



**2016-17 Dream in Green Academy Activities
Elementary Schools
Presented by: www.dreaminggreen.org**

Guidelines

- Schools enrolled in the **Green Schools Challenge** select one activity from #1 - #4
- Schools enrolled in the **WE-LAB** program complete activity #5

October Challenge – Energy Efficiency and Conservation

Activity 1: Community Involvement and Action – Modeling Habitat Loss

Activity Description/Overview

The high consumption of energy in North America affects plant and animal habitats and communities. As population increases, more energy resources are used up which can lead to destruction of vital habitats. Turn the classroom into a forest community and simulate habitat loss due to expanding community needs.

Research

Research the different effects expanding human populations can have on habitats. For example, think about the different forms of energy humans use and how our use of energy affects natural communities of plants and animals (think mining, building pipelines, dams, roads, hydro corridors, power plants, deforestation), and how humans can reduce energy use to reduce our impact.

Take Action

- Complete the Energy Conservation grade 4 activity on page 27 of this document: http://www.ontarioecoschools.org/wp-content/uploads/2014/11/1EN_EconEner1_8FIN.pdf
- The activity includes background information and a short story to set the stage, questions to get the students thinking critically about human energy use and habitat loss, and instructions on how to stimulate a forest community in the classroom that is undergoing habitat loss due to human encroachment.
- The final product will have students graphically represent what happened to their species (cartoon, graph, mural, poster), showing the effect of habitat loss – before, during, and after.

Results

- Submit the monthly challenge submission form to DIG staff detailing how your students completed the activity and what they learned.



- Send pictures/video of your simulated forest classroom to DIG staff.
- Send copies or pictures of students' graphical representation to DIG staff.

Activity 2: Hands on Learning/Reporting or Presentation – Solar Sweet Tea

Activity Description/Overview

The Sun releases heat and light that reaches Earth and provides us with an abundance of energy. Solar energy can be converted into other types of energy, like thermal energy! Did you know that a container filled with cold water and left exposed to the sun will increase in temperature to about 130 degrees Fahrenheit? In this activity, students will use the Sun's energy to make 'solar sweet tea'.

Research

Students should begin by learning about the Sun and the solar energy it provides. Students should also research various types of renewable and non-renewable. What is solar energy? How is it used? What is thermal energy? How is solar energy able to heat water enough to brew tea? How is using the sun different than making tea at home on the stove?

Action

- Gather materials: one liter jars, tea bags, water, sugar, spoon, cups
- Fill each one liter jar with water and a tea bag. Place jars in the sun for one to three hours.
- Explain how the sun is heating the water. Have students draw a diagram of the tea brewing using arrows to indicate how the tea is being heated by the sun.
- When the tea is dark enough, take tea bags out and add ½ cup of sugar to each jar. Let cool.
- Have a tea party and have students share their diagrams with the class!
- Discuss with students how the Sun can be used as an alternative and renewable source of energy for their homes, schools, and daily lives.

Results

- Submit the monthly challenge submission form to DIG staff detailing how the students completed the experiment.
- Submit pictures of the students' diagrams and the students performing the experiment to DIG staff.



*Experiment from:

[file:///C:/Users/Dream%20in%20Green%203/Downloads/SolarSweetTea.Lesson%20\(1\).pdf](file:///C:/Users/Dream%20in%20Green%203/Downloads/SolarSweetTea.Lesson%20(1).pdf)

Activity 3: Theatrical/Multi-media – Mad For Renewable Energy

Overview/Activity Description

This activity will challenge students to practice language, vocabulary, and grammar while learning about renewable energy. Renewable energy is generally defined as energy that is collected from resources which are naturally replenished on a human timescale. Students will research different types of renewable energy and then make their own Mad Libs with stories about renewable energy.

Research

Mad Libs is a phrasal template word game where one player prompts others for a list of words (nouns, verbs, adverbs, or adjectives) to substitute for blanks in a story, before reading the – often comical or nonsensical story – aloud. Students will create their own Mad Libs regarding renewable energy, so they should begin by researching the different types of renewable energy. Some examples are wind and solar, but there are others to be discovered. What do you think is the best type of renewable energy? Why is renewable energy better than traditional forms of energy? What makes it renewable? How efficient is it? Where does it come from? How does it work?

Action

- After researching and learning about renewable energy, students should become familiar with Mad Libs, if they are not already. Find free Mad Libs here:
 - <http://www.glowwordbooks.com/blog/category/kids-online-mad-libs/>
 - <https://www.eduplace.com/tales/>
- Then students will create their own Mad Libs, telling a short story that has to do with renewable energy. When finished, students should exchange their Mad Libs and complete a couple that have been created by their peers.
- To create a Mad Lib:
 - Choose a theme. Examples include: what is renewable energy, solar energy, benefits of renewable energy, geothermal energy, problems with non-renewable energy.
 - Write out a short story that relates to your chosen theme.
 - Remove some important words and identify the type of word it is (noun, verb, adverb, adjective) and put that in the blank.
 - Type or write up your Mad Lib with the blanks and share with the other students.



- Links to 'create your own Mad Lib' resources:
 - <http://theinquisitivemom.com/2016/03/make-your-own-mad-libs.html>
 - <https://www.teachervision.com/reading-and-language-arts/printable/31845.html>

Results

- Send the monthly challenge submission form to DIG staff detailing how your students researched renewable energy and then created their own fun Mad Libs.
- Send copies of some of your students Mad Libs to DIG staff.
- Send pictures and video of students partaking in the activity.

Activity 4: Create Your Own Energy Efficiency and Conservation Activity

Overview

This activity is intended for Green Team members to use their creativity and apply their leadership skills to design and lead an energy efficiency and conservation project of their choosing.

