



Fairchild Challenge at Phipps

2018 – 2019 Middle School Challenges In-Depth

Challenge I: Visual Arts and Writing

“Our STEAM Mentors”

For individuals or groups | Maximum points: 200

Due at Phipps: Friday, October 26 by 5 p.m.

Your Challenge: The world is full of amazing Science, Technology, Engineering, Art and Mathematics (STEAM) mentors. From engineers to activists, and poets to researchers, people are making a difference and working to improve our world. Who inspires you the most?

Create a STEAM Mentor Booklet that features five to eight people that inspire you from any of the STEAM fields. For each mentor include:

- An information sheet that includes a brief (2-3 paragraph, double spaced, 11 or 12 point font, 1 inch margins) written biography on the mentor.
- A drawn or painted portrait of the mentor on 8.5” x 11” paper
- Works Cited

Describe the mentor’s involvement in a STEAM field and why it is important locally or globally (or both). How did they get to where they are now? Why are they a mentor to you? Is their cause or career something that you would like to pursue yourself? The mentor can be someone well-known or someone you know personally and can be living or deceased. Works Cited must be included with each biography.

Entry Requirements: Deliver to high school program coordinator at Phipps in person or via certified mail (electronic submission is not accepted):

- Create a booklet that includes five to eight STEAM mentor biographies with accompanying portraits.
- Clearly state 1) personal details about the chosen mentor, 2) the Five W’s (Who, What, When, Where, Why)
- Please include the school name and a list of the students involved in the project.
- Works Cited must be included with each biography.
- Maximum Entry: 1 booklet
- Challenge Entry Form

School Submits: Challenge Entry Form, 1 booklet

Challenge 2: Environmental Design

“Green Stormwater Solutions”

For individuals or groups | Maximum Points: 200

Due at Phipps: Friday, December 7 by 5 p.m.

Your Challenge: Where does the water go when it rains? If rain falls on areas covered with soil and plants, it slowly seeps down into the ground, is filtered by soil, and then recharges the water table. If, however, the rain falls on impervious surfaces such as rooftops, roads or sidewalks, it is unable to soak into the ground, negatively impacting our ecosystems and communities in a variety of ways. This stormwater runoff can cause dangerous flooding of homes and roadways, pollute ecosystems with surface contaminants, and even cause raw sewage to overflow into the rivers.

While one solution may be to add to existing “gray infrastructure” (more storm drains, larger pipes, or new treatment plants), another approach is to use green infrastructure. Green stormwater infrastructure includes bioswales, rain gardens, and other features that allow the rain water to infiltrate into the earth.

Choose a property in your community such as your home or school and calculate the amount of permeable and impermeable surfaces on it. (You may need to use some basic geometry skills.)* According to the National Weather Service¹, the 30 year mean rainfall in Pittsburgh, PA is 38.19 inches. Use this value to calculate the average volume of water that falls on the impermeable parts of the property each year.*

Now create a design for the area that incorporates green stormwater infrastructure. The design should be on a poster no larger than 22” x 28” and should include a map of your property with the new features clearly labeled. Include captions that explain why you added each element. As an option, you may choose to use cross-sectional drawings or topographic lines to better illustrate how your features will work. Can you reduce the amount of rain that will become surface water?

*Remember:

Area of a Rectangle = Base x Height

Area of a Triangle = (Base x Height) / 2

Volume of Water = Area of Property x Average Annual Rainfall (Pay attention to units!)

Resources: The following list of online information resources is recommended for use in preparing your entry:

- [3 Rivers Wet Weather](#)
- [Allegheny County Conservation District](#)
- [Earth Echo International](#)
- [Green Schools National Network](#)

- [Nine Mile Run Watershed Association](#)
- [Penn State Extension: Stormwater Basics](#)
- [Rain Check: A Guide for Stormwater Action](#)
- [Water Blues Green Solutions](#)
- [Western Pennsylvania Conservancy](#)

Entry Requirements: Deliver to high school program coordinator at Phipps in person or via certified mail (electronic submission is not accepted):

- Choose a property in your community and calculate the area (both impermeable and permeable surfaces) of it.
- Using the average annual rainfall for Pittsburgh (38.19 inches), calculate the amount of water falls on the property each year.
- Create a design that incorporates green infrastructure to the property that you choose. Label elements and explain why you chose to use them.
- Design should not exceed 22" x 28"
- Include all calculations with the design.
- Please attach a list of the students and/or classes involved in the project.
- Works Cited
- Maximum Entry: 1 design concept
- Challenge Entry Form

School submits: Challenge Entry Form, 1 design concept

I. https://www.weather.gov/pbz/pit_records

Challenge 3: Ecology Infographic

“Invasives Most Wanted”

For individuals or small groups (2-5 students) | Maximum Points: 200 (100 points/submission)

Due at Phipps: Friday, January 25 by 5 p.m.

