



The Fairchild Challenge is our award-winning, interdisciplinary, environmental science competition designed to engage students of diverse interests, abilities, talents and backgrounds to explore the natural world. The program has been recognized as a benchmark for exceptional STEM education and for empowering PreK – 12th grade students to become the next generation of scientists, researchers, educated voters, policy makers, and environmentally-minded citizens.

*The Fairchild Challenge is made possible by the generous support of the Batchelor Foundation.*





# High School Challenges

**Challenge 1: Botanical Breakthrough**

**Challenge 2: Connect to Protect Network – Short Film**

**Challenge 3: Growing Beyond Earth**

**Challenge 4: Green Cuisine – Pantry Based Cookbook**

**Challenge 5: Environmental Debate Tournament**

**Challenge 6: Green Treasures – Fairchild's Pharmacy**

**Challenge 7: Million Orchid Project**



# Challenge 1

## Botanical Breakthrough

Nature can be regarded as the most profound inventor ever known. **In response to the ever-changing environment, living organisms have evolved and adapted their form and function.** To unlock solutions to modern problems, humans are inspired by, learn from and emulate nature's materials, structures and systems. **We asked students to research a current engineering issue and design a plant-inspired solution.**

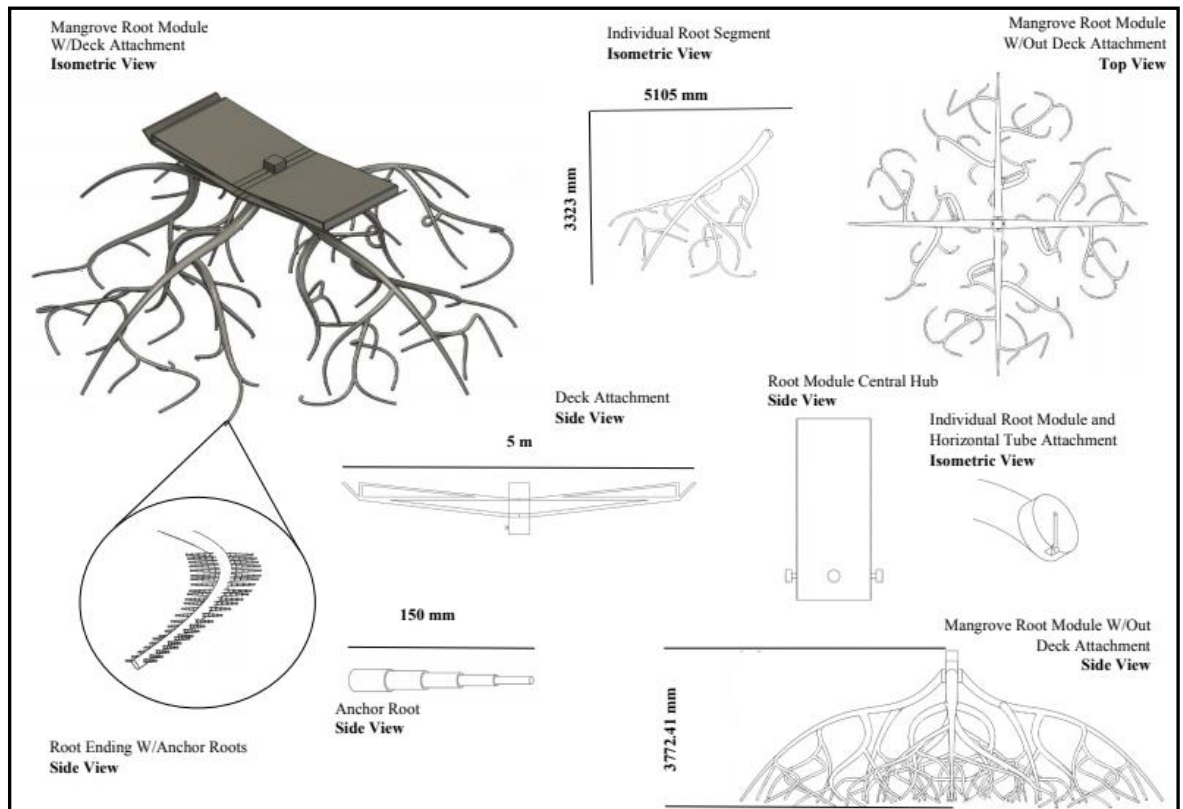
# Challenge 1 Botanical Breakthrough



## FIRST PLACE

**Heleny Perez, Liliana Guillot, Yaniel Rodriguez,  
Giovanni Lopez, and Justin Sanchez**

**iMater Preparatory Academy High School**



Click image to learn more about this entry.

