



Project: Developing 3D plant models with high school students for plant and agriculture science education

BACKGROUND

This project addresses the disconnect between science, design, and technology through the creation of plant 3D models. High school students benefit from innovative learning experiences in plant and agriculture sciences that allow them to gain the interest and skills needed for future STEM+Ag careers.

GOALS

- Generate awareness that design and technology are part of science and vice versa.
- Promote collaboration through teams of art-, science-, and tech-oriented students working on the creation of 3D plant models.
- Collaborate with scientists from the Donald Danforth Plant Science Center (DDPSC).
- Develop communication skills through presentations in public and scientific events and writing of worksheets.
- Learn about the applications of 3D models in augmented and virtual reality (AVR) environments.
- Foster knowledge and appreciation of plants and plant/agricultural sciences.
- Inspire interest in STEM and provide skills for a future STEM+Ag career.
- Contribute to education research by participating in surveys.

DURATION OF THE PROJECT

The time to implement this project can be a period of ~3-4 weeks, a quarter, or a semester:

~4 hours: Student training in 3D modeling, team set up, species selection, and completion of education research pre-surveys.

~20 hours: Design, creation, and testing of 3D models.

2-4 hours: Preparation of presentations and worksheets.

2-4 hours: Danforth Center visit for augmented and virtual reality experiences.

2-3 hours: Project presentations and completion of education research post-surveys.

MATERIALS AND COMMITMENTS

Provided by the Danforth Center	Provided by the schools
Protocols and training videos	Computers (if available)
Scientist and 3D modeling advisory to create the plant models	During Danforth visit: <ul style="list-style-type: none"> • area to display the zSpace computers (classroom) • open area to use the head-mounted devices (Oculus) • electrical source and Wi-Fi connection
Laptops for 3D modeling (if needed)	
School visit to bring augmented and virtual reality experiences to the students. Equipment: <ul style="list-style-type: none"> • zSpace computers for augmented reality • Oculus Quest head mounted devices for virtual reality 	
Cleaning and disinfection supplies	



STEPS FOR PROJECT IMPLEMENTATION

1. Contact the project manager to coordinate the implementation of the activity (Dr. Sandra Arango-Caro, sarango-caro@danforthcenter.org).
2. Access project materials and share student artifacts through a Google folder space.
3. Follow the detailed project steps provided in protocols.
4. Complete photo release form as applicable.
5. Guide student 3D modeling training using the videos provided.
6. Establish student teams compose of art-, tech- and science- oriented students.
7. Support student teams on developing their projects (e.g., species selection, timelines, 3D model progress, etc.).

8. Collaborate with Danforth scientists to support teams in the creation of the 3D models.
9. Coordinate a Danforth visit to bring augmented and virtual reality experiences to the students and introduce them to the application of 3D models in AVR.
10. Support the teams to prepare presentations of their projects and write worksheets.
11. Coordinate with the teams the presentation of their projects at scientific and education events with the Danforth Center as applicable.
12. Share student artifacts (e.g., 3D models, photos, sketches, etc.) with the Danforth Center.
13. Complete the education research surveys for both the teacher(s) and students.

CONTACT INFORMATION

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