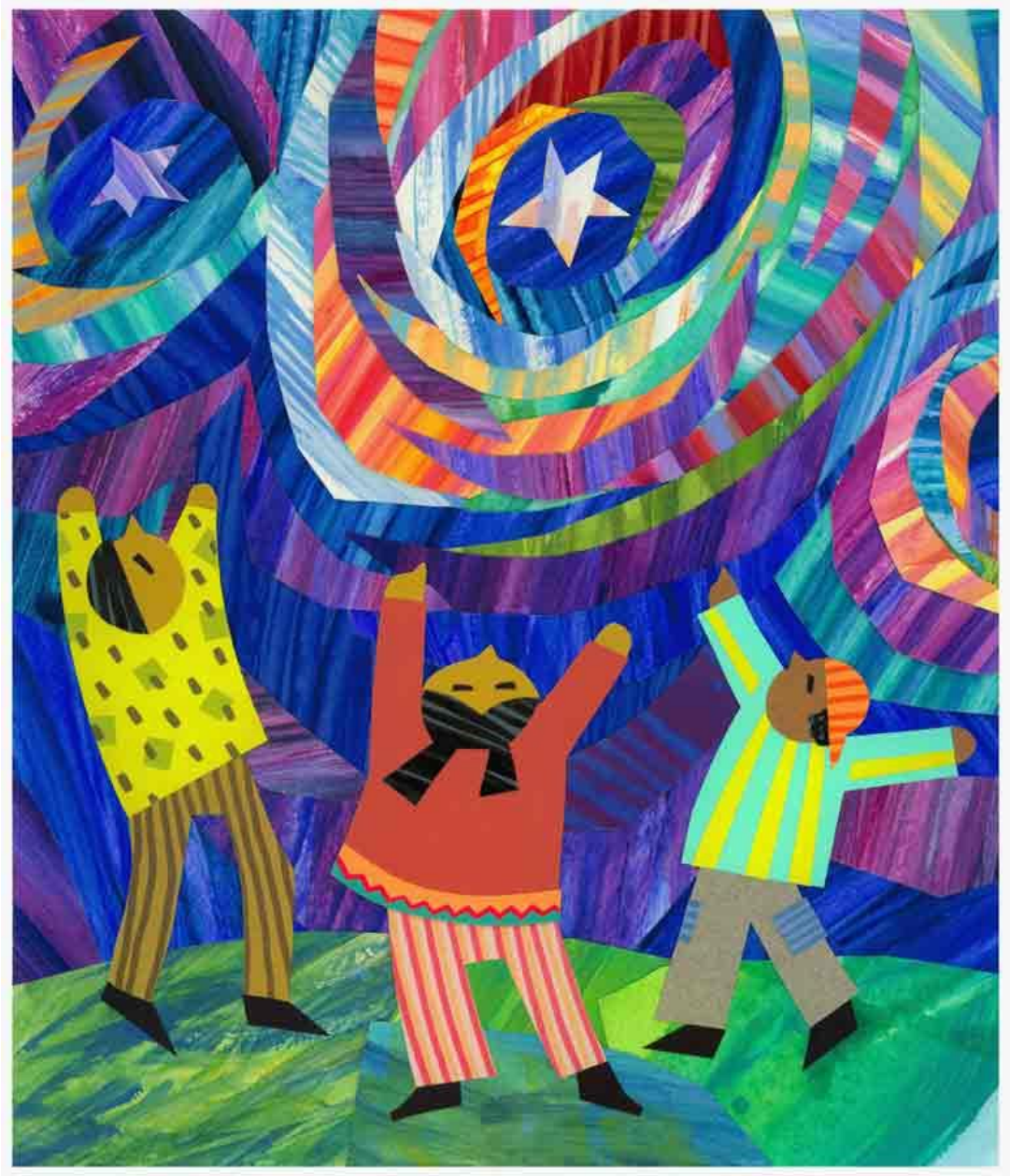


Climate Change in the Garden

Cornell Garden-Based Learning
Cornell University Cooperative Extension

Climate Change in the Garden

Climate Change in the Garden is an exciting model of youth community action in the garden. This document offers examples of how youth and their community members can get involved in monitoring, adapting, and mitigating climate change in the garden!