# Challenge 1

## Botanical Breakthrough

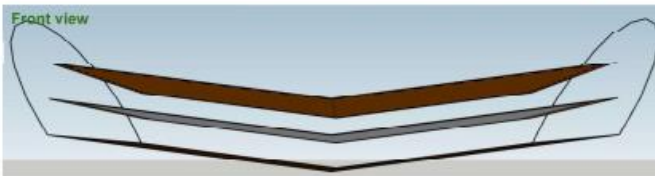
## SECOND PLACE

### Princess Rojas and Aaron Andressen

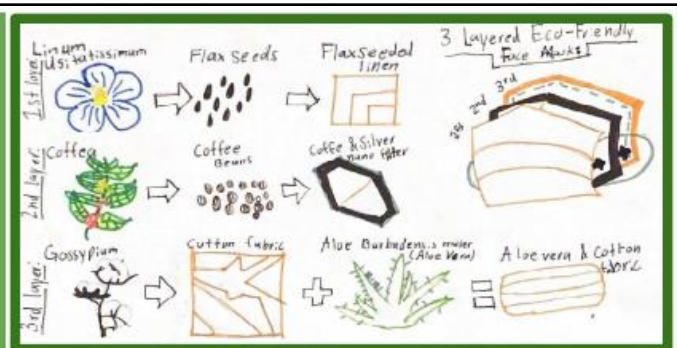
### Archimedean Upper Conservatory

#### Eco-Friendly COVID-19 Mask

According to the Centers for Disease Control and Prevention (CDC), face coverings slow down the spread of SARS-CoV-2 by protecting others from receiving their transmittable virus. Without a face mask, this pandemic may never end and millions more will die. The devastation caused by single time use masks is already alarming and it is happening only since March 2020. The oceans and marine life are in jeopardy. This situation calls for an eco-friendly mask made of plants with the same efficiency. In my invention, the outside layer of the eco-friendly mask would be Flaxseeded Linen, it is made from *Linum usitatissimum* which produce the flax seeds. Flaxseed Linen is a breathable fabric that regulates your temperature to keep you comfortable across the seasons. This linen will also help with the common complaint that masks become too hot and may even cause a heat rash. The middle layer would be the filter layer, the CDC agrees that coffee filters are effective but may not be the best for the environment. Therefore, the eco-friendly mask would include a filter made of *Coffea* plant, *Coffea* sp., as a nano filter. Nano filters are the most effective in moist environments and able to remove dissolved solids from the surface. The water droplets exhaled by a person are filtered by the membrane-like nano filter. The layer most near your mouth is made of *Gossypium* sp. and *Aloe barbadensis* var. miller to make a cotton and aloe vera fabric. This hybrid eco-blend is to be closest to the mouth because of its benefits such as helping to rejuvenate skin cells, forming healthy dermis, fighting against skin damage, and keeping the skin free from microbial infections. I strongly believe this eco-friendly mask is beneficial to both the user and the environment.



Princess Rojas, Aaron Andressen  
Grade: 11th  
Archimedean Upper Conservatory



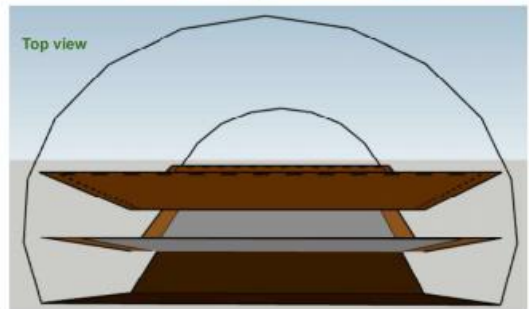
Inside of the Mask



Outside of the Mask



Top view



[Click image to learn more about this entry.](#)

# Challenge 1 Botanical Breakthrough



## Special Merit – Most Innovative

**Millard Mcleod**

**Coral Reef Sr. High School**



[Click image to learn more about this entry.](#)



# Challenge 1 Botanical Breakthrough



## Special Merit – Most Inspired

**Amanda Diaz, Anastasia Haro, Carolina Morales, Eryn Proaño, and Carmen Rangel**  
**Florida Christian School**

### SPIRAL SHELTER



**PROBLEM:**

Over the past 20 years, there has been a rise in natural disasters according to the United Nations. In addition to this, pre-disaster homeless individuals are not eligible for federal disaster aid. We saw this as unacceptable and sought to fix this issue for those who couldn't themselves

**MIMICRY AND DESIGN:**

Aloe polyphylla is a species of aloe that we used. We mimicked the aloe's spiral and leaf structure when constructing the safe house in order to create an efficient and secure place for those seeking refuge from a natural disaster.





**INSPIRATION:**

The inspiration behind the Spiral Shelter was the structure and configuration of the leaves and the spiral shape. Aloe polyphylla has an average of 150 leaves per plant, and that can be mimicked in our shelter with 60 rooms, which, in total, can hold an entire community. Each leaf holds a different amount of nutrients and substance which correlates with the diversity of people in each section.

**SOLUTION:**

There are two outer protective layers in this bunker. The first outer ring is made of steel concrete with a door entering the second ring. This is to mimic the aloe leaf's protective rind. There is a door entering the second ring which is a series of hallways that imitate the storage parenchyma. These hallways are spiraled inward and have multiple doors that lead to rooms for living. The spiral is very much like that of the aloe plant and is able to contain more rooms in less space.



