

STEMteachersNYC

Summer STEM Institute 2021

Applied Panarchy in Environmental Science Workshop - Invitation to Student Participants



Workshop Leaders: Glen E. Stuart of Montgomery HS NJ, and Kerry Kline of Packer Collegiate NY

Workshop Dates: July 26-August 6 (choose only the topic dates of interest)

Student Program:

The Consilience Coalition of STEMteachersNYC would like to invite 4-8 rising juniors and/or seniors in high school to participate in a curriculum collaboration project with environmental science teachers this summer! In July and August 2021, as part of our 11th annual Summer STEM Institute, we will run a multi-day professional development workshop for teachers, and are seeking a small group of high school students interested in local ecology, climate science and environmental education, to join in co-designing lessons relevant to their neighborhoods and lives.

Workshop Description:

The Applied Panarchy in Environmental Science (HS) workshop will explore active learning strategies for deepening understanding of crucial concepts in environmental and sustainability science and help effectively implement a student-centered and NGSS aligned approach to science education. Participants will engage in thought-provoking, pertinent experiments, and activities that you can utilize in your own classroom. We will spend time observing instruction from the point of view of a student (“student-mode”), and learn strategies to incorporate in their own classroom using the claim, evidence, reasoning (CER) framework, Social Ecological Systems (SES), transdisciplinary thinking, and panarchy as tools to probe student preconceptions. Periodically, participants will switch to “teacher-mode”, to practice Socratic questioning techniques, analyze readings, and discuss the pedagogical rationale for all aspects of active learning and modeling in Environmental Science. We’ll also discuss the use of “Reflective Checklists” as a way of promoting student reflection throughout a unit.

The Applied Panarchy in Environmental Science curriculum blends a humanities-based lens with scientific methods to create a transdisciplinary approach, to empower students to live more sustainable lives. Panarchy transcends the boundaries of scale and discipline. Most importantly, the panarchy model advocates a transition from a static understanding of nature to a dynamic idea that places an emphasis on multiple stable states, resilience, and cross-scale interactions that result in adaptive change. The adaptive cycle – in its development, deployment, and representation – ties each of the units of the APES curriculum together.

Goals for Student Participants:

- *By the end of the workshop student participants would, at a minimum, be able to design and run an engaging workshop directed at peers and/or teachers.*
- They will also have formed strong group bonds, deep transdisciplinary connections, confidence, and leadership skills to help them in their personal and academic careers.
- We see this as an opportunity to add student perspectives to our work so that it can be made better for future students, participants, and teachers.

Expectations:

- The program for students is free of charge.
- Prior to the start of the workshop (July 26th), students meet with workshop leaders to make introductions, set goals for students, and outline expectations of both students and workshop facilitators.
- Please note this is **NOT** a proposal for students to be an audience in a 2-week lecture series, instead, it is a highly collaborative and engaging experience!

During the workshop:

STEMTeachersNYC professional development workshops include a ‘student mode-teacher mode’ component, where teacher-participants experience a model activity, lesson and/or content story, as students, and subsequently unpack that lesson as teachers. Student participants will be experiencing the same “environmental science through human stories” as the teacher participants. This includes a historical thread, resilience/panarchy thread, and a humanities-based, consilience thread, simultaneously. Students will participate in hands-on/minds-on activities individually, with each other in small groups, and alongside teacher participants, as all go through student-mode. Student-mode involves experiencing the curriculum/ pedagogy first hand so teachers can understand what it looks/feels/sounds like to be a student in our classes. Student-participants would also explore the rationale for content and pedagogical decisions in teacher mode alongside fellow participants. During teacher-mode, participants unpack and reflect on the student-mode activities and find applications to their own classroom environment.

We would not expect to evaluate or report back on student written work and/or reflections unless there was an explicit request from the student to do so, in which case we would be more than happy to oblige. Please see below for feedback from prior student participants.

Timeline:

Workshop July 26- August 6th

*AM Session (9am-11:30am with short breaks throughout)**PM Session (12:30pm-3:00pm with short breaks throughout)*