Your Challenge: According to Executive Order 13112, an invasive species is a non-native species that may cause harm to humans or the environment¹. Garlic mustard, for example, is a plant that can take over spaces where native plants once grew. Now other species, such as the West Virginia white butterfly are suffering due to the loss of those native plants. The spotted lanternfly is an invasive insect that has the potential to decimate many tree species across the northeastern US. In this challenge, you will bring attention to a species that is invasive in Western Pennsylvania and identify actions that individuals or communities can take to combat it.

Create a “Most Wanted Poster” for a species that is considered invasive in Western Pennsylvania (the species can currently be invasive or predicted to invade in the future). The poster must be two dimensional and no larger than 16” x 20”. It can be made using any

medium, but all artwork must be original (no printed pictures or clipart). The invasive featured will be a kind of “wanted outlaw” and the poster should contain the following:

- The name of the invasive species.
- An original drawing or painting of the species.
- The Five W’s
 - Where is it found natively and where is it found now?
 - When and how did it get here?
 - Why is it a problem or “most wanted”? Is it a threat to human health or agriculture? Is it diminishing another species or resource?
 - What would be the “reward” if this outlaw was “caught?” For instance, if the spotted lanternfly is stopped, the reward will be healthy forests, crops, and all the services and products that come from them.
 - Who can help? What efforts have been made to control it and what actions can citizens take?
- Works Cited

Select students’ posters will be displayed in the Center for Sustainable Landscapes Gallery.

Entry Requirements: Deliver to high school program coordinator at Phipps in person or via certified mail (electronic submission is not accepted):

- Create a “Most Wanted Poster” that identifies a current or predicted invasive species in Western Pennsylvania.
- Poster should clearly state the species name and the Five W’s (Who, What, When, Where, Why) and should include an original rendering of the species.
- Please attach the school name and a list of the students who participated
- The poster must be two dimensional and no larger than 16” x 20”
- Works Cited must be included with each poster
- Maximum Entry: 2 posters
- Challenge Entry Form

School Submits: Challenge Entry Form, 2 posters

I. <https://www.gpo.gov/fdsys/pkg/FR-1999-02-08/pdf/99-3184.pdf>

Optional Challenge: Video

“Urban Garden Infomercial”

For individuals or small groups (2-5 students)

Note: *Entries will be considered for the Patti Burns Prize for Excellence in Communication and Media, but will not be awarded points towards the 2018-2019 Fairchild Challenge.*

Due at Phipps: Friday, February 22 by 5 p.m.

Fairchild Global Challenge: The Fairchild Global Challenge is distributed to the many Fairchild Partner Sites (such as Phipps) by the Fairchild Tropical Botanic Garden in Miami, Florida. Because this challenge is posed to Fairchild Partner Sites around the world, it provides the opportunity for students to have a wider and stronger impact. In this year's Global Challenge, students will create a video that can become part of a "Global Showcase" on the Fairchild YouTube channel.

Your Challenge: Traditional gardening and farming techniques have long been a large part of our country's landscapes. However in recent years, more and more of our local food is being produced in an urban setting. According to the USDA about 15% of the world's food supply is now grown in urban centers. As our population continues to grow and more people move to cities, this new approach to growing food has the potential to revolutionize how and where we produce fresh food. Develop a business plan for an urban garden that you would like to see built at your school and create an infomercial video pitching your ideas on how to grow food in urban environments. Videos should emphasize how to maximize small growing spaces (indoor, outdoor, or both) and sustainable practices.

The first place school for this challenge will be awarded The Patti Burns Prize for Excellence in Communication and Media. This \$250 award will be presented at the Awards Ceremony in May, 2018.

Entry Details: Deliver to high school program coordinator at Phipps via email (please use subject: FC GLOBAL VIDEO CHALLENGE MS [school name]):

- Video infomercial that begins with opening credits (including school name and a student participation list) and address the growing food demands of our society and how their design will increase food production in urban environments.
- Business Plan
- Works Cited that includes at least three sources and follows MLA or APA format.
- Maximum Entry: two videos, each a maximum of four minutes long
- To participate in the Fairchild Global Challenge, video must be uploaded to www.youtube.com/education
- Challenge Entry Form

School Submits: Challenge entry form, maximum of 2 videos

Challenge 4: Sustainable Event Planning

"Green Your Party"

For individuals | Maximum Points: 200

Due at Phipps: Friday, March 29 by 5 p.m.