Guidelines

- Students work in groups to design an activity that will enhance their understanding of energy efficiency and conservation or the relationship between energy and water.
- Make sure the activity:
 - 1) identifies a problem area,
 - 2) helps solve a problem,and
 - 3) leads to energy efficiency or conservation and/or greater awareness of climate change
- Remember there are points to be earned and prizes to be won. So make sure the information is resourceful, creative and has an effective message.
- Get 1 bonus point for creating your own activity

WE-LAB – Activity 5: Energy Around the World

Activity Description/Overview

Energy and water are intrinsically linked through the water-energy nexus. Producing energy requires water, while treating and delivering potable (drinking) water requires large amounts of energy. For example, a person uses four times more water in energy consumed by watching TV and turning on lights than by direct water use like taking a



shower, brushing their teeth or washing dishes. Students may be familiar with how energy (and therefore water) is used in the United States, but what about around the world? Countries use many energy resources at different levels of consumption depending on the climate, available resources, level of industrialization, economic status, and culture. In this activity students will be introduced to different ways that people in other countries produce and consume energy by providing information on a representative sample of countries throughout the world.

Research

This activity is retrieved from www.need.org, which provides all the background information students and teachers will need to complete it. Begin by having students get a basic understanding of the different types of energy, consumption, and efficiency by looking over this guide:

<http://www.need.org/files/curriculum/guides/Intermediate%20Energy%20Infobook.pdf>

. There is more information than you could ever possibly need, so you can decide on your own or with your students what is the most important information to review. Then read over the 'Energy Around the World' activity found here:

<http://www.need.org/files/curriculum/guides/Energy%20around%20the%20World.pdf> and prepare accordingly.

Take Action

- Students and teachers complete the activity detailed in the link above.
- Each student will be assigned a different country, and then students will be grouped by continent.
- Students will give a short presentation on their countries energy profile. As well as short group presentations on their continents energy profile. Identifying the sources of energy and possible uses for each, explaining how countries use energy differently, citing possible reasons for differences (like geography, finances, availability, culture, politics, etc.).
- The teacher or Green Team leader will initiate the activity by presenting on Antarctica, Australia, and finally the United States' energy profile. These presentations will show the students how they should present, and provide them with information to compare their country to.
- Give students time to research and gather their country and continent information, using the profiles provided in the activity as well as outside resources as needed.
- Create presentations to give to the class or school.



- Be sure to discuss how water and energy use are connected, as well as ways to conserve water and energy, not just in the U.S. but in other countries. Are there ways to conserve in the U.S. that are not as practical in other countries? And vice-versa?

Results

- Submit the monthly challenge submission form to DIG staff detailing your students experience with researching the energy profiles of other countries.
- Submit pictures/video or copies of students presentations to DIG staff.

November Challenge – Waste Reduction and Recycling

Activity 1: Community Involvement and Action – Waste Not, Want Not

Overview/Activity Description

Every year, Americans create 254 million tons of trash. 167 million tons of that ends up in landfills and incinerators, but it doesn't have to! Students will attempt to have a 'Zero Waste Day'. Pick a day where students will throw all of their garbage/waste into a single Ziploc bag. This Ziploc bag will be the only garbage they are allowed to generate that day forcing students to think about how they can reduce, reuse, recycle and rethink the materials they use.

Research

Have students research the amount of waste material generated worldwide, in the United States, in Florida, and finally in Miami Dade County. Then have students reflect on how much waste they generate and ways they can reduce the amount they create. Think about the 5 R's of Sustainability: Refuse, Reduce, Reuse, Repurpose and Recycle.

Take Action

- Have each student bring or provide a Ziploc plastic bag. The size depends on how serious you want to get about creating little to no waste.
 - If you'd like to be even more sustainable have students reuse a grocery bag or use a small reusable fabric bag.
- Instruct the students that anything they would throw into a garbage can (not recycling bin) that day should be put into their bags.
- This will allow students to physically see the amount of waste they generate each day. This will also challenge the students to think about other options for their waste.
 - Refuse: Do you need to use that material in the first place?



- Reduce: How much material do you actually need?
- Reuse: Can you reuse the material before throwing it out?
- Repurpose: Can the material be made into something else?
- Recycle: Can the material be recycled?

Results

- Have students reflect on their experience. Did they find it difficult to generate so little waste? Did they come up with any creative solutions to minimize their waste? Did the activity inspire them to think about trash in a new way?
- Take photos of the students with their bags of garbage and submit to DIG staff.
- Submit reflections to DIG Staff.

Activity 2: Hands on Learning/Reporting or Presentation – DIY Paper

Activity Description/Overview

The papermaking industry once obtained pulp from virgin forests and old-growth trees, which take hundreds of years to grow and are virtually nonrenewable. Although the industry has been moving towards renewable forestry plantations for virgin pulp paper, the papermaking process still uses many toxic chemicals and high amounts of water and energy to produce new paper. Using recycled paper saves trees, energy, water, and landfill space; protects forests, watersheds, and ecosystems; and produces less pollution than virgin paper. In this activity students will learn about the benefits of using recycled paper and how to make their own.

Research

Begin by researching how the virgin papermaking industry can negatively affect the environment. Research the virgin papermaking process and how recycled paper is made, compare and contrast them. Discuss how students can help save forests and protect the environment by not wasting paper and using recycled paper instead. Some resources are included below.

- How paper is made: <https://www.youtube.com/watch?v=7IP0Ch1Va44>
- Environmental impacts: 1. <https://www.youtube.com/watch?v=ljcsryVPMuc>; 2. <http://environment.nationalgeographic.com/environment/green-guide/buying-guide/paper/environmental-impact/>; 3. <http://conservatree.org/learn/EnvirolIssues/TreeStats.shtml>
- Recycled paper: <http://www.conservatree.org/paper/PaperTypes/RecyBrochure.shtml>



Action

- After learning about the papermaking process and its impacts on the environment, the students will then make their own recycled paper.
- There are a few different ways to make your own paper but the basic process is the same:
 - Create a pulp by tearing the old paper into small scraps and adding water.
 - Mix with a blender, fork or egg beater.
 - Spread the pulp in a way that allows for the excess water to be removed.
 - Let dry.
 - Use your new recycled paper for art projects, classwork, or to make signs encouraging other students not to waste paper!
- These are some resources for making your own paper:
 - <http://tinkerlab.com/how-to-make-paper/>
 - <http://makezine.com/projects/papermaking-101/>
 - <https://www.youtube.com/watch?v=18VLIKA5QV0>
 - <http://www.wikihow.com/Make-Paper>

Results

- Send the monthly challenge submission form to DIG staff detailing how the students learned about the papermaking process and made their own recycled paper.
- Submit pictures and video of the activity to DIG staff.