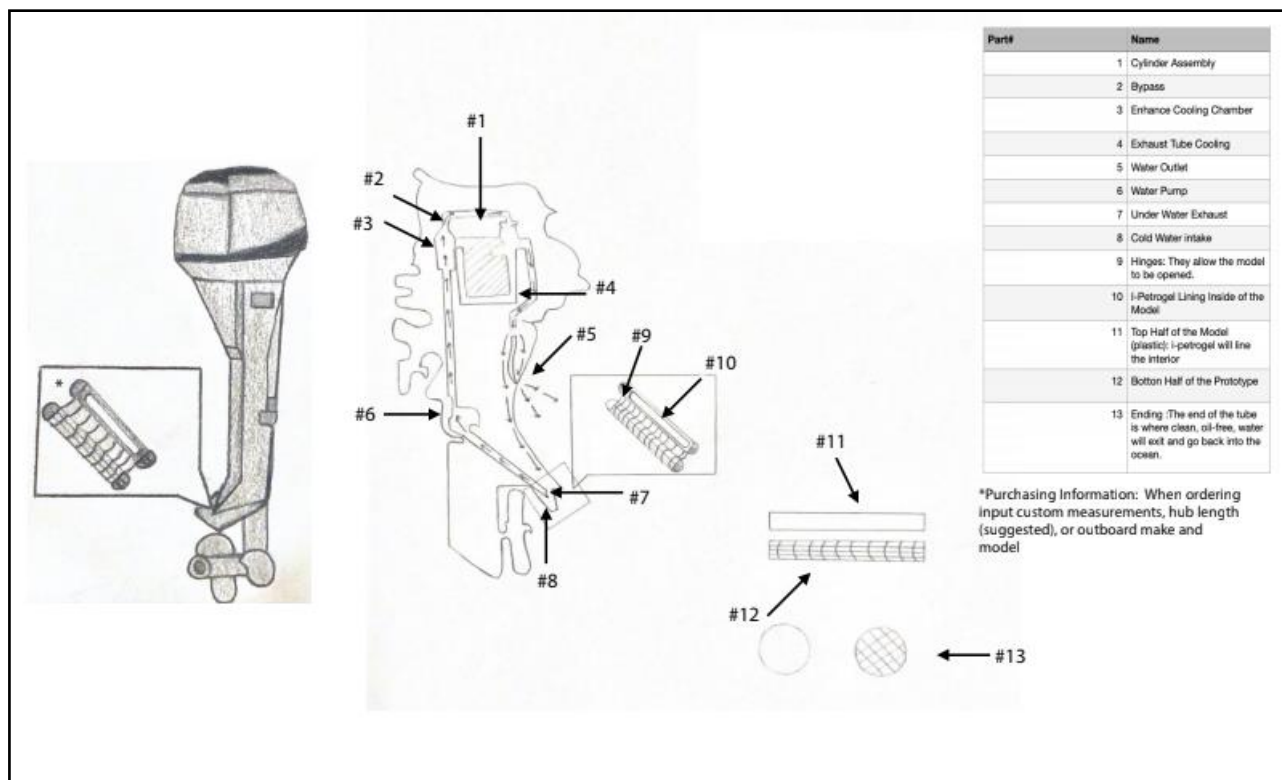
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# Challenge 1 Botanical Breakthrough

## Special Merit – Most Practical

**Diana Gil, Maria Muñoz, Christian Rodriguez,  
Emily Rodriguez, and Kaitlyn Hidalgo**

**iMater Preparatory Academy High School**



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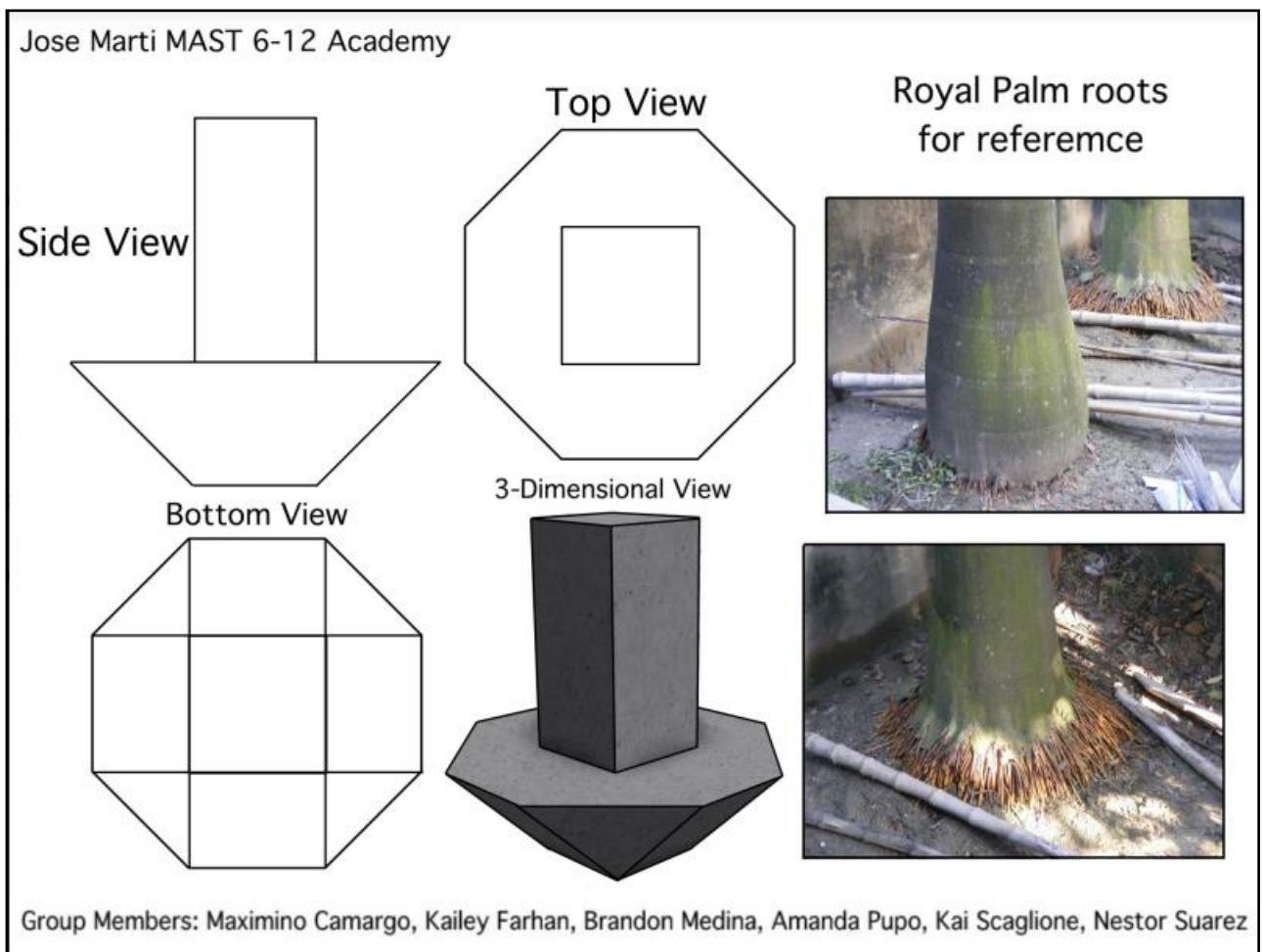
# Challenge 1 Botanical Breakthrough