Your Challenge: Plan a "green" school dance or party. What environmentally-friendly practices can you use for your event that meet your requirements and are affordable? Maybe your plan will include sustainable or recycled decorations, a plan to reduce food waste, or awards for the most environmentally friendly outfits! Create a poster or report that explains your plans. Keep in mind the many aspects of event planning: catering, decorating, finances, guest comfort, aesthetics, energy consumption, set-up/clean-up, venue rental, etc. Your report

or poster should include a timeline for your plan and an estimated budget. You can also include drawings or digital designs of the space and other details. This is going to be an awesome party, while still being easy on the environment!

Entry Requirements: Deliver to high school program coordinator at Phipps in person or via certified mail (electronic submission is not accepted):

- Create a poster or written report that contains your plan for a “green” school dance or party.
- Clearly state your goals for the event and the specific details that make it eco-friendly. Include a timeline and estimated budget.
- Please attach a list of the students and/or classes involved in the project.
- Limit report to a maximum of five pages of text, double-spaced, 8.5” x 11” pages. Any pictures or designs included must be within the five page limit.
- Maximum Entry: 1 poster or 1 report
- Challenge Entry Form

School Submits: Challenge Entry Form, 1 poster or 1 report

Challenge 5: Environmental Action

Home, School, or Community

For individuals or groups | Maximum points: 200

Due at Phipps: Friday, May 3 by 5 p.m.

Your Challenge: “Never doubt that a small group of thoughtful committed citizens can change the world; indeed, it’s the only thing that ever has.” -- Margaret Mead

Even small and simple environmental initiatives can affect great change. For this challenge, you are asked to initiate, implement and sustain an activity or activities that promote environmental awareness and conservation within ONE of the three following targets areas: home, school, or community.

Entry Requirements: Deliver to high school program coordinator at Phipps in person or via certified mail (electronic submission is not accepted):

- Create a tri-fold display or written report that documents your school’s efforts to promote environmental awareness and conservation in one out of three areas: within students’ homes, throughout the school or across the community.
- Clearly state 1) the project goal(s), 2) the Five W’s (Who, What, When, Where, Why), 3) how you met your goal(s) and 4) how your project(s) promotes environmental awareness and conservation.
- Please attach a list of the students and/or classes involved in the project.
- Limit report to a maximum of 10 pages of text, double-spaced, 8.5” x 11” pages. Any photographs included must be within the 10 page limit.
- Maximum Entry: 1 poster or 1 report

- Challenge Entry Form

Additional Information: For this challenge, one or multiple environmental action projects done throughout the school year are encouraged. Ideally, this challenge should become an all-school effort, engaging as much of the student body as possible. While creative and original ideas for projects are welcomed, we have also provided some optional examples below.

Suggested Projects

Home:

- Perform a home energy audit and make changes based on your findings.
- Set a recycling goal for your household.
- Educate and encourage your family to become responsible purchasers and consumers.
- Encourage your family to prepare and eat more sustainable (ie., meat-free, locally grown) meals.
- Create a western PA-friendly habitat in your backyard that invites wildlife and minimizes environmental impact.
- Start a household compost.

School:

- Host an environmental documentary at school and donate proceeds to an environmental organization.
- Have a school grounds clean up, being sure to recycle and/or dispose of materials properly.
- Devise a plan to reduce waste at your school. Consider classroom items, energy or food.
- Perform an energy audit at your school and present a plan for improvement to your school board.
- Create a mentoring program where older students can educate younger students about environmental issues.
- Post environmental tips and reminders on posters in visible locations at school.
- Encourage your kitchen and maintenance staff to use environmentally friendly products.
- Host an educational Earth Day event at school.
- Conduct a biodiversity inventory of your school grounds, including plants, birds, butterflies, and others.

Community:

- Volunteer with a local environmental organization.
- Participate in an environmental organization's work project on Earth Day.
- Assist with environmental education or initiatives at a local community center.
- Host a fundraiser and donate money to an environmental cause.
- Write letters about your environmental concerns to local politicians.
- Participate in a citizen science project.

School Submits: Challenge entry form, 1 trifold or 1 report