

Challenge 4B: Million Orchid Project - (STEMLab Schools) Bioreactors

YOUR CHALLENGE:

As part of the Million Orchid Project (MOP), the STEMLab program is unique in that it allows students the opportunity to participate in every aspect of the orchid micropropagation and reintroduction process. The MOP has successfully propagated hundreds of thousands of native orchids and planted them in urban landscapes with the goal of reestablishing one million plants in the South Florida region.

For this Challenge and as part of STEMLab, you will be conducting an experiment to test how different rates of watering affect the growth and proliferation of baby orchid seeds, also known as protocorms. After your first STEMLab visit, the students will be given 12 bioreactors; these bioreactors create an efficient nutrient delivery system where the seedlings are temporarily immersed in a liquid medium containing plant nutrients. This technique provides more even nutrient uptake and can reduce damage from over wetting or drying of the roots.

Half of these bioreactors will be assigned to be immersed once a week, the others three times a week. Follow the provided STEMLab research protocol to collect data while conducting this experiment. Create a social-media-style graphic carousel ([here's an example!](#)) that explains this experiment, with at least one graph showing data you collected and what it means, and why it is important to run experiments like yours on endangered plants. Additionally, to prepare for the second STEMLab visit, include possible places around your campus that would be suitable for planting either epiphytic or ground orchids. Your scientific findings are crucial to helping us determine how to effectively grow more plants in the South Florida area!

MANDATORY TEACHER

WORKSHOP: August 7, 2025

SUBMISSIONS AND DATA

SHEETS DUE: December 15, 2025

 Digital Entry Form for each submission required

Participants per submission:

Student Group

POINT SYSTEM:

Maximum Points	100 points per submission
	<u>2 submissions per school</u> = 200 max points
Bonus Points	50 pts for completed datasheet

✓ SUBMISSION REQUIREMENTS:

Mandatory STEMLab Teacher Workshop on August 7th, 2025 at Fairchild from 8:30 AM – 3:00 PM.

Social-media-style graphic carousel which showcases the experiment conducted including at least one graph derived from their school's collected data, background information, and possible locations around the campus to outplant orchids. (6-8 slides)

Last slide of carousel includes student first name(s) and last initial(s), student grade level(s), teacher name, school name, and text saying "Million Orchid Project" and "2025-2026"

Digital Entry Form.

- Video link should be added to digital entry form
- Video can be uploaded to Instagram, Google Drive, YouTube, or school video sharing program and then link provided (*please ensure that link is open access*)

Bonus points for data sheet completed by December 15th, 2025

Two submissions (social-media-style graphic carousels) per school. Schools will only use one datasheet for their middle school STEMLab experiment.

Challenge 4: Million Orchid Project

Prior Knowledge:

To be successful, students should be familiar with these concepts:

- Different plants have different adaptations which help them survive in their respective ecosystems.
- Resources (light, oxygen, water, etc.) that plants need to survive.
- The Earth's climate is constantly changing. Currently, the average temperature of the atmosphere is increasing.
- Public communication and persuasive writing.
- The concept of audience targeting and tailoring messages.
- Collaborative skills for working on a team project (if applicable)

Standards/Learning Targets:

Subject	Strand	Standard(s)
Science	Earth and Space Science	SC.7.E.6.6 Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.
	Science and Society	SC.8.N.4.2 Explain how political, social, and economic concerns can affect science, and vice versa.
English Language Arts (B.E.S.T.)	Expectations	ELA.K12.EE.6.1 Use appropriate voice and tone when speaking or writing.
	Communication	ELA.6.C.1.3 Write and support a claim using logical reasoning, relevant evidence from sources, elaboration, and a logical organizational structure with varied transitions.
		ELA.6.C.2.1 Present information orally, in a logical sequence, using nonverbal cues, appropriate volume, clear pronunciation, and appropriate pacing.
		ELA.7.C.4.1 Conduct research to answer a question, drawing on multiple reliable and valid sources, and generating additional questions for further research.
		ELA.8.C.5.1 Integrate diverse digital media to emphasize the relevance of a topic or idea in oral or written tasks.
Virtual Arts	Skills, Techniques, and Processes	VA.68.S.1.1 Manipulate content, media, techniques, and processes to achieve communication with artistic intent.

For more detailed information and resources, please visit the Middle School Challenge 4 webpage.

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Learning Goals/Objectives:

By the end of this Challenge, students will be able to:

Tend orchids native to South Florida and the Caribbean.

Communicate their research findings via a social-media-style carousel to a general audience.

Develop an understanding of the significance of conserving native orchid species.

Differentiation:

Students who speak English as a Second Language may complete their infographic in their first language.

We strive to be inclusive of all students' learning needs. If you have questions about specific accommodations, please email us at challenge@fairchildgarden.org.

For more detailed information and resources, please visit the Middle School Challenge 4 webpage.



Check out these
**Social-Media-Style
Carousel Examples**



Carousel on Poaching from
National Geographic



Carousel on Invasive Species
from Reserva:
The Youth Land Trust