



Youth Community Action and Science in Our Forests

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Land Acknowledgement

We acknowledge that our project is based on the ancestral homelands of the Nevada City Rancheria Nisenan Tribe. Ancestral homelands means that the Nisenan people lived in this place for thousands of years and continue to live here today. They never ceded their lands. They are the first caretakers of this forest.

Road Map:

- Context of the project
- Project Goals
 - What is Environmental Science Agency?
- Our Educational Design
 - What is Community & Citizen Science?
- Shifts made during 2020
- Emergent Questions



Context: Joining the conversation about California Forest Health and Fire Risk



After the Fire



Bark Beetle Infestation



Fire Ecology



Forest Health



Fuel Break



Insects & Diseases

- Nevada County forests are composed of coniferous trees and oak woodland.
- Due to historical fire suppression policies and effects of climate change, our regional forests are at high risk for fire.
- We are collaborating with local organizations already doing forest/fire ecology work.
- We are working with these experts to develop rigorous data collection protocols for students.
- Students monitor and assess forest ecology factors such as forest density, recruitment of pines and oaks, fuel load, and biodiversity.

Image Credit:

<http://www.ncrcd.org/index.php/resources-and-links/forest-health/>

Project goals:



Education-focused goals: Design and implement a YCCS program for 3rd–5th grade students and teachers in which students investigate community-identified resource management issues of forest health & fire risk at two sites -- near their school & while on a field trip to an environmental center in their region.

Research-focused goals: Investigate 1) the variations of *program design features* (students collecting, analyzing, sharing their data findings in different ways) and 2) how program features support youth in science learning outcomes – specifically student *environmental science agency*...(see next slide)

Environmental Science Agency (ESA) is how youth...

(Ballard, Dixon & Harris, 2017)

**..learn and use their
science content
knowledge and skills**



**...self-identify with
science**



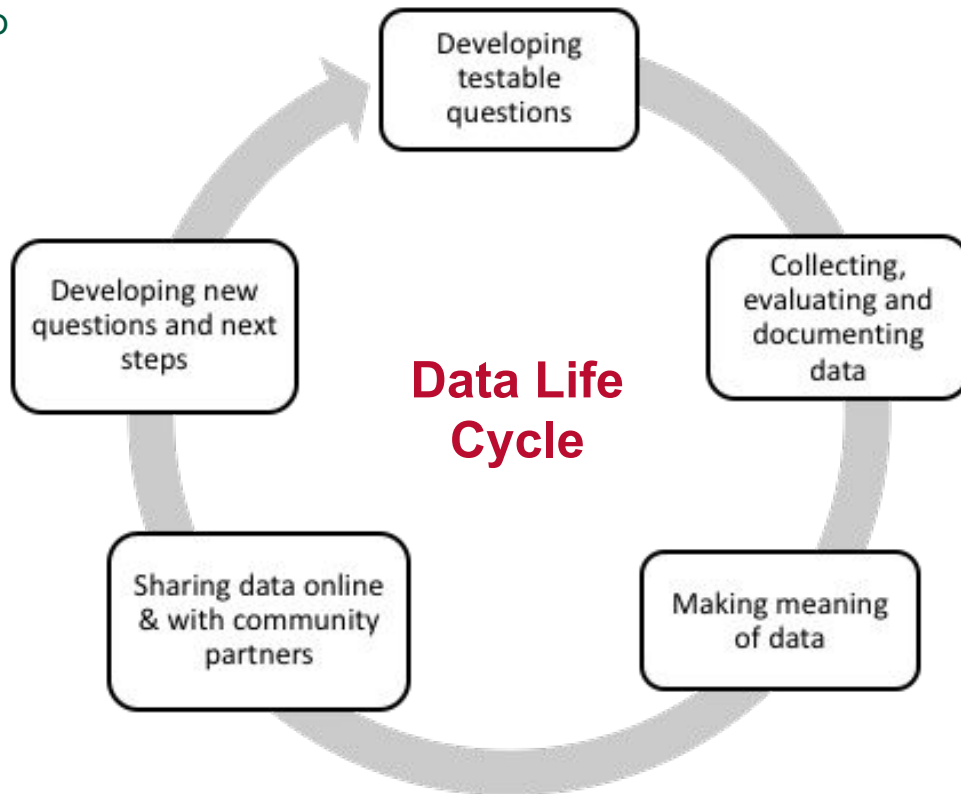
**...use their scientific
work to make and/or
envision change in their
lives**