## Special Merit – Explanation of Design

**Maximo Camargo, Kailey Farhan,  
Brandon Medina, Amanda Pupo,  
Kai Scaglione, and Nestor Suarez**

**José Martí MAST 6-12 Academy**



[Click image to learn more about this entry.](#)



## Challenge 2

### Connect to Protect Network – Environmental Short Film

Less than 2% of the pine rocklands remain outside of Everglades National Park making **this natural community one of the most globally imperiled ecosystems**. Much of what remains occurs today exists as only fragmented parcels across Miami and The Keys. **Fairchild's own Connect to Protect Network encourages families, schools and local businesses to plant pine rockland gardens to increase the probability of visits of seed dispersers and pollinators.** The goal of this conservation program is to improve genetic health of plant species by connecting these remaining isolated patches across urban areas. **We asked students to create a short film that showcases Connect to Protect Network.**

Challenge 2  
Connect to Protect Network  
Environmental Short Film



**FIRST PLACE**

**iMater Academy Preparatory High School**

Fairchild Challenge 2: Connect to Protect  
2020- 2021

iMater Academy Preparatory High School



Andy Ortega, Dany Jimenez, Diana Gil, Emily Rodriguez, Giovanni Lopez, Heleny Perez, Jose Caballin, Jorge Perez, Justin Sanchez-Almirola, Kaitlyn Hidalgo, Karen Pineda, Liliana Guillot, Maria Munoz, Matthew Ramos, Steven Bartumeu, Yadiel Vento, Yaniel Rodriguez

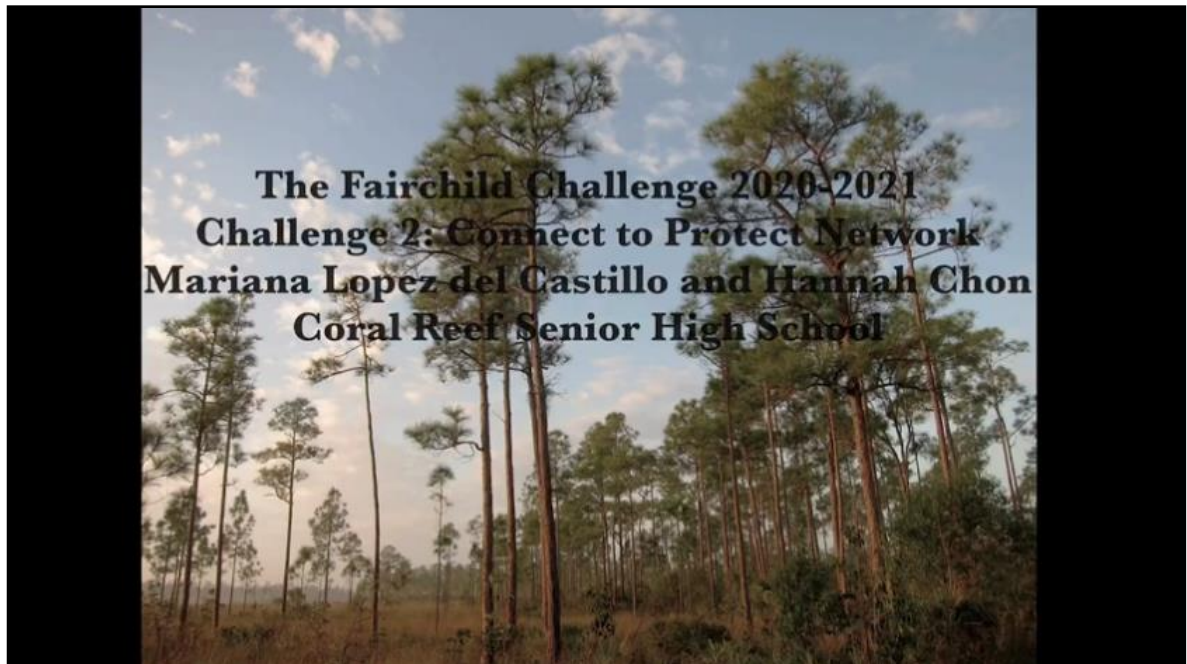
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Challenge 2  
Connect to Protect Network  
Environmental Short Film



**SECOND PLACE**

**Coral Reef Senior High School**



Click image to learn more about this entry.



