context description) INTASC: #4, 5, 7; (5 pts)	Give excellent insight into key content ideas, provides powerful description of unit goals. Excellent listing and engagement for the content background teachers would need to know to carry out lesson goals. Excellent description of school and students that the unit is designed.	Give insight into the content and include several key content ideas. Lists and engages the content background teachers would need to know to carry out lesson goals. Provides a solid description for the school and students that the unit is designed.	Does not provide insight into the content and include several key content ideas. Does not completely provide the content background for teachers. Does not provide a detailed description of the school and students.	Missing
B. Curriculum Design and Assessment discussion (Theoretical background) (10 pts) INTASC: #8, 6 This section is replaced by reading synthesis paper!	Utilizes inquiry-based lesson model (5E's), clearly describes pedagogical process that embodies inquiry. Uses a myriad of excellent and well-respected sources properly referenced within narrative descriptions. Describes diagnostic, formative and summative approaches throughout the unit.	Utilizes inquiry-based lesson model (5E's), clearly describes pedagogical process that embodies inquiry. uses dependable sources that properly referenced within narrative descriptions. Describes diagnostic, formative and summative approaches throughout the unit.	Does not provide complete descriptions or theoretical background; and/or is not self-explanatory. Does not utilize reputable sources within narrative descriptions and/or more needed clarity within narrative. Does not include all three types of assessment.	Missing

C. Detailed Lesson plans (Lesson Framework, pedagogical process & procedure) INTASC: #5, 7, 8 (12 pts)	Standards, objectives and lesson activities all seamlessly align and support one another. Utilizes inquiry-based lesson model (5E's), clearly describes pedagogical process that embodies inquiry. Clearly described, highly usable and innovative ideas with original elements; addresses issues of safety	There exists alignment between standards, objectives and they support lesson approach. Utilizes inquiry-based lesson model (5E's), clearly describes pedagogical process that embodies inquiry. Effectively describes, usable and effective ideas; addresses issues of safety	Standards, objectives and activities not clearly aligned or appropriate for the lesson. Difficult to use; does not have complete components; and/or is not self-explanatory. Does not address safety.	No consistent format nor serious professional commitment to student needs.
D. Assessment INTASC: #6 (5 pts)	Innovative, well-supported assessment strategies clearly linked to objectives; demonstrates all stated objectives, copies of assessments included. Includes diagnostic, formative and summative approaches throughout the unit.	Assessment clearly linked to objectives; demonstrates nearly all stated objectives, copies of written assessments are attached. Includes diagnostic, formative and summative approaches throughout the unit.	Assessment is not clearly linked to objectives; demonstrates some stated objectives, and/or copies of written assessments are not attached. Does not provide differing types of assessment strategies.	Missing
E. Support materials INTASC: #4, 5, 8 (5 pts)	Innovative materials used throughout that incorporates engaging, developmentally appropriate and scientifically accurate approaches; multiple connections are made to students' everyday lives and accessible.	Some innovative materials used throughout that incorporates engaging, developmentally appropriate and scientifically accurate approaches. These approaches make attempts to connect to students' everyday lives.	Lacks innovation and does not include activities that support inquiry. Activities might contain some scientific inconsistencies; little effort to connect to students everyday lives.	Missing
F. References cited. (3 pts)	Uses well-respected sources properly referenced with no errors.	Uses well-respected sources properly referenced, but with a few small errors.	Mistakes in formatting and does not utilize well-respected reference materials.	Missing