Activity 3: Theatrical/Multi-media – Do’s and Don’ts of Recycling

Overview/Activity Description

Recycling is a process that depends on three important steps: collecting, re-manufacturing and purchasing products made with recycled content. Each step is essential for the recycling industry to succeed and in order for your materials to be recycled it is imperative that you recycle correctly. Students will research the ins and outs of recycling in Miami Dade County, then create posters or flyers to inform the public on the correct way to recycle. (Information from Miami Dade Solid Waste Management)

Research

Although many people may recycle they often recycle the wrong things, which can negatively impact the whole process. Have students research the recycling process. What exactly is recycling? What can and cannot be recycled (specifically focus on the problem of plastic bags)? Why? What happens to recyclable materials? What should you do with your recycling cart? You can even have a speaker from Solid Waste Management come and give a presentation on recycling by emailing



pwwm@miamidade.gov or have DIG staff put you in contact with someone.

Helpful information can be found here:

<http://www.miamidade.gov/solidwaste/recycling.asp>

Action

- After students have researched and discussed all the aspects of proper recycling they will create an awareness campaign using posters, flyers, or pamphlets designed to inform the community about the do's and don'ts of recycling.
- The campaign materials should highlight what can and cannot be recycled, why, and what to do with the recycling cart.
- Try to make materials as fun and engaging as possible in order to reach community residents.
- The students' awareness campaigns may be used as part of a competition with Miami Dade County Solid Waste Department.
- After the campaign, make sure to recycle the materials used! Even better if the students used recycled materials in the first place.

Results

- Submit monthly submission form to DIG staff detailing your activities.
- Submit pictures of the awareness campaign materials to DIG staff.

Activity 4: Create Your Own Waste Reduction and Recycling Activity

Overview

This activity is intended for Green Team members to use their creativity and apply their leadership skills to design and lead a waste reduction and recycling project of their choosing.

Guidelines

- Students work in groups to design an activity that will enhance their understanding of waste reduction and recycling or the relationship between energy, water and waste.
- Make sure the activity:
 - 1) identifies a problem area,
 - 2) helps solve a problem,and
 - 3) leads to energy efficiency or waste reduction and/or greater awareness of climate change
- Remember there are points to be earned and prizes to be won. So make sure the information is resourceful, creative and has an effective message.
- Get 1 bonus point for creating your own activity



WE-LAB – Activity 5: Wasting Away

Activity Description/Overview

By now, students should be familiar with what can be recycled, reused, repurposed, or thrown away. But what about electronics and chemicals? Electronic waste, or e-waste, is a term for electronic products that have become unwanted, non-working or obsolete, and have essentially reached the end of their useful life. Chemical waste is waste generated from harmful chemicals. Many people don't know how to properly dispose of electronic and chemical waste which can lead to negative impacts on the environment. In this activity, students will create an awareness campaign for E- and chemical waste.

Research

Students should begin by researching what is considered chemical and electronic waste. What makes these things harmful to the environment? Think about how it can impact the water supply and energy consumption. Globally, what is happening to electronic and chemical waste? How can the 7 R's of recycling be applied to electronic and chemical waste? What should be done with this waste both globally and in your community?

Some resources:

<http://www.miamidade.gov/solidwaste/electronics-recycling.asp>

<http://greenermiami.com/2011/01/free-electronics-recycling-in-miami/>

<http://ecomb.org/programs/recycling-program/e-waste-recycling/>

<http://www.miamidade.gov/solidwaste/home-chemical-disposal.asp>

<http://www.miamidade.gov/solidwaste/chemical-collection-centers.asp>

Take Action

- After researching electronic and chemical waste, students will put together an awareness campaign highlighting the environmental impacts and the proper disposal methods.
- The campaign can be posters, flyers, a video, school announcement, or a skit.
- Be sure to answer these questions:
 - What is it?
 - What are the associated problems? How does the waste impact the water supply and energy consumption?
 - What can and should you do with it?
- Bonus: Set up a drive for students/parents/teachers to bring in their E-waste and/or chemical waste and dispose of it properly.



Results

- Submit the monthly challenge submission form detailing the students' research and awareness campaign to DIG staff. Include if you organized a waste collection.
- Submit pictures/video of the activity.

December Challenge – Water Conservation

Activity 1: Community Involvement and Action – The Everglades, Water, and You

Activity Description/Overview

The water cycle (or the hydrologic cycle) is the journey water takes as it circulates from the land to the sky and back again. The Everglades' unique ecosystem is an important part of the hydrologic cycle, or at least it used to be. The landscape of the Everglades system used to store water naturally and consisted of a complex system of plant life, linked by water, and provided a variety of wildlife habitats. However, due to the increased need for water by our growing population and the dwindling wetland areas, the delicate balance of the Everglades system has been upset causing major threats to both the quantity and quality of southern Florida's water. Students will make posters illustrating the roll of water in the Florida Everglades, as well as ways in which human actions impact the quality and quantity of our water resources.