Challenge 2  
Connect to Protect Network  
Environmental Short Film



**Special Merit – Most Informative**  
**Christopher Columbus High School**

A photograph of a pine tree against a blue sky with white clouds. The text "Christopher Columbus High School Challenge 2 2020-2021" is overlaid on the image in a white, serif font with a black outline.

*Christopher Columbus  
High School  
Challenge 2  
2020-2021*

[Click image to learn more about this entry.](#)

Challenge 2  
Connect to Protect Network  
Environmental Short Film



## Special Merit – Depth of Research

**José Martí MAST 6-12 Academy**



Click image to learn more about this entry.



Challenge 2  
Connect to Protect Network  
Environmental Short Film



**Special Merit – Originality**

**Miami Springs Senior High School**

***MIAMI SPRINGS SENIOR HIGH SCHOOL***  
***CHALLENGE 2***  
***2020-2021***

Click image to learn more about this entry.

Challenge 2  
Connect to Protect Network  
Environmental Short Film



**Special Merit – Captivating**  
**Archimedean Upper Conservatory**

Archimedean Upper Conservatory  
Challenge 2: Connect to Protect  
2020-2021

[Click image to learn more about this entry.](#)



## Challenge 3

### Growing Beyond Earth

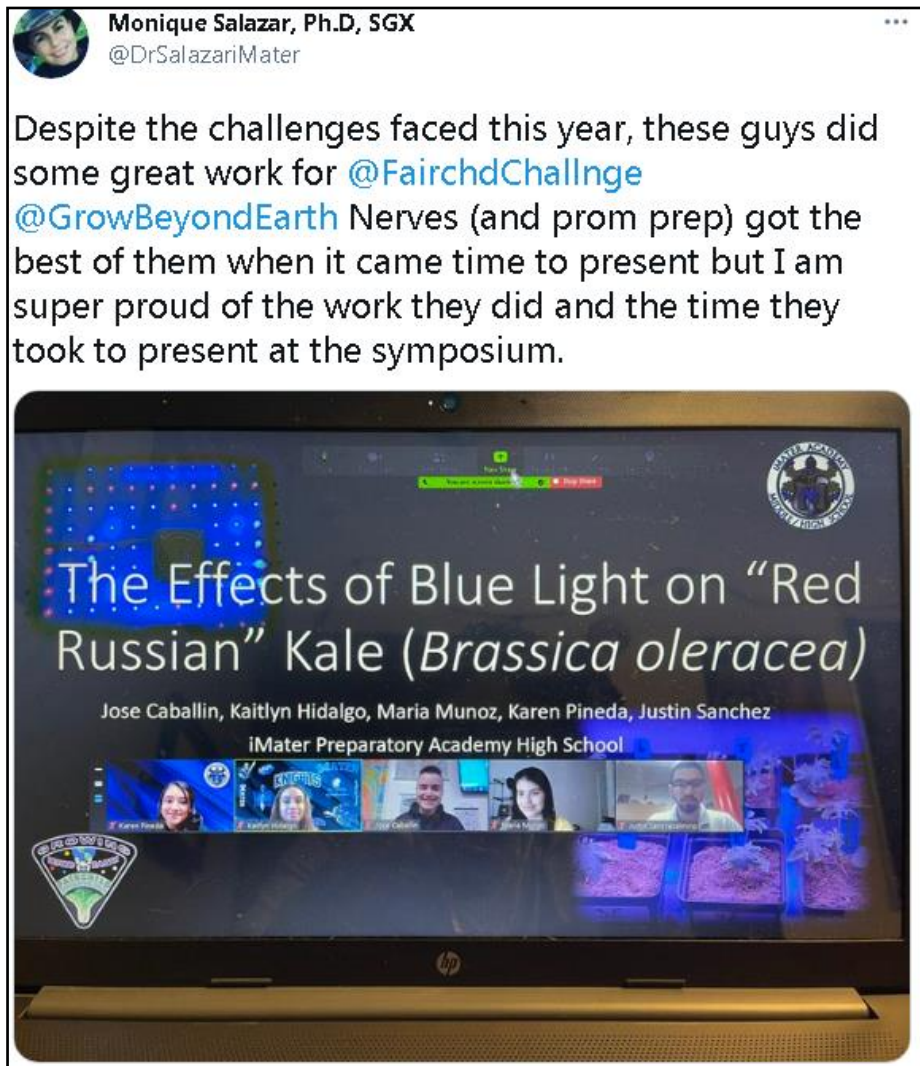
Humans have never been more determined to explore the universe, however reaching and settling new planets is still an incredible challenge with several hurdles to overcome. **One of the biggest challenges will be providing fresh produce for astronauts during long distance space travel.** For the past 5 years, your research has brought NASA closer to solving that problem and has supported some of the important components of growing plants in space. This year, **students selected one of the three variables, fertilizer, photoperiod, or light spectrum, to test how they affect plant growth** by growing them in the “Advanced Plant Habitat”, the big brother of “Veggie”.

# Challenge 3 Growing Beyond Earth



## SECOND PLACE

### iMater Preparatory Academy



Click image to learn more about this entry.

