# Fairchild Challenge at Phipps

2018 – 2019 High School Challenges In-Depth

## Challenge 1: Visual Arts and Writing

**"Shaped by Nature"**
For individuals or small groups (2 – 5 students) | Maximum points: 200 (100 points/submission)
**Due at Phipps: Friday, October 26 by 5 p.m.**

**Your Challenge:** Humans and nature are increasingly thought of as separate from one another. However, humans are a part of nature and function within it. This challenge identifies some of the relationships between biological systems within our human bodies and the broader natural environment.

Choose a human organ or organ system and compare and contrast it with a plant or biological system. While these systems may not be evolutionarily or functionally equivalent, we encourage you to think creatively about the similarities between the two. You can compare and contrast based on one or more of the following:

- **Synergy. (An interaction of two or more systems that creates an effect greater than the sum of the individual effects.)** Example: Compare the functions of human lungs and trees. Human lungs breathe in oxygen and exhale carbon dioxide while plants absorb carbon dioxide and respire oxygen.
- **Similarity.** Example: Compare the human cardiovascular system with a plant's root system. Both deliver water and nutrients to an organism.
- **Human Dependence.** Example: Connect the human stomach with fruits and nuts, because humans need food to survive.

You can focus on any of these examples or explore your own.

Write a 1 – 2 page, double-spaced essay with 1 inch margins and 11 or 12 point font comparing and contrasting the two systems that you choose.
Create a two-dimensional artistic rendering that illustrates the connection between the organ and the biological system by superimposing the system over the organ in some way. The organ or system rendered must be life-sized, although the total size of the artwork should not exceed 16" x 20". Any medium may be used, but the finished work must be **completely two-dimensional and on paper**. This challenge is in connection with work being done by Phipps' Artist in Residence, Ashley Cecil. Ashley's artwork will be displayed beginning January 2019 in Phipps' Welcome Center Gallery. Selected students' work will be exhibited in the Center for Sustainable Landscapes Gallery as part of her residency exhibit.

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

- Write a 1 – 2 page, double-spaced essay with 1 inch margins and 11 or 12 point font comparing and contrasting the two systems that you choose.
- Create a two-dimensional artistic rendering illustrating the connection between the organ and the biological system by superimposing the system over the organ in some way. The organ or system rendered must be life-sized, although the total size of the artwork should not exceed 16" x 20". Any medium may be used but the finished work must be **completely two-dimensional and on paper**.
- Please include the school name and name(s) of the student(s) on the essay and artwork.
- Works Cited must be included with each essay.
- Maximum Entry: 2 essays with 2 accompanying art pieces
- Challenge Entry Form

**School Submits:** Challenge Entry Form, 2 essays with 2 accompanying art pieces

---

## 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 aquatic 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.)* Look up annual precipitation data (in inches) for your area. You can visit NOAA's National Weather Service webpage for Pittsburgh Climate Data at https://www.weather.gov/pbz/pit_records to find this information. Select "Historical Precipitation Amounts by Month" to view historic and current monthly totals as well as the 30 year average. Use this data to calculate the volume of water that has fallen on the impermeable parts of the property so far this year.*

Now create a design for the area that incorporates green stormwater infrastructure. 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 either 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 Rainfall this Year (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 area rainfall data, calculate the amount of water that has fallen on the property so far this 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

---

## Challenge 3: Ecology Data Sheet

**"Invasive Species Infographic"**
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 environment[1]. 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.

An infographic data sheet uses catchy colors and concise graphics to display factual information. These sheets can be a compelling way inspire environmental action. Check out this example (https://www.michigan.gov/documents/invasives/AIS_Infographic_v8_8-5x17_576319_7.pdf) from the Michigan Department of Agriculture. Create an infographic data sheet of your own for a species that is considered invasive in Western Pennsylvania (the species can currently be invasive or predicted to invade in the future). The sheet must be no larger than 16" x 20" and can be made digitally or using any medium. The infographic should contain the following:

- The name of the invasive species.
- A photo or artistic rendering of the species.
- Graphic representations for some or all of the following:
    - Current and historical ranges of the species
    - Estimated population size in the US
    - How and when it came to Western Pennsylvania (or is predicted to arrive)
    - Problems caused by this invasive species: habitat displacement, resource depletion, etc.
    - Current efforts being taken to combat this species
- Actions that citizens can take to stop or reduce the spread of this species
- Works Cited

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

- Create an infographic data sheet that identifies an invasive species in Western Pennsylvania.
- Infographic data sheets should clearly state the species name and include a photo or rendering of the species along with graphic representations for select data.
- Please attach the school name and a list of the students who participated
- The infographic data sheet must be no larger than 16" x 20"
- Works Cited must be included with each sheet
- Maximum Entry: 2 infographic data sheets
- Challenge Entry Form

**School Submits:** Challenge Entry Form, 2 infographics

1. 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 HS [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

**"Take Earth to Prom"**
For individuals | Maximum Points: 200
**Due at Phipps: Friday, March 29 by 5 p.m.**

**Your Challenge:** Plan a "green" prom or party for your school. 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. Prom is going to be tons of fun this year - and 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 "Green Prom."
- 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 eight pages of text, double-spaced, 8.5" x 11" pages. Any pictures or designs included must be within the eight 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 (i.e., 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