**Supplement 1: Agenda for the First Class Meeting**

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| **First Class Agenda** | |
| **Activity** | **Specific prompts and information** |
| Journal Writing | In your journal, respond to this prompt: What questions do you have about science/science education? |
| Introductions | What is one question you feel you always get asked? |
| Instructor Introduction | My science teaching story |
| Project Introduction | Prereading discussion  Class overview: Syllabus creation  Consent documents |
| Objects Representations | Share objects brought in by students and instructor, and allow students who forgot to find items around the classroom   1. What is your item? 2. Why did you choose it?   Discuss differences/similarities when all have shared. Reflect in notebooks about what these ideas of science mean and what science teachers mean to them. |
| Timeline Creation | 1. Prompt: Think of a high and low moment you experienced in science. Sketch or write about this in your journal. 2. Introduce timeline concept (blank sheet, safety pins, notecards) 3. Have students choose colors for their high and low experiences and write the ones they want to share on cards. 4. Share cards in group discussion, analyze to compare similarities and differences. 5. Arrange and pin notecards on the sheet however students want. |
| Syllabus Planning | 1. Prompt students to respond in journals:  * What kind of science teacher do you want to be? How can we get there? * What are your expectations and goals for this class?  1. Have students share questions from the beginning of class and goals/expectations 2. Use questions and goals to drive discussion of:  * Assignment Ideas * Grading * Class Norms |

**Supplement 2: Cocreated Syllabus**

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| **Week** | **Topic(s) In Class** | **Assignments & Out of Class Work** |
| **1** | * Welcome & Overview * What is science? Who are science teachers? * Our Science Journey * Goals for this Course | Review syllabus and comment with suggestions |
| **Week 2- MLK Jr. Day—No Class** | | |
| **3** *What is science?* | * Science in Elementary Schools * Science Standards: NGSS & TN * Nature of Science | For next week (choose 1):   * Ready, Set, Science (Ch 1) * Teaching Science in Elementary and Middle School (Ch 1) * Elementary Science Methods (Ch 1) |
| **4** *What is science?* | * Reading Discussion * Integrating Science in the Elementary Classroom * Integrating Literacy/Math in the Middle School Science Classroom | For next week:   * Framework: Introduction to DCIs * Talking Science Chapter 5   *Work on 1st draft of lesson plan* |
| **5** *Who are Science teachers?* | *Answering Tough Questions Part II:*   * AST Puddle Unit Day1 * Strategies for teaching science * Ambitious Science Teaching; 5E; Storylines; Project Based Teaching   *Answering Tough Questions Part II:*   * Exploring Science Content: Disciplines of Science | **1st draft lesson plan due Feb. 15**  Choose learning segment partner and template.  Talking Science Chapter 5 |
| **6** *Who are Science teachers?* | *Where to find resources Part I: Guest Speaker—Agriculture in the Classroom*  Part II: Talking Science & DCIs Review | For next week:   * Gutiérrez, R. (2016). Strategies for creative insubordination in mathematics teaching. *Special Issue Mathematics Education: Through the Lens of Social Justice*. (**PAGES 53–60 ONLY)** |
| **7** *How do we teach science?* | Part I: Moon Phases Investigation   * AST Puddle Unit Day 2 * Observation Videos   Part II: Curriculum Review (Being Creative with Scripted Curriculum)   * Taking a standard apart: Ideas for teaching   **In-Class Workshop: Textbook Evaluation Due (end of class)** | Enjoy spring break!  Optional:   * Meyer, X., & Crawford, B. A. (2011). Teaching science as a cultural way of knowing: Merging authentic inquiry, nature of science, and multicultural strategies. *Cultural Studies of Science Education*, *6*(3), 525–547. |
| **Week 8 –Spring Break—No Class** | | |
| **9** *Science teaching for all* | Part I: AST Puddle Unit Day 2   * Textbook Evaluation Review * Unpacking Standards: Core Ideas   Part II:   * Culturally Relevant Teaching in Science * Photo Activity * What does CR teaching mean? What does it look like? (Student choice/discussion/bringing in and acknowledging their realities—How can you do this with a scripted curriculum?) | For next week:   * Ladson-Billings, G. (2014). Culturally relevant pedagogy 2.0: aka the remix. *Harvard Educational Review*, *84*(1), 74–84. * Emdin, C. (2008). The three C’s for urban science education. *Phi Delta Kappan*, *89*(10), 772–775. |
| **10** *Science teaching for all* | Part I: AST Puddle Unit Day 3 & 4 (Wrap Up)  Part II: Culturally Relevant Teaching in Science: Sociocultural Embeddedness   * Fish Weir Activity and Critique | Work on science resource list |
| **11** *What do we need in our classrooms?* | Science Tools and Resources:   * Where to find resources & What resources to look for   Part I: *You be the Chemist—Guest Presenter*  Part II: Present Resource Lists | **Science Resource List Due**  Before interviewing:   * Russ, R. S., & Sherin, M. G. (2013). Using interviews to explore student ideas in science. *Science Scope*, *36*(5), 19. |
| **12** *Making science thinking visible* | No class—NARST Conference  Conduct Student Interviews  Review partner student interview | **Interviews and Reflections Due Online by Saturday, April 5 at 11:59 pm** |
| **13** *Connecting science lessons* | No class—AERA Conference  Work on Learning Segments  Watch Observation Videos and Reflect (15 min) |  |
| **14** *What kind of science teacher do you want to be?* | Part I:   * Class Discussion: Controversies in Science * Learning Segment Presentations   Part II:   * **In-Class Workshop: Designing your science classroom** | **Learning Segments Due**  Write questions for the panel |
| **15** Becoming a science teacher… | Pizza and Panel: Q&A |  |
| **16** Becoming a science teacher… | Content Exam (in class)  Presentations of Science Classroom Design | **Classroom Design Due**  **Final Lesson Plan Due** |