Research

Students should begin by learning about the hydrologic cycle and how it functions within the Everglades system. Have students research how the Everglades system historically stored and filtered water across Florida. Finally, educate students on the Biscayne aquifer and the problems associated with unsustainable water use. Why is the Everglades system important to humans as well as wildlife? How have human actions altered it? What is being done to fix it? What can you do to help? Check out this great resource from the South Florida Water Management District about the Everglades: http://www.sfwmd.gov/portal/page/portal/xrepository/sfwmd_repository_pdf/everglades_american_treasure.pdf

Take Action

- Once students have a good grasp on the Everglades ecosystem and its importance to our dwindling water resources, they should create posters illustrating these concepts.



- Posters can show waters natural journey through the Everglades, ecosystem services the Everglades provide, alterations by humans, conservation initiatives, etc. Include tips on how you can conserve water!
- Post the students work around the classroom/school in order to spread awareness about the importance of the Everglades and water conservation.
- Extra step: Take a field trip to the Everglades so students can see first-hand how this unique ecosystem functions. Or invite a guest speaker to talk about this biologically rich ecosystem.

Results

- Submit the monthly challenge submission form to DIG staff detailing your students' efforts in understanding the Everglades and water conservation.
- Send pictures of students' posters to DIG staff.

Activity 2: Hands on Learning/Reporting or Presentation – Water Watchers

Activity Description/Overview

Schools use an average of 22,284 gallons per day of water. Between the many sinks, toilets, locker room showers, outdoor irrigation, cafeteria, cleaning of school grounds and swimming pools – schools use up a lot of water! Inefficient water use also wastes energy as well as money. So why not save water where you can? Students will investigate their school looking for places water is being wasted and identifying ways to conserve water.

Research

Students should begin by researching the importance of water conservation. Clean water is quickly becoming the world's most precious resource. According to the United States Environmental Protection Agency the need to conserve water is becoming more and more critical as the U.S. population doubled over the past 50 years. What are the various ways you can help to save water in your school as well as at home? What do you think wastes the most water at school? How can you spread awareness about saving water at school?

Action

- Begin by creating a list of places and things that might use or waste water like the bathrooms, cafeteria, and water fountains. Use this checklist from the South Florida Water Management District to help:
<https://www.swfwmd.state.fl.us/conservation/waterwork/checklist-school.html>
- Students will then explore the school identifying all the items on their list. It would be helpful if a facilities staff member or administrator went with them to recognize the changes that need to be made.



- Is everything in working order? Does the water run for too long on the sinks with sensors? Are there any leaks? Is the dishwasher full? Is the cafeteria staff turning off the water when not using it? Are the sprinklers running at the right time of day? Are the showerheads, faucets and toilets water efficient?
- After the school investigation, students will create signs or reminders to place around the school to encourage water conservation behaviors. Make announcements as well detailing the importance of saving water!

Results

- Submit the monthly challenge submission form to DIG staff detailing the students' water use investigation.
- Send pictures of students' flyers and reminders to DIG staff.

Activity 3: Theatrical/Multi-media – Navy Showers

Overview/Activity Description

Although 70% of the Earth is covered by water, only less than 1% of that water is useable to us and it is only replenished by rain and snow. With the world's population increasing at an alarming rate, humans are using up freshwater faster than it can naturally be replenished, so conserving our precious water resources is as important as ever! There are many different ways to save water at home, school, and work but in this challenge students will test out Navy showers.

Research

Students should research and learn about the importance of water conservation before beginning the activity. Why should we conserve water? Why can't we just make more water? How can we conserve water? How much water does the average person use every day? How much water do you use when you shower?

Action

- Students will first go over what a Navy shower is versus taking a short regular shower.
- A Navy shower is a method of showering that allows for significant water and energy conservation by turning off the flow of water while lathering. Turn the water off to soap up and wash hair, then turn the water back on to rinse off. Total water use time should not exceed 1 minute, even though you may be in the shower for as long as you want.
- Have students experiment with Navy showers at home.
- Then students will calculate how much water they use when they shower normally, when they take a five minute shower, and when they take a navy shower.



- Students should then reflect on their navy shower experience. Did they like it? Will they use the method again? How does it compare to taking a five minute or a regular shower?

Results

- Submit pictures of students' water use calculations for the various types of showers to DIG Staff.
- Submit students' reflections to DIG Staff.

Activity 4: Create Your Own Water Conservation Activity

Overview

This activity is intended for Green Team members to use their creativity and apply their leadership skills to design and lead a water conservation project of their choosing.

Guidelines

- Students work in groups to design an activity that will enhance their understanding of water conservation or the relationship between energy and water.
- Make sure the activity:
 - 1) identifies a problem area,
 - 2) helps solve a problem,and
 - 3) leads to water conservation and/or greater awareness of climate change
- Remember there are points to be earned and prizes to be won. So make sure the information is resourceful, creative and has an effective message.

Get 1 bonus point for creating your own activity

WE-LAB – Activity 5: From the Sky to Your Cup

Activity Description/Overview

Less than 1% of all the water on Earth is useable freshwater for human consumption, and it is only naturally replenished by rain and snow. But how does water get from the sky to your cup? Furthermore, how do we purify the water in order to make it safe for drinking? Methods of water purification include physical processes (filtration, sedimentation, and distillation); biological processes (slow sand filters, biologically active carbon); and chemical processes (flocculation, chlorination, electromagnetic radiation like UV light). In this activity students will experiment with solar distillation and explore other ways in which water is purified.



Research

This activity involves two parts: a required experiment with solar distillation and then further research on other methods of water purification required for secondary schools but optional for elementary schools. Begin by having students research and discuss the importance of clean water, as well as where it comes from and how we get it. Then look into the various methods of purifying the water to make it acceptable for human consumption. How is energy involved in the various purification processes? In part one, solar energy and the hydrological cycle itself is used to make clean water from dirty water.