## Challenge 3 Growing Beyond Earth



### Special Merit – Enthusiasm

#### Allison Academy



Click image to learn more about this entry.



Challenge 3  
Growing Beyond Earth



**Special Merit – Technical Ability**

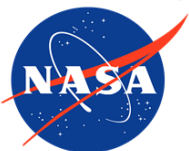
**Miami Palmetto Senior High School**

**Effects of Light Configuration  
on Growth, Health, and Water  
Needs of Red Russian Kale**

Isabel Duran and Alexa Fein  
Miami Palmetto SHS

Experiment: Light Spectrum

Light Configuration: Blue, supplemental white, red, green



[Click image to learn more about this entry.](#)



# Challenge 3 Growing Beyond Earth



## Special Merit – Effective Use of Visuals

### Somerset Academy Charter School



Click image to learn more about this entry.



## Challenge 4

### Green Cuisine – Pantry-based Cookbook

Food brings comfort during these unprecedented times when people maintain social distancing and stay at home. **To reduce shopping trips people turn to their pantries for convenience, nutrition and delicious meals.** Staples such as rice, pasta and beans to shelf-stable condiments like vinegar, soy sauce and hot sauce can be found in the cupboard. **Students were asked to create a “Pantry-based Cookbook” showcasing tasty and imaginative recipes from the cupboard.**

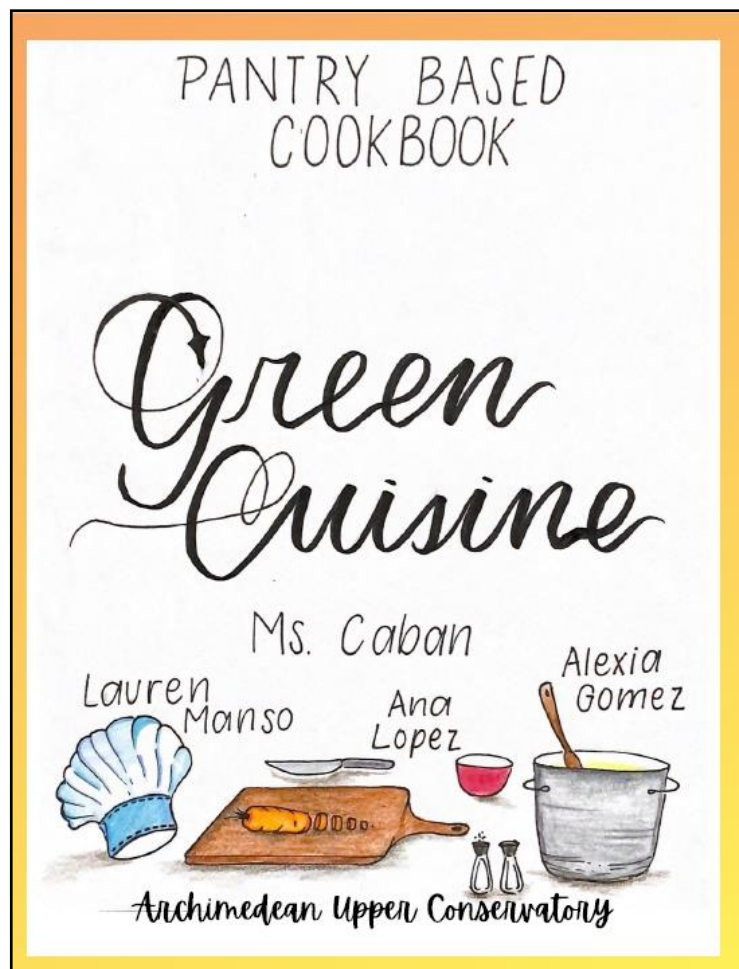
Challenge 4  
Green Cuisine  
Pantry-based Cookbook



**FIRST PLACE**

**Lauren Manso, Ana Lopez, and Alexia Gomez**

**Archimedean Upper Conservatory**



Click image to learn more about this entry.