Introduction

One Seed at a Time:
Alleviating Climate Change through Youth Community Action in the Garden

What?
One Seed at a Time is a model project for how teams of children, youth and adults working in partnership can make a difference in their communities through sustainable gardening practices.

Why?
Climate change is considered to be one of the primary daunting issues in the lives of young people. Feelings of fear and complacency are becoming a part of the human landscape. It is critical that youth do not feel overwhelmed by this issue, and imperative that they readily have the resources and tools needed to understand, cope with, and actively challenge this widespread phenomenon. We believe that small cumulative changes in homes, gardens and communities are the most essential and effective ways to make significant change to our climate and environment.

Who?
Teams of children, youth and adults dedicated to making a difference in their communities!

How?
(1) *Understand:* Youth learn about the causes and impacts of climate change both on the broader global environment and on local gardens specifically.
(2) *Monitor:* Youth become citizen scientists and monitor the climate-induced changes in their garden and natural landscape.
(3) *Adapt:* Youth try out different approaches to adapting a garden to a changing climate.
(4) *Mitigate:* Youth create "greener" gardens and adopt other sustainable lifestyle practices that are part of the climate change solution.

Where?
In your community gardens, parks, schools, community centers, after-school programs, summer camps, backyards, town halls… anywhere and everywhere!

What for?
At the end of a "One Seed at a Time" project, youth will have a better understanding of how climate change affects their local natural environment, and will have gained the tools and resources needed to monitor, adapt, and mitigate these changes in a garden setting. They will also have learned how to successfully partner with adults in a garden-based youth community action project!

Participate

- Do you have a group of youth that you are already working with?
- Do you have a garden in your community that you could work in?
- Are you passionate about climate change issues but aren't sure how to make a real difference?

Then you are ready to participate in a One Seed at a Time project! The steps below will help you to plan your own project:

Prepare:

- Review the resources from the Understand and Links pages on this website for a beginner's primer on climate change and how it connects to gardening.
- Review the Activities and Case Studies pages on this site to get a sense of how you might proceed with a garden-based climate change action project in your community.
- Review the New York State 4-H Youth Community Action (YCA) website for ideas about how to incorporate YCA philosophy into your climate change project!

Propose:

- Identify a group of children, youth, and adults who are committed to, or already, working in partnership.
- Propose the idea of working together on a climate change community action project that is based in the garden.
- Share activities and educational resources about climate change and its effect on the global environment.
- Share ideas of ways that your group could partner to make a difference in your own community.

Plan:

- Once your group has decided to work on climate change, identify what areas you would like to focus on (i.e. Monitoring, Adaptation, Mitigation, Outreach, etc).
- Use the activities and case study timelines as a guideline for developing your project plan.
- Consider incorporating documentation, evaluation and celebration into the plans.

Participate:

- Proceed with your planned community-based activities.
- Document the project process – from planning through implementation to celebration.
- Evaluate the project process as well as the end result.
- Celebrate!

Understand

It's not just thermometers telling us the climate is changing. The living world (including plants, insects, and weeds) are responding to change as well. The life cycles of insects, including the beneficial ones that keep others in check, are becoming out of sync with their prey. Pollinators, like honeybees, may already be out of sync with the plants they feed on. Earlier flowering and fruiting of plants has caused a great disconnect for some long-distance migrating birds, who depend on food availability at the same time each year.

Signs of climate change in the garden:

- Plants are leafing out and blooming earlier.
- Birds and butterflies are breeding and migrating earlier, disrupting important pollinator-to-plant connections.
- Invasive, non-native plants and animals are expanding because they are able to take advantage of weakened ecosystems and are able to out-compete native species.
- Native and iconic plants may no longer find suitable climate conditions in major portions of their historic range.
- Some plants are failing because the winter cooling period isn't long enough, and others suffer when summer evenings are not cool enough.
- Rain events are more extreme, taking the form of longer droughts and more frequent floods.
- Longer warm periods mean more generations of some pests per year. Others are increasing their number because winters aren't cold enough to keep them in check.
- Weedy and invasive plants like poison ivy, honeysuckle and kudzu, thrive in the presence of extra carbon dioxide, and poison ivy becomes more toxic than ever.
- Native plant populations are threatened by these changes in temperature, rainfall, pests and competitors, even the iconic ones chosen as state flowers and trees. In fact, the National Wildlife Federation predicts that 28 states will see their official plants become extinct by the end of the century.

