

EICP Can Bust Dust By Forming Carbonate Crust

**ASU CBBG RET Program
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Innovation Center Grades 10-12**

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The Research

- **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.**
- **It is the purpose of this research and experiment to help mitigate the wind-blown 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.**

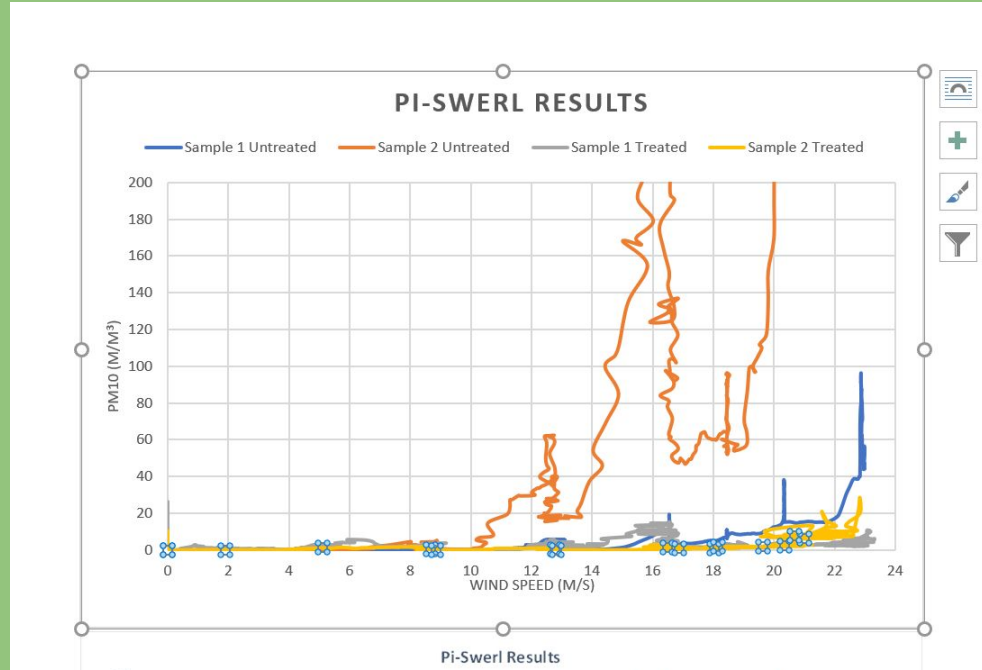
Exposed Surface Soil at Innovation Center



Research Objectives

- **11th grade students at the Innovation Center will actively implement EICP technology in a surface application dust mitigation experiment on exposed surface soil located in the north field of the Innovation Center located at 490 West Guadalupe Road, Tempe, Arizona 85283.**
- **Students will measure these results with observable and quantitative data points and report all data and findings to Dr. Hamed Khodadadi Tirkolaei and his research team for further analysis, adjustments, and collaboration with the Innovation Center.**

Conclusion



**RET 2023 PI SWERL test results from Innovation Center Field.
Two samples tested with EICP.**

Lesson Description

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 PBL format that students will be utilizing is as follows.

1. Students in their group will generate driving question for the project.
2. Students generate learning goals.
3. Students generate project summary with facilitator and ASU CBBG approval.
4. State and NGSS standards. Students align ADE standards and follow NGSS standard, NGSS – HS-ESS2-2 analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earths systems.
5. Active partner collaboration with ASU CBBG to conduct research, share results and receive feedback.
6. Share with public audience (references included).
7. Public review and critique held at the I.C conference by invitation, scientific poster included in presentation both physically and digitally.
8. Final dust mitigation implementation plan for Innovation Center North field, possible continuing or research plan could be written pending actual research results from academic year of 2023/ 2024.

Student final grades are subjected to a rubric based grading system that will encompass the details of each individual steps 1-8.

Objectives

- **Students will be able to create and test an EICP solution to mitigate fugitive dust at the Innovation Center.**
- **Students will collect fugitive dust data from applying the EICP solution to exposed surface soil.**
- **Students will collect data from carbonate crust formation on surface soil.**

Questions / Comments