Take Action

- **Part 1:** After researching the various ways in which humans get their fresh drinking water, go to the link below and complete the activity and solar distillation experiment.
 - <http://www.peacecorps.gov/wvs/lesson-plans/building-solar-still/>
 - Watch this video to see how Peace Corps Volunteers use solar distillation to help bring freshwater to Cape Verde.
<http://www.peacecorps.gov/wvs/videos/sol-soul/>
 - Answer the questions in steps 1-6 on Day 1 as well as questions 1-4 on Day 2 of the activity procedures.
- **Part 2:** Research the other methods in which water is purified and create a PowerPoint to present to the class. You can focus on the methods listed above or find other ways in which water is purified.
 - Provide examples of where these methods are used.
 - Can waste water be purified by these methods too?

Results

- Submit the monthly challenge submission form to DIG staff detailing how your students researched water purification and experimented with solar distillation.
- Submit pictures/video of the experiment, students' reflections, and copies of the presentations on other methods of water purification to DIG staff.

January Challenge – Alternative Transportation

Activity 1: Community Involvement and Action – What Are You Breathing?

Activity Description/Overview

Citizen Science is the public's involvement in inquiry and discovery of new scientific knowledge. A citizen scientist is someone who doesn't necessarily have a science



background, but still contributes his or her time, effort, and resources towards scientific research in collaboration with professional scientists or alone. In this activity the students will become citizen scientists as they participate in “Air Visual: The Air Pollution Monitoring Project” found on the Citizen Science project database www.SciStarter.com.

Research

First, students should become familiar with what Citizen Science is. As a newly emerging field of science, there is a lot of information online, as well as many different projects students may find interesting. Then students should research air pollution. What is air pollution? What causes it? What are the different types? What are the national air quality standards? As this month’s theme is alternative transportation, have students focus on how different methods of transportation can affect air quality.

Take Action

- Go to: <http://scistarter.com/project/1477-AirVisual%3A%20The%20Air%20Pollution%20Monitoring%20Project>
- Get started by joining SciStarter or by acquiring your air quality monitor directly from: <https://www.indiegogo.com/projects/airvisual-node-the-world-s-smartest-air-monitor#/>
- Price on SciStarter is \$149. Price on Indiegogo is \$169. Consider applying for a Green Leadership Grant from Dream in Green.
- Run the air quality monitor throughout the day in the classroom or outside.
- Record the activities that made your air quality worsen.
- Submit your findings to: <https://airvisual.com/contact>
 - Findings will be posted on their website with credit to you in an effort to spread awareness about the sources of air pollution in the home, office or classroom.

Results

- Send the monthly challenge submission form to DIG staff detailing how the Green Team used the air quality monitor as well as the findings submitted to airvisual.com.
- Send pictures of students setting up the monitor, experimenting with different activities that may affect the air quality, and of your results.



Activity 2: Hands on Learning/Reporting or Presentation – Redo Your Route!

Activity Description/Overview

Transportation by automobiles increases traffic congestion and air pollution, both locally and globally. The transportation end-use sector is one of the largest contributors to U.S. greenhouse gas (GHG) emissions including carbon dioxide, methane, nitrous oxide, and various hydrofluorocarbons. Carpooling, using public transit, walking or bicycling just one day a week for a year can save you more than \$500 dollars in total driving costs as well as reducing your GHG emissions. In this activity, students will re-evaluate a route they take regularly to determine how utilizing alternative transportation methods will save them money and reduce emissions.

Research

Students should research what alternative transportation means. What are the various methods? What are some alternative fuels? What are the benefits of using alternative transportation? What are the problems associated with traditional transportation methods? How much GHG emissions are produced from the various forms of transportation?

Action

- Students will first pick a route they take regularly and redo it. This can be the route and method of transportation they use to get to school, home, a friend's house, the parents' workplace, etc.
- Have students calculate how much money and fuel is used for this route, as well as the amount of GHG produced. Some resources are listed below, but feel free to use other calculators or resources to determine these numbers.
 - <http://calculator.me/vehicle/transportation-savings.php>
 - <https://www3.epa.gov/otaq/climate/index.htm>
- Next students will 're-do their route' by coming up with 1 to 2 alternative ways to get to their destination using alternative transportation methods or fuels.
- Calculate how much money, fuel, and GHG emissions are saved by using this alternative route.

Results

- Submit the monthly submission form to DIG staff detailing how students completed the activity.
- Submit pictures of students' calculations as well as their original and alternative routes. Routes can be written out, drawn, animated, etc. Don't be afraid to get creative with it!



Activity 3: Theatrical/Multi-media – Alternative Street Art

Overview/Activity Description

Transportation is a basic part of our daily lives, but cars have a significant impact on the environment. Cars emit carbon dioxide and other fumes that pollute the air, are bad for our health, and contribute to climate change. However, there are other ways for people to make smart transportation choices: use public transportation, carpool, bike or walk. Students will organize and participate in a street/sidewalk art competition focusing on alternative transportation awareness.

Research

Engage in a discussion about the different modes of transportation and which are less polluting to the environment. Which transport should be encouraged for a healthier and cleaner planet? You can also discuss the benefits of using cars less often: decrease dependence on oil, make our air cleaner, reduce carbon emissions, keep streets safer, promote exercise, save money, and support transport innovation.

Action

- This is the chance to put your students' creative skills to work! Students will organize a street art festival at their school that highlights alternative transportation.
- Students can work individually or in groups to make a sidewalk or street art piece that focuses on raising awareness for alternative transportation. The street art festival can be a competition among students or just a fun activity for everyone.
- Art pieces can include fun facts and benefits related to alternative transportation methods, the negatives of fossil fuel consumption and standard modes of transportation, or even ideas for transportation methods of the future.

Results

- Submit the monthly challenge submission form to DIG staff detailing the street art festival your students put on.
- Submit pictures and/or video of the art pieces and festival to DIG staff.

Activity 4: Create Your Own Alternative Transportation Activity

Overview

This activity is intended for Green Team members to use their creativity and apply their leadership skills to design and lead an alternative transportation project of their choosing.