**Supplement 3: Alignment of Course-Specific Objectives, Class-Created Questions, and Assignments**

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| **Course-Specific Objectives** | **Class-Created Questions and Experiences** | **Assignments and Activities** |
| 1. Teacher candidates will demonstrate understanding of elementary and middle school science through the use of inquiry-based, open-ended, and material-based investigation, incorporating pedagogical techniques required to effectively deliver the content in a safe environment. | * What grade does science become its own subject? * What all does science include in the lower grades? * What are some of the best ways to integrate science into the curriculum? | Lesson plan and teaching of lesson in elementary/middle school classroom |
| 2. Teacher candidates engage in multiple levels of inquiry that incorporate the science and engineering practices as described in the NGSS in each discipline or science (life, physical, earth-space, engineering). | * Practical, Specific methods for actually teaching—different categories/concepts of science (physical, earth, life, etc.) | Watch and reflect on science lessons being taught in elementary schools; Review NGSS and state standards |
| 3. Teacher candidates demonstrate the interrelationships among the various science disciplines, literacy, mathematics, and social sciences by integrated teaching practices. | * What are some of the best ways to integrate science into the curriculum? | Group unit curriculum plan; Science Integration Lesson Posters |
| 4. Teacher candidates foster the creation of a classroom culture that supports higher levels of questioning, controversial discussions, collaborative learning, and real-world connections using culturally relevant pedagogy. | * How would you answer tough questions that your students may have about the material? * Different approaches for teaching science; How to engage students who are not really interested in science; Global connections to science | Lesson planning; culturally relevant science readings and activities; experience with different inquiry-based science lessons; Padlet board; student interview |
| 5. Teacher candidates plan lessons that incorporate a learning cycle- engagement, exploration, explanation, extension, and evaluation- and safe management of materials for all students (including but not limited to gifted, students on 504s or IEPs, and ELLs) | * What are some ways to break down difficult material into manageable chunks/pieces? | Lesson plan and teaching of lesson in elementary/middle school classroom; Unit plan |
| 6. Teacher candidates explore the various tools and resources needed in a K–8 science classroom. | * What are the must-have tools for teaching science? * How do you teach science with limited resources? | Science teaching resource list; Inquiry-based, in-class lessons with various materials |