

RET Lesson Implementation Report

Lesson Details

Name: Jason Parsons

School and grade level: Tempe Union Innovation Center, Grade 11

Lesson Title: EICP Busts the Dust by Forming Carbonate Crust

Implementation Date(s): August 15th 2023 through September 21

Reflection

Implementation

11th grade students at the Tempe Union High School District Innovation Center will be conducting a dust control experiment using enzyme induced carbonate precipitation (EICP) technology which relies on a crude extract from Jack Beans. This crude extract contains urease enzyme which induces carbonate precipitation when introduced into a solution containing calcium chloride and urea and when sprayed on soil surface, it has the potential to bind together the soil particles (i.e. bio-cement the soil).

It is the purpose of this research and experiment to help mitigate the wind-blown dust (fugitive dust) on exposed soil at the Innovation Center by applying EICP solution onto these surfaces and recording measurable and observable results over fixed intervals of time. It is the intention of this research to then communicate the results of this dust control experiment to Dr. Hamed Khodadadi Tirkolaei and his research team at the ASU CBBG for data compilation and further collaboration or adjustments for the experiment with the Innovation Center students.

Student Outcomes

11th grade Innovation Center students will be utilizing a Project Based Learning model to conduct this scientific investigation with the ASU CBBG program for the ***duration of the 2023/2024 academic year.***

The Project Based Learning format utilized at the Innovation Center format that students will be utilizing is as follows.

1. Students in the group generate driving questions for the project.
2. Students generate learning goals.
3. Students generate project summaries with facilitator and ASU CBBG approval.
4. State and NGSS standards. Students align ADE standards and follow the NGSS standard, NGSS – HS-ESS2-2 analyze geoscience data to make the claim that one change to Earth's surface can create feedback that causes changes to other Earth's systems.
5. The students working on the EICP dust busting project will be working on this project at the Innovation Center campus and applying EICP solution to various locations of exposed surface soil around campus all year. It is our intention to record the results and compile them into a large document to share with Dr Hamed.

The 11th grade Innovation Center students will be utilizing a Project Based Learning model to conduct this scientific investigation with the ASU CBBG program for the ***duration of the 2023/2024 academic year.*** The Innovation Center conducts Project Based Learning with community and business partners within a unique framework that promotes collaboration, team work, alignments of learning standards in a fast paced, real world environment with feedback from our partnerships.

Revisions

Ideally, it would be nice to have students involved in this project over the summer because of the long-term factors involved with the project. Otherwise, the project is running smooth although not 100% complete by the time of this report because we are planning to run it year-round because of the unique PBL format we operate in at the Innovation Center. It would be more accurate to asses' potential revisions at the end of the academic year because of our PBL framework unique to the Innovation Center. However, at this time other than potential student involvement over the summer I have none.