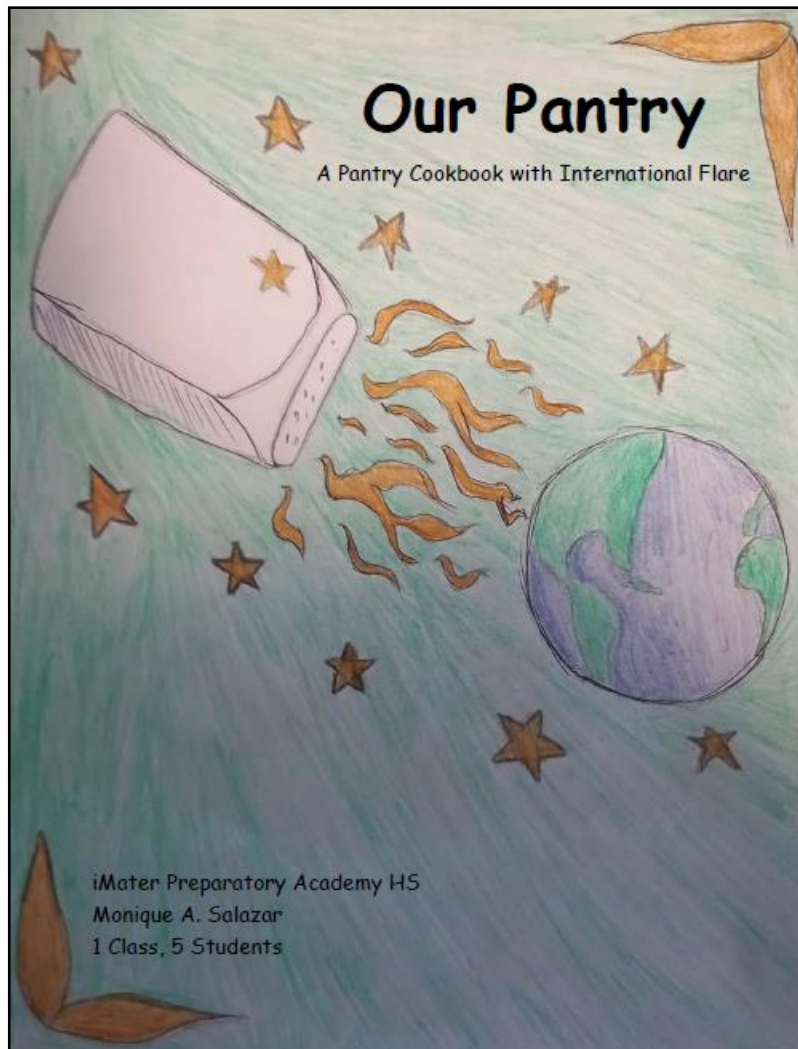
Challenge 4  
Green Cuisine  
Pantry-based Cookbook



## SECOND PLACE

### iMater Knights

### iMater Preparatory Academy High School



[Click image to learn more about this entry.](#)

## Special Merit – Ingenious Use of Pantry Ingredients

**Emily Garcia, Elyssa Ojito,  
Natalie Ruiz-Ocana, Kevin Rodriguez,  
and Sean Velarde**

**Hialeah-Miami Lakes Sr. High School**

**Hialeah-Miami Lakes  
Senior High School**

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**Mr. Raul Hernandez**

**Emily Garcia**

-

**Elyssa Ojito**

-

**Natalie Ruiz-Ocana**

-

**Kevin Rodriguez**

-

**Sean Velarde**

Click image to learn more about this entry.



Challenge 4  
Green Cuisine  
Pantry-based Cookbook



## Special Merit – Overall Presentation

**Nicole Norono, Giovanna Lopardo,  
and Julian Parke**

**Miami Springs Sr. High School**



Click image to learn more about this entry.





## Challenge 5

### Environmental Debate Tournament

The Fairchild Challenge Environmental Debate Tournament provides a powerful forum for students to build life-long skills and engage in real world issues. During this year's virtual event, **students will refine the art of persuasion as they assess and anticipate two different perspectives of local, national and international environmental issues.** Team members will increase their civic awareness by participating in this British Parliamentary style debate.

Challenge 5  
Environmental Debate  
Tournament



**FIRST PLACE**

**Daniel Perez and Luke Yang**  
**Miami Palmetto Sr. High School**



Challenge 5  
Environmental Debate  
Tournament



## SECOND PLACE

**Gianna Hutton and Julian Orrego**

**Miami Palmetto Sr. High School**



Challenge 5  
Environmental Debate  
Tournament



## **Special Merit – Best Rebuttals**

**Gianna Hutton**

**Miami Palmetto Sr. High School**



Challenge 5  
Environmental Debate  
Tournament



**Special Merit – Most Articulate**

**Bella Gonzalez**

**TERRA Environmental Research Institute**



Challenge 5  
Environmental Debate  
Tournament



**Special Merit – Most Persuasive**

**Joshua Burke**

**TERRA Environmental Research Institute**







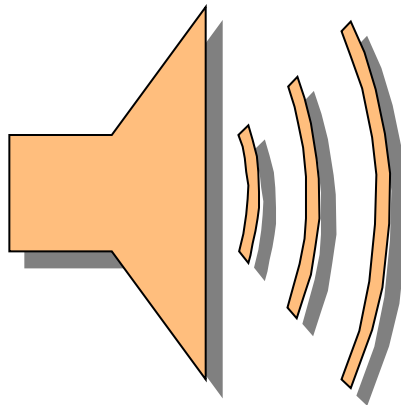
## Challenge 6

### Green Treasures – Fairchild's Pharmacy

Throughout the course of history people from all over the world have turned to specific plants for their healing properties many of which have been incorporated into contemporary medicine. **To date, nearly 18,000 plant species have documented medicinal uses several of which are on display at Fairchild.** These plants are not only beautiful to look at but are traditionally used to create natural remedies for the treatment of many common ailments. **Students were asked to research three of the plants on the provided list below and create a podcast describing the medicinal uses of each plant found in Fairchild's living collection.**