Guidelines

- Students work in groups to design an activity that will enhance their understanding of alternative transportation or how it relates to energy.
- Make sure the activity:
 - 1) identifies a problem area,
 - 2) helps solve a problem,and
 - 3) leads to the use of alternative transportation and/or greater awareness of climate change
- Remember there are points to be earned and prizes to be won. So make sure the information is resourceful, creative and has an effective message.

Get 1 bonus point for creating your own activity

WE-LAB – Activity 5: Transportation Fuels Debate

Activity Description/Overview

All transportation fuels have economic, environmental, and societal advantages and disadvantages. Many factors go into deciding what transportation fuels are used either personally or for fleet vehicles. Some factors are the economic and environmental impacts, as well as societal needs, personal beliefs, and changes to the quality of life. In this activity students will investigate the economic and environmental advantages and disadvantages of different transportation fuels, and then represent their fuels in a debate-style game.

Research

Students should start by gaining an understanding of what transportation fuels are and how it relates to alternative transportation. This activity will focus on: biodiesel, diesel, electricity, ethanol, gasoline, hybrid electric, hydrogen, natural gas, and propane. A great resource for information on various transportation fuels can be found here:

<http://www.need.org/files/curriculum/guides/Transportation%20Fuels%20Infobook%20web.pdf>

What are other forms of transportation that don't involve fuels? How is water used in the production and consumption of each of the transportation fuels?

Take Action

- The activity to be completed can be found here:
<http://www.need.org/files/curriculum/guides/TransportationFuelsDebate.pdf>
- The activity provides a teacher guide, the debate game board, transportation fuel debate sheets, and instructions for completing the activity.



- Students will be assigned in groups to represent different transportation fuels and then complete a debate sheet to help them learn about their fuel.
- Students will present the advantages and disadvantages of their fuels to a panel of judges in debate style in order to try and move up the game board.
- The activity suggests having two debates, one for personal vehicles and one for fleet vehicles. You are only required to complete one debate, but feel free to have both if you can! The two debates focus of different fuels.
- After the debate be sure to 'Interpret the Debate Results' with the questions on page 6.
- Additionally, have your students discuss other modes of alternative transportation that do not involve fuels. How do these compare with the environmental and economic impacts of transportation fuels?
- Go one step further by investigating how water is involved in the processes of the various transportation fuels. How is water used to make the fuel? How much water is used? What is better: saving water or avoiding fossil fuel use and emitting CO₂? Students may quickly realize that there is not always a clear, perfect answer.

Results

- Submit the monthly challenge submission form to DIG staff detailing the students' research and debate on transportation fuels.
- Submit pictures/video of the debate game.
- Submit pictures or copies of students' reflections/short essays interpreting the debate results, as well as the questions about alternative transportation and water use listed above.

February Challenge – Green Living

Activity 1: Community Involvement and Action – Eco-Friendly Future

Activity Description/Overview

The buildings in which we live, work, and play protect us from nature's extremes, yet they also affect our health and environment in countless ways. Green, or sustainable, building is the practice of creating and using healthier, resource-efficient models of demolition, construction, renovation, operation, and maintenance. Students will learn about green building principles and then create their own diorama (an architectural model) of a green building or green city of the future (the next 50-100 years).



Research

Students will begin by learning what ‘green’ building entails. What are the impacts of a built environment (meaning building homes, buildings, and cities)? How does green building reduce those impacts? What are components of a green building? What are green building types? Why should you build green? Finally, have students research some ideas for the future of buildings and cities. Some interesting TED Talks on green buildings are listed below and more information about green buildings can be found here: <https://archive.epa.gov/greenbuilding/web/html/>

- Catherine Mohr “The tradeoffs of building green”
- Dan Phillips “Creative houses from reclaimed stuff”
- Michael Pawlyn “Using nature’s genius in architecture”
- Leisha John “White roofs for green schools”
- Dream in Green’s co-founder Nick Gunia “Greening schools one student at a time”

Take Action

- After students understand how and why to build green, they will create their own green building or city diorama (or 3D architectural model).
- Models should be futuristic in design, meaning they don’t have to adhere to today’s normal standards of building. Get creative!
- Dioramas should showcase attributes of a green building and highlight ways the building or city design address the problem of sustainability.
- Display the students work around the classroom or school for other students, teachers, and parents to see.

Results

- Send the monthly challenge submission form to DIG staff detailing how the students learned about green buildings and made their dioramas.
- Send pictures/video of the models to DIG staff.

Activity 2: Hands on Learning/Reporting or Presentation – Green Field Trip or Guest Speaker

Activity Description/Overview

Students will be able to see first-hand what makes a green building or a green career! In this activity students will either take a field trip to a STEAM facility or ‘green’ business, or have a guest speaker talk about green careers or green buildings.

Research

This activity focuses on ‘Green Living’ which includes topics like STEAM or environmentally friendly careers as well as sustainable or ‘green’ development and buildings. Introduce the idea of living green to students, decide a topic to focus on and whether you’d like to go on a field trip or have a guest speaker. Once the decision has



been made, have students perform background research on the facility or speaker. Brainstorm questions you can ask during the field trip or lecture.

Action

- Field trip:
 - Set a time frame when you can arrange for a field trip.
 - Appropriate permission slips will need to be obtained from students.
 - If you need help choosing a destination, contact DIG staff for a list of contacts.
 - Create excitement about the trip by researching your destination.
 - After the field trip, have students recall the event by writing in the journals or writing a paper according to grade level.
- Guest speaker:
 - Set a time frame when you can host a green professional at your school.
 - Contact DIG staff for a list of green professionals available to visit your school.
 - Create excitement about the visit with your students – ask them to think of green jobs prior to your green professional visiting.
 - After the speaker, have students recall the event by writing in their journals, interviewing the professional, or writing a paper appropriate to grade level.

Results

- Submit the monthly challenge submission form to DIG staff detailing what your students did for the field trip or guest speaker.
- Submit pictures and video of the event and copies of students' reflections to DIG staff.

