K-12 AST + Science in the City Syllabus

Yearlong 2023-2024

K-12 AST + Science in the City Yearlong 23-24 PDU Syllabus

Instructor Information (name/s, contact info)

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Course Description:

We live in a time when quality science education is critical to solving crisis-level problems in the world and society, and simultaneously a time when scientists are called into question by misinformation and conspiracy. The advancement of best practices and pedagogical shifts in the public school science classroom is more important now than ever before. We will explore two science education research books as a matter of this course. A coherent vision for best practices in science and a systematic way of improving practice is the goal of *Ambitious Science Teaching* (AST)**.** Educators engaging in this book study, including studying, implementing, reflecting upon, and refining the strategies/core practices described within the book, will be empowered to help students from all backgrounds understand fundamental science ideas deeply, participate in the practices of science, solve authentic problems together, and learn how to continue learning on their own. *Science in the City* explicitly addresses language acquisition in the science classroom, complementing the strategies in AST and diving into the research behind the culturally sustaining science vocabulary strategy of Disaggregate Instruction.

Course Objectives:

- Participants will improve their instructional practices aligned to the Next Generation Science Standards as measured by
    - peer evaluation of planning and instruction
    - educator self-assessment surveys at the end of each cohort session
    - educator end-of-course reflection and artifact sharing
    - student artifacts which may include standardized and authentic assessments
- Participants will learn, implement, reflect, and revise upon the 4 core practices outlined Ambitious Science Teaching:
    - planning for engagement with scientific ideas and phenomena
    - eliciting students' ideas about phenomena to continuously inform science teaching decisions
    - supporting ongoing changes in students' thinking to support sense-making
    - drawing together evidence-based explanations for phenomena
- Participants will learn, implement, reflect, and revise upon specific teaching strategies for science:
    - productive classroom discourse supporting sense-making science

- explanatory modeling and making sense-making visible in science
- making and justifying claims for evidence-based explanations of phenomena

Prerequisites:

Participants will be best prepared to engage with the content if they have an understanding of the *NGSS Framework for K-12 Science Education*

Texts, Readings, Instructional Resources:

- *NGSS Framework for K-12 Science Education*
- ambitiousscienceteaching.org
- Book: *Ambitious Science Teaching* by Mark Windschitl, Jessica Thompson, and Melissa Braaten (2018)
- Book: *Science in the City: Culturally Relevant STEM Education* by Bryan A. Brown
- https://www.nationalacademies.org/our-work/call-to-action-for-science-education

Course Requirements & Course Policies:

Attendance & Participation

Participants are expected to attend 10 study/strategy sessions of 2 hours each (in person), 15 hours of asynchronous coursework, and 10 hours of classroom observation/debrief with the course facilitators. Participants must attend all cohort sessions or make arrangements with PDU leaders to make up the session (perhaps by viewing a recorded session or having a 1:1 session with a leader). Participants may not make up more than 2 sessions. Participants are expected to be fully present and prepared for each session.

Assignments

In order to successfully complete the PDU, participants must complete and document all the required hours under Study, Demonstration, and Reflection. Participants must submit and receive passing grades from the PDU leaders for all required artifacts. Particular emphasis will be given to review of a participant's artifacts from the Demonstration and Reflection portions of the PDU, including:

- lesson plans and student-facing instructional materials incorporating core practices and strategies from AST
- student work and analysis of the work as formative assessment of student learning and of teacher effectiveness
- peer review of and feedback on lesson plans, instructional resources, and student work
- analysis of student surveys and reflection

*participants must complete and submit all assignments by May 1, 2024

Data Collection

Data will be collected at each cohort session, including artifacts such as teacher video samples, student work, as well as teacher self-assessment surveys and student reflection surveys

Grading/Evaluation

Exchanging Feedback

Opportunities for exchange and any planned activities will be dependent on the size and the needs of the cohort. Each participant will be assigned a mentor and a peer group of 1-3 other participants that teach a similar grade level (elementary, upper elementary/middle school, and high school). As part of collaboration, participants will share lesson plans or mini-unit plans for peer review.

Evaluation

The following data will be collected to show baseline and growth of teachers:

- Pre/post assessment of participant's knowledge of NGSS and aligned AST core practices
- lesson plans or curricular resources for each studied practice or strategy
- Sample student work products, including video or transcription of discourse and photos of modeling products
- Peer assessment of products
- Participant reflection on level of student mastery and engagement
- Participant's overall evaluation of the PDU opportunity

Course Schedule:

Session #	Date/Time/ Location	Topic/Objectives	Activities/Method of Inquiry	Asynchronous
1	Oct 5 4:30-6:30 PM	By the end of the session, participants will be able to engage in discussion surrounding the following aspects and impacts of the teaching practices found in science in the city on the topics of : ● Playing to Our Strong Suits ● The Black Tax ● The cultural cost of organic language development	Socratic seminar	Prework: Read Intro and Ch. 1-2 of *Science in the City* Portfolio work
2	Oct 19 4:30-6:30 PM	By the end of the session, participants will be able to ● Experience explaining a phenomenon in everyday language ● Review the format of disaggregate instruction	Reflection, discussion, planning, artifact sharing	Prework: Read SiC Ch. 3-4 Portfolio work
3	Nov 16 4:30-6:30 PM	● Plan an upcoming lesson using investigative phenomena in which you have students explain in everyday language and then provide academic language and re-explain	Reflection, discussion, planning, artifact sharing	Prework: Read SiC Ch. 5-6 Portfolio work
4	Dec 14 4:30-6:30 PM	By the end of the session, participants will be able to explain why and how the introduction of academic language can affect conceptual understanding if not planned for carefully.	Reflection, discussion, planning	Ch. 7

5	Jan 18 4:30-6:30 PM	By the end of the session participants will be able to: ● We will analyze teacher talk moves that happen in classrooms. ● We will understand how to effectively utilize scaffolds to promote student talk and discourse in the classroom. ● We will plan for an upcoming lesson integrating AST scaffolding and productive discourse.	Reflection, discussion, planning	AST Ch. 3,4 Productive Discourse
6	Feb 15 4:30-6:30 PM	By the end of the session participants will be able to: ● plan for scaffolded modeling in their classroom using the 6 principles of modeling from AST Chapters 5 & 6!	Reflection, discussion, planning	AST Ch. 5 Eliciting Student Ideas
7	Mar 14 4:30-6:30 PM	By the end of the session participants will be able to: ● plan for scaffolded modeling in their classroom using the 6 principles of modeling from AST Chapters 5 & 6!	Reflection, discussion, planning	AST 6-7 Modeling
8	April 11 4:30-6:30 PM	By the end of the session, participants will be able to plan for concepts and strategies that support ongoing changes in student thinking from Chapters 8-10 in AST.	Reflection, discussion, planning	AST 8,9,10 Supporting Ongoing Changes in Thinking
9	April 25 4:30-6:30 PM	Participants get a chance to reflect on their goals and progress of their goals from the PDU, as well as the impact the PDU has had on their teaching practices.	Reflection, discussion, planning	Portfolio Presentations