## FIRST PLACE

**Miami Palmetto Sr. High School**

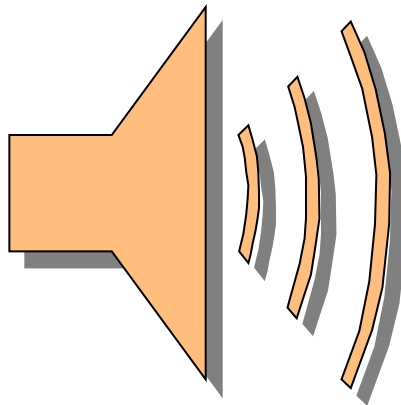


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## SECOND PLACE

**Maria Munoz and Justin Sanchez**

**iMater Preparatory Academy High School**

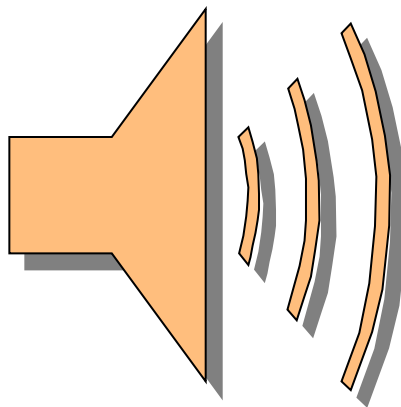


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## Special Merit – Unique Plant Selection

**Rocco Lulinski and Sophia Gumbiner**

**Dr. Michael M. Krop Sr. High School**

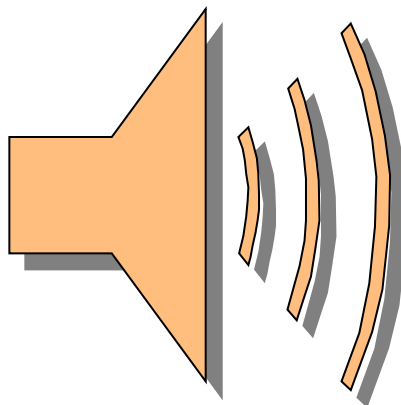


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## Special Merit – Educational Content

**Lucia Alonso**

**Miami Sr. High School**

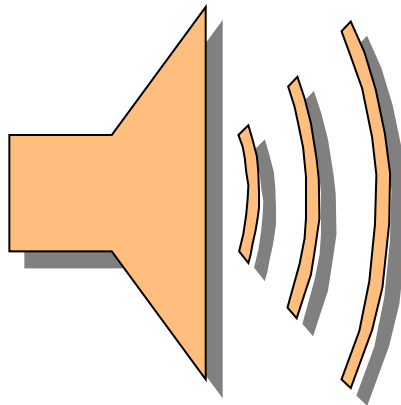


Click image to learn more about this entry.

## **Special Merit – Best Production**

**Julie Casanovas, Elizabeth Saumell,  
Kaden Ovcarich, Adonis Carmona,  
and Dylan Lake**

**Miami Springs Sr. High School**



Click image to learn more about this entry.





## Challenge 7

### The Million Orchid Project

This year's challenge students will help restore rare native orchids in their yards and neighborhood. **Students will receive *Encyclia tampensis* orchids** and the necessary materials to attach them on trees. These seedlings were grown by students at Fairchild laboratory and on STEMLab, our mobile tissue culture laboratory. As the plants become established, **students will also collect demographic data including tree type, orientation, root attachment, and growth rates.** This important data will help guide ongoing conservation efforts by Fairchild scientists to re-establish these lost species in south Florida. Data will be collected every two weeks using the OrchidTracker mobile application. **Based on the student findings, schools produced a tri-fold growing and care guide for this species that may be used to inform the general public about the program.**

Challenge 7  
The Million Orchid Project



## FIRST PLACE

### iMater Preparatory Academy High School



[Click image to learn more about this entry.](#)

# Challenge 7 The Million Orchid Project



## SECOND PLACE

### Mater Lakes Academy High School



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Challenge 7  
The Million Orchid Project



## Special Merit – Attention to Detail

### G. Holmes Braddock Senior High School



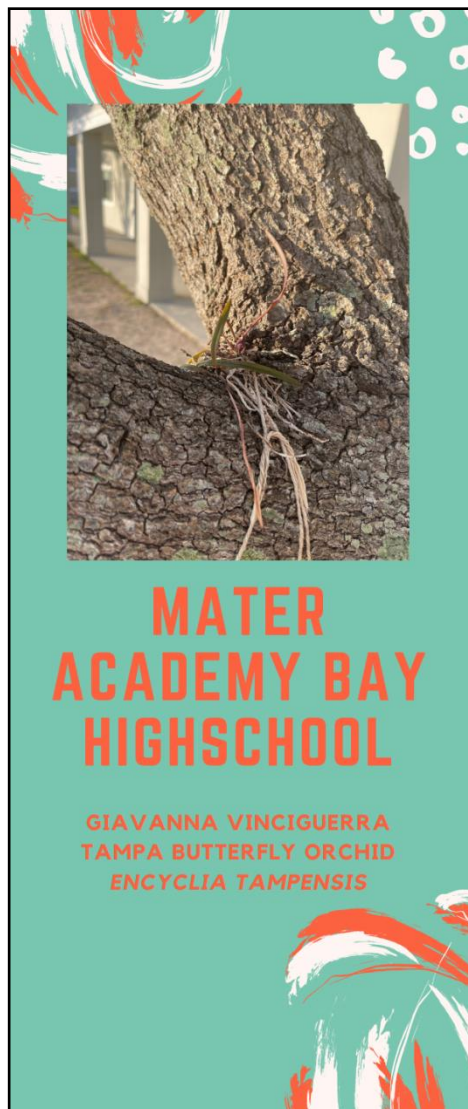
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# Challenge 7 The Million Orchid Project



## Special Merit – Professional Layout

### Mater Academy South High School



[Click image to learn more about this entry.](#)



Challenge 7  
The Million Orchid Project



**Special Merit – Artistry**

**Miami Springs Senior High School**



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