Activity 3: Theatrical/Multi-media – Story Time

Overview/Activity Description

Literature often contains important themes and life lessons, even about sustainable development! The students will use Dr. Suess' story *The LORAX* to introduce and understand the concept of sustainable development through a reading activity. The fictional story is about a man whose activities abused the environment and what he learned from his experience. Students will use the reading activity found here:

<http://tpwd.texas.gov/education/resources/resources/lesson-plans/ecology/THE-LORAX-and-SUSTAINABLE-DEVELOPMENT.pdf>



Research

Before students read the story and answer the associated questions, they should become familiar with the concept of sustainable development. The activity in the link above includes information about the four basic parts of sustainable development – human needs, technology needs, economic needs, and environmental needs. Research further by looking at sustainable development techniques that can be found in your home, school, and neighborhood.

Action

- After students have researched various attributes of sustainable development, they should read the story *The LORAX*.
- Then students should complete the associated activity found in the link above. The activity consists of questions that encourage the students to think critically about the story and how it applies to the environment and sustainable development.
- After students have completed the activity, discuss their answers as a group and reflect on how a story like *The LORAX* applies to real life.

Results

- Submit the monthly challenge submission form to DIG staff detailing the students' experience with the sustainable development reading activity.
- Submit copies of the students' answers and reflections to DIG staff.

Activity 4: Create Your Own Green Living Activity

Overview

This activity is intended for Green Team members to use their creativity and apply their leadership skills to design and lead a green living project of their choosing.

Guidelines

- Students work in groups to design an activity that will enhance their understanding of green living, particularly focused on green buildings or green careers.
- Make sure the activity:
 - 1) identifies a problem area,
 - 2) helps solve a problem,and
 - 3) leads to the adoption of green living and/or greater awareness of climate change
- Remember there are points to be earned and prizes to be won. So make sure the information is resourceful, creative and has an effective message.

Get 1 bonus point for creating your own activity



WE-LAB – Activity 5: Green Career Goals

Activity Description/Overview

According to the United Nations Environmental Program a green job is work in agricultural, manufacturing, research and development, administrative, and service activities that contribute(s) substantially to preserving or restoring environmental quality. Students will research different types of careers in sustainability which may include the renewable and solar energy industry, recycling, green building, landscapers, agriculture, and more. Other examples include but are not limited to scientists, engineers and manufacturing, as well as non-profit, government and education jobs.

Research

Students should begin by researching and discussing the various aspects of green careers. What is the definition of 'green' or sustainable careers? What makes it a green career? What are some green jobs? How can some careers that are not considered 'green', be made more sustainable? Can you think of any jobs that may be created in the future that are sustainable careers?

Take Action

- Each student should choose a green career they are interested in or would like to have in the future. The job does not have to be one that exists now.
- **Elementary:** Students will make their own business cards for their ideal green career. Get creative! Use recycled materials, have cartoons and pictures, incorporate elements from their career, etc. Business cards should convey the general idea of their green career and job description.
- **Secondary:** Students will pretend they are going to apply for a job within their ideal green career field. They will create a mock resume to be used when applying to the position.
 - This is an opportunity for students to gain resume building as they start venturing out into the job market.
 - Discuss some important elements that good resumes have as well as elements that are required on all resumes. How should they be organized? What should you not put on a resume?
 - Students should research what type of education and experience is required as well as what skills are preferred for the career, then create a mock resume that would be suitable for the job application.
 - Resumes can include actual experience the students have, things they may be doing in the future (like college, volunteering, or work), and made up



experiences. The activity is designed to get students thinking about what it might take to gain a job in their ideal field.

Results

- Submit the monthly challenge submission form to DIG staff highlighting how the students created their business cards or mock resumes.
- Send pictures or copies of the business cards and resumes to DIG staff.

March Challenge – Food Efficiency

Activity 1: Community Involvement and Action – Act Locally, Think Globally

Activity Description/Overview

Organic, local, and sustainable foods are very popular these days. Out-of-state produce found in your local grocery stores is often picked prematurely in order to survive long hauls, hampering its quality and flavor often. Additionally, consuming from out-of-state leaves a number of local farms that grow the same items much closer to home out of the supply chain. In this activity students will visit a farmers market or host their own, while learning the benefits of eating locally.

Research

Students will begin learning about food sustainability by learning about farmers markets and locally grown foods. What does eating locally mean? What are the benefits of eating locally grown food? What are the negatives of eating imported foods? What are farmers markets? How does going to farmers markets for your produce benefit food sustainability? Check out some of the resources below:

https://www.ted.com/talks/birke_baehr_what_s_wrong_with_our_food_system

http://www.ted.com/talks/roger_doiron_my_subversive_garden_plot?language=en

<http://www.miamiherald.com/living/article1982321.html>

<http://greenyourplate.net/eat-local/>

Take Action

- The Green Team will visit a local farmers market or host their own farmers market at school!
- If visiting a farmers market, talk with some of the vendors there. Where does their food come from? How is it grown? What makes it sustainable? Why do they choose to sell their food at farmers markets?
- If hosting your own farmers market, invite vendors to the school to sell their food or other locally made products. If students and their families have a garden



or if the school has a garden, sell the produce for fundraising! If students or their families make their own products (like bracelets, decorations, purses, etc.) sell those as well!

- Create an awareness campaign for eating and buying locally for your school or community.

Results

- Submit the monthly challenge submission form to DIG staff detailing the farmers market your students visited or hosted.
- Submit pictures and videos to DIG staff of the farmers market and of your awareness campaign.

Activity 2: Hands on Learning/Reporting or Presentation – Urban Farming

Activity Description/Overview

There are seven billion people on Earth and all of those people need to eat to survive. Human agriculture exerts a tremendous toll on the planet, from energy use to habitat loss. Urban farming/agriculture/gardening is the practice of cultivating, processing, and distributing food in or around a village, town, or city. Urban farming aims to make our food as 'local' as possible while also adding greenery to cities, reducing harmful run off, increasing shading, and countering the heat island effect. In this activity, students will research urban farming and develop a presentation for their peers. They may even visit an urban farm if possible!