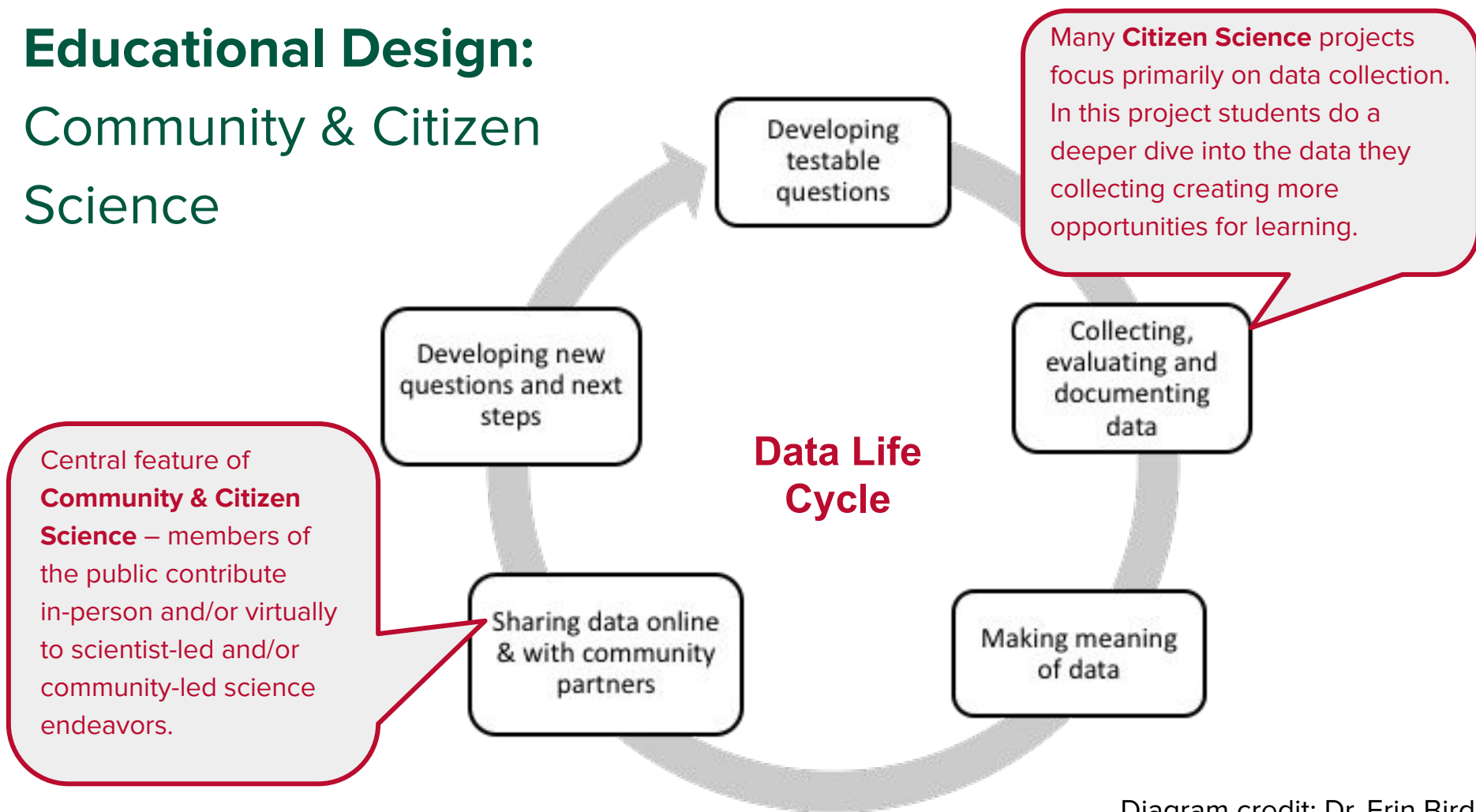
Educational Design:

We build in opportunities for students to take ownership of their scientific work (Harris et al., 2020; O'Neill, 2010) throughout the data life cycle from determining questions to taking actions on their findings.

These data-focused design features of the program are where we track student's **environmental science agency**.



Educational Design: Community & Citizen Science



This was the plan... but the reality was:



Covid pandemic and
distance learning

Photo credit: Pixabay.com



Wildfires in the fall and the Sierra
Streams Institute office burning
down

Photo credit: The Union

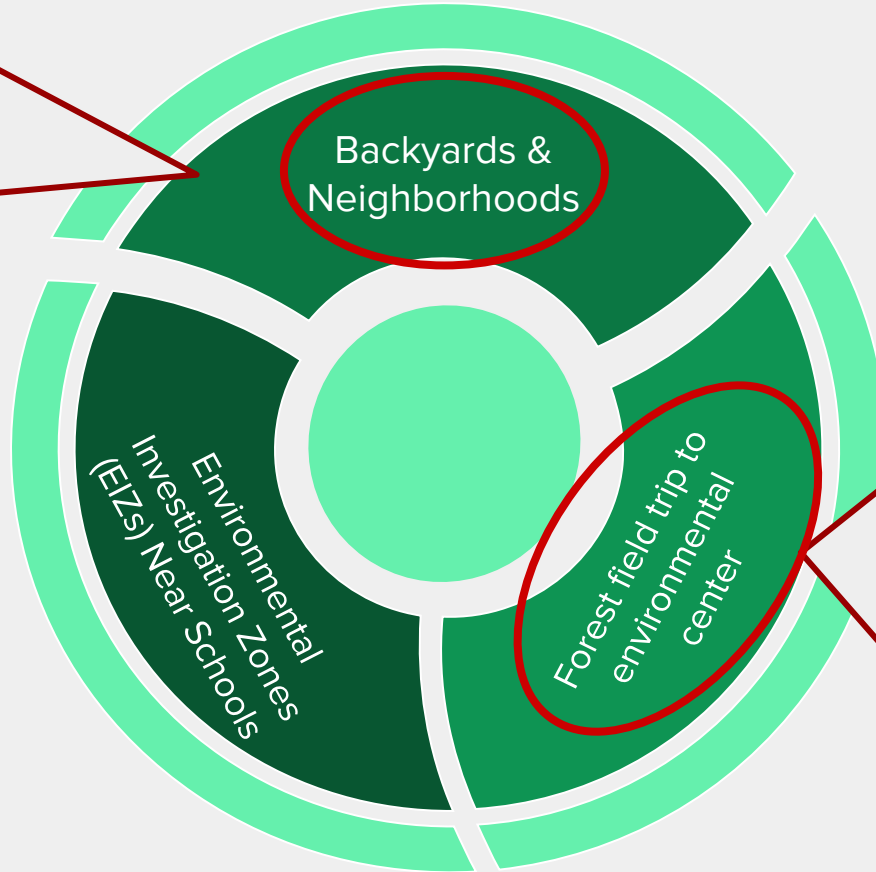


Racial Justice protests

Photo credit: Ted Eytan

Shifts in our Educational Design: Distance Learning

As students could not attend field trips, we included opportunities for students to use their backyards & neighborhoods.



In the spring staff scientists at Sierra Streams collected data at the env. Center site that burned in the fall. This data became a student **case study** for analysis comparing burned and unburned sites. Photos and videos were used extensively.

Shifts in our Educational Design: Forest Fire Case Study

In August 2020, the forest site students were going to monitor burned in the Jones Fire. Different parts of the forest experienced different fire intensity. Sierra Stream Institute lost their office and much of our educational supplies to this fire.

Silver lining: an opportunity for students to investigate the impacts of fire on their local forests. We pivoted to create a Distance Learning case study where although students were unable to collect



No fire damage



Low-intensity burn



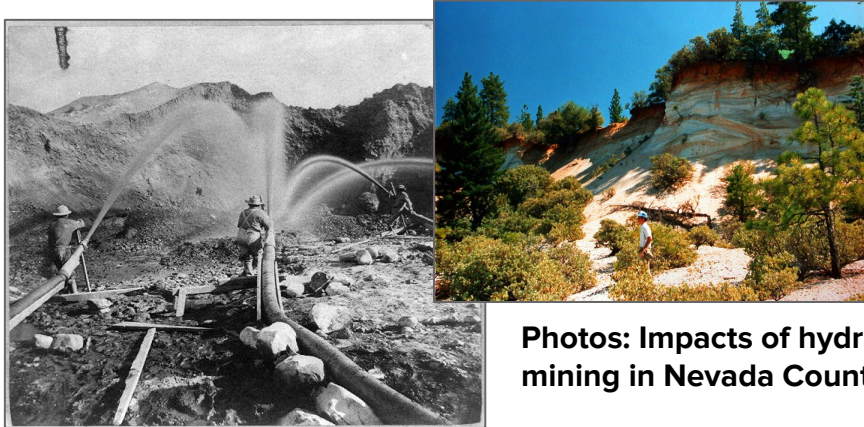
Severe fire damage & salvage clear cutting

Emergent question: How do we teach place-based environmental science when the *place* investigated (e.g. forests) can trigger unresolved trauma?

1. The Jones Fire made addressing unresolved fire-related trauma an imperative. Our teachers created sharing circles for students, they made phone calls home, provided additional resources and made exceptions for students who did not have the emotional bandwidth to participate in lessons. Students also learned about the benefits of fire.



2. Also, as human activity throughout history gets mapped onto land (e.g. mining techniques, removal of indigenous peoples), trauma is part of the reality of studying local forests.



Photos: Impacts of hydraulic mining in Nevada County

Shifts to our Educational Program Design

- Utilizing students home & neighborhood spaces.
- (Fall) Building in more open inquiry and student-lead investigations.
- (Spring) Providing students with CCS data for analysis while creating opportunities for students collect their own data beyond forest protocols.
- Protecting teachers time by asking for targeted input as opposed to in depth collaboration.
 - Ensuring that our lessons meet the needs and teaching contexts of teachers now.
 - Keeping lessons SHORT & providing optional lessons/activities.
- Collaborating more closely with retired teachers on developing Fall and Spring lessons.

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