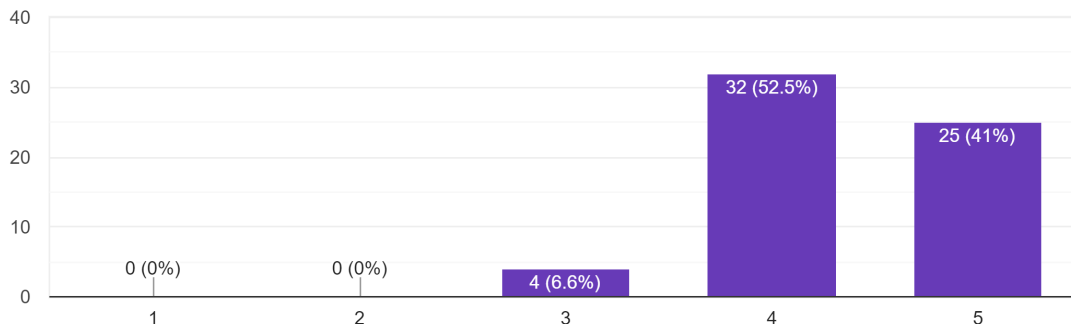
WORKSHOP DAY	DESCRIPTION
(July date TBD)	Meeting with Facilitators and Students to discuss expectations and make introductions (1hr)
Day 1 - Transdisciplinary Thinking (Unit 1)	AM Session - Allegory of the Cave, Biodiversity Part 1 PM Session - Resilience, Earth Science, Transdisciplinary Thinking (07/26)
Day 2 - Adaptive Cycle (Unit 2)	AM Session - Population Ecology, Evolution PM Session - Community Ecology, Adaptive Cycle, Consilience Prompt (07/27)
Day 3 - Panarchy (Unit 3)	AM Session - System Thinking, Atmospheric Circulation, El Nino/La Nina, Feedback Loops PM Session - Panarchy, Revolt and Remember, Consilience Prompt (07/28)
Day 4 - Social Ecological Systems (Unit 4a)	AM Session - Tragedy of the Commons Lab, Social Ecological Systems PM Session - Materials Economy, The Great Pacific Garbage Patch (07/29)
Day 5 - Global Climate Change (Unit 4b)	AM Session Global Climate Change Causes and Impacts PM Session Culturally Relevant Teaching, Technological Solutions (07/30)
Day 6 - Air Pollution (Unit 4c)	AM Session - Air Quality Index, The Great London Smog, Political Solutions PM Session - Social Impacts, Meat Packing Industry, Economic Solutions, Old Mind vs New Mind Solutions (08/02)
Day 7 - Extraction (Unit 4d)	AM Session - Extraction Round Table, Hydrosphere Impacts, Water Quality, Eutrophication PM Session - Scientific Solutions, Consilience prompt (08/03)
Days 8-10	Prep and demo your own lesson with feedback from workshop leaders - only eligible to participants who register for 3 or more modules (08/04-08/06)

How do previous students feel about the experience?

Montgomery Township School District Alumni Feedback

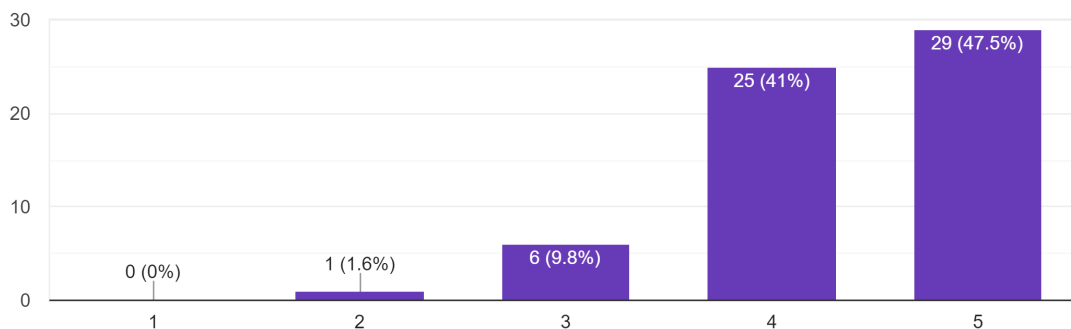
On a scale of 1 to 5 - **How much did you enjoy this class overall?** (1-not at all, 5-Immensely)

On a scale of 1 to 5 - How much did you enjoy this class overall
61 responses



On a scale of 1 to 5 - **How well did this class empower you to start living and thinking sustainably?** (1-not at all, 5-Immensely)

On a scale of 1 to 5 - How well did this class empower you to start living and thinking sustainably?
61 responses



What advice would you give to a student signed up for this course next year?

I would advise them to not think of this class as "just another science class". While this class is a science class, it is also much more, teaching us about not just the environment in a school-like approach, but also giving us insight that not many classes get about problems (and solutions or paths to solutions) which have caused the current state of the planet, and also bear in them the ability to influence the future of the planet.

Be aware that this class didn't teach me a whole lot about rocks and trees or whatever, but it taught me the most when expanding my horizons, getting me to think outside the box, and completely changing my mindset for the betterment of the Earth than any other class I've taken in my life - in other words your whole perspective of life and the world will shift.

This class is unlike any other! (in a good way) The concepts/topics we discuss are applicable to our lifestyle. The ideas we take away from class can really be inspiring/ eye-opening, so make the most of your time in class! Be ready to think differently!

Be prepared to do a lot of out of the box thinking and learn things that may be considered unconventional. This class is not your ordinary class and you should be prepared to come up with sophisticated answers to difficult questions.

I would tell them that this class will change your worldview and how you live your life, and will make you more aware of environmental disasters, and how you can change your life to better yourself and for the environment.

Alumni reflections on the course:

The purpose of Environmental Science is not to merely inform students about the environment. Rather, the goal is to enact change. Simply put, meaningful change will only take place when students are actively engaged in conversation about what is happening, why it is happening, and why it matters, and they understand our moral obligation to respond. These conversations are made possible through an integrative curriculum that respects and incorporates both scientific exploration and philosophical debate.

We would be happy to discuss any questions that you have.
You can reach workshop leaders Glen E. Stuart & Kerry Kline at
info@stemteachersnyc.org.