Research

Have students research what urban farming or agriculture is and how it is changing city landscapes. What are some examples of urban farms? Where does urban farming take place? What are the costs and benefits of urban farming? Identify any places near you that may be involved in urban farming practices. How can you get involved if you are interested?

Action

- After students have thoroughly researched urban farming, they will create a presentation focused on urban farming for their classmates, school, or community.
- The presentations can be as creative as they'd like! Some ideas:
 - Basic information on urban farming in general
 - Highlight an urban farm in Miami or anywhere else in the world
 - Come up with an original idea for your own urban farm and present it
- Be sure to highlight how urban farming can improve food sustainability and security both locally and globally.



- If possible, take a field trip to or attend a workshop at a local urban farm. Some resources are listed below:
 - <http://oceandrive.com/behind-miamis-farm-to-table-craze>
 - <http://www.urbanoasisproject.org/>
 - <http://www.miamigrowproject.org/>

Results

- Submit the monthly challenge submission form to DIG staff detailing how your students researched and presented on urban farming.
- Send copies of presentations, pictures and video to DIG staff.

Activity 3: Theatrical/Multi-media – Lunchroom Detectives

Overview/Activity Description

The USDA's Economic Research Service estimates 31% of the overall food supply at the retail and consumer level went uneaten in the U.S. in 2010. K-12 schools can reduce, recover, and recycle food waste on their premises; and educate students about recovering wholesome excess food for donation and reduce food waste to conserve natural resources. In this activity, students will act as lunchroom detectives by observing their peers' trash habits then create an awareness campaign to encourage food waste reduction.

Research

Begin by researching the problem of food waste, especially in schools. How much food is wasted every year? What happens to food that isn't eaten? What are other options besides throwing food away? What are some strategies to reduce food waste? Why do people waste food? Challenge the class to find ways to reduce the trash. Have the class brainstorm the best way to educate others about food waste.

Action

- Students will observe their peers' trash habits during lunch for one week.
- Give each student a data sheet like the one in the link below for collecting information. Or have students develop their own based on their research. Students will keep track of what other students at their tables throw away or waste.
 - <http://web.archive.org/web/20021123214831/http://www.mcswmd.org/kids/datatabl.html>
- At the end of the week, students will total the data. As an option, you might keep a master data table in the classroom for collating student data and displaying results. You might also calculate a ratio of trash items per students.



- Questions to address:
 - Do most students bring lunch or buy lunch, and is there any difference in waste generated by either?
 - What type of food is wasted the most, the least?
 - Is it less expensive to buy larger amounts of food or snacks and pack them in reusable containers, or to buy individual servings in disposable packages?
- Students will then create an awareness campaign of their choice (i.e. posters, announcements, video, skits, pamphlets, etc.) designed to educate their peers about unsustainable food waste and ways to reduce it. Include results from the student's lunchtime detective work.
- Optional: Have students observe the trash habits of their peers again during or after the awareness campaign. Was the campaign successful? Did students generate less food waste?

*Activity from:

<http://web.archive.org/web/20021114110332/http://www.mcswmd.org/kids/cafwaste.html>

Results

- Submit the monthly challenge submission form to DIG staff detailing the students' experience with the food waste data collection and awareness campaign.
- Submit pictures/video of the food waste awareness campaign to DIG staff.
- Submit copies of the data sheet showing students' trash habits to DIG staff.

Extra Step: Register your school as a participant in the U.S. Food Waste Challenge. Info found here: http://www.usda.gov/oce/foodwaste/resources/K12_schools.html

Activity 4: Create Your Own Food Efficiency Activity

Overview

This activity is intended for Green Team members to use their creativity and apply their leadership skills to design and lead a food efficiency project of their choosing.

Guidelines

- Students work in groups to design an activity that will enhance their understanding of food efficiency, or how it related to water and energy consumption.
- Make sure the activity:
 - 1) identifies a problem area,
 - 2) helps solve a problem,



and

3) leads to the improvement of food efficiency and/or greater awareness of climate change

- Remember there are points to be earned and prizes to be won. So make sure the information is resourceful, creative and has an effective message.

Get 1 bonus point for creating your own activity

WE-LAB – Activity 5: Water You Eating?

Activity Description/Overview

At this point, students should understand the connection between water and energy. But what about your food? Water, energy and food are also intricately linked. Water is an input for producing agricultural goods in the fields and along the entire agro-food supply chain. Energy is required to produce and distribute water and food. Agriculture is currently the largest user of water at the global level, accounting for 70% of total withdrawal while also accounting for about 30% of total global energy consumption. In this activity students will research the water-energy-food nexus and create an infographic that demonstrates that connection.

Research

Students will first learn what the water-energy-food nexus is. How is water and energy used to produce food? How much water and energy is used to produce food? For example, did you know that broccoli takes 5.5 gallons of water to produce? So throw away broccoli and you throw away water and energy. What are ways in which water and energy can be saved in the agricultural industry? How can you help at home and school to save food, water, and energy? In addition, students should learn how to create an infographic properly. Some resources are included below:

- Water-Energy Food Nexus: 1. http://www.fao.org/nr/water/docs/FAO_nexus_concept.pdf, 2. <http://www.unwater.org/topics/water-food-and-energy-nexus/en/>
- Infographics: 1. <https://infogr.am/>, 2. <https://piktochart.com/>

Take Action

- After researching about the water-energy-food nexus, students should each create their own infographic illustrating this connection.
- Infographics should include pictures and numbers designed to educate the viewer on the nexus.



- Be sure to include some solutions to conserving water/energy/food in your infographic.
- Share the infographics with the school and community.

Results

- Submit the monthly challenge submission form to DIG staff explaining how your students went about making their infographics.
- Submit pictures or copies of infographics to DIG staff.