Impacts of climate change on gardens:

- More frequent and severe weather extremes, including heat waves, droughts and floods.
- The expansion of harmful invasive species, pests and diseases.
- The disruption of ecosystems.
- The extinction of thousands of species–all of which are disasters for nature, let alone gardeners.
- Changing plant hardiness zones

(Source: The Arbor Day Foundation)

Related activities (pdfs)**:**

• Garden Sombreros
• Arctic Tale
• Connecting with Peers in the Arctic

Monitor

Citizen science programs like Project Budburst are great ways to get youth closer to nature, while simultaneously providing valuable scientific data to researchers about the impacts of climate change on plants and the environment.
Through engaging in one of these programs, youth will learn important concepts such as:

- *Dichotomous key:* Youth will learn how to use the dichotomous key to identify some of their local plant species that they will monitor for changes.
- *Plant observation and data collection*: They will return to the same plant a number of times to mark the dates and weather conditions on which the plant shows developments of the first leaf, first bud, first flower, full bloom, and die-off.
- *Plant phenology* (changes in life cycle events over time): Youth will learn how the climate affects plant life cycle events, and in turn how changes in plant life cycle events can affect natural ecosystems and human life activities.

Adapt

Learn how to adapt a garden to changing climate conditions:

Start by introducing youth to concepts such as the difference between native and non-native species. Discuss these differences in the context of what thrives well in a given climate and why? Why is the threat of invasive species greater as global warming increases?

Another important concept to consider is plant adaptation – how does a plant respond to a changing environment and climate? What mechanisms do certain plants have in place to deal more readily with environmental stress, such as drought or changing temperatures?

Plants that are considered to be more adaptable to a change in climate:

- Perennials from Mediterranean climates, which thrive without summer rain (i.e. lavender, rosemary, sage, catmint, oregano, and thyme).
- Local native plants are particularly good for sustaining wildlife, but be sure to ask for ones that will survive the new climatic conditions.
- Choose trees and shrubs that do well across many temperature zones. For example, oak leaf hydrangea, serviceberries, deciduous magnolias and many pines are especially adaptable to a range of conditions.

Factors to consider about plant adaptation to global warming:

- Shifting crops and varieties (and an expansion of agriculture in the Northeast as other regions become less suitable…

- Earlier planting dates (at what risk?)
- Delayed pruning, or less severe pruning?
- Increased need for weed and pest control (increased chemical loads?)
- There are many things to consider and gardeners are in a good position to experiment with different strategies of adaptation, without risk of a major economic loss. This activity, Superhero Plants (pdf), helps children think about what attributes a plant has that help it be more or less adaptable to certain climate conditions.

Mitigate

Simple garden-based activities like organic gardening, composting, and growing your own food can play a significant role in reducing greenhouse gas emissions and therefore assisting in the process of climate change mitigation. Find out more about the climate-related benefits of each garden-based activity below:

Organic Gardening:

Organic gardening is one of the best ways to reduce your carbon footprint! Rather than using petroleum-based synthetic fertilizers or pesticides, try using organic practices that focus on soil improvements and integrated pest management. When the amount of humus in the soil is increased, carbon emissions are kept out of the atmosphere. But soil can release carbon rather than capture it, if left exposed. Because carbon is concentrated in the top layer of soil, it is then vulnerable to oxidation, which increases emissions. It is therefore important to keep gardens covered with growing plants – perennial gardens are ideal! Mulching is another important practice in organic gardening. Organic gardening reduces the need to purchase petroleum-based products which increase fossil fuel emissions during their production and transport phases.

Composting:

- Did you know that the average family produces a ton of greenhouse gas emissions every year just from throwing out their food and garden waste?

Garbage in landfill sites release methane, a very active greenhouse gas that has worse potential to warm the planet than carbon. Composting those wastes, on the other hand, locks up carbon from the atmosphere for decades. Using homemade compost also eliminates those additional travel miles to the store for soil and fertilizers, products that have already been transported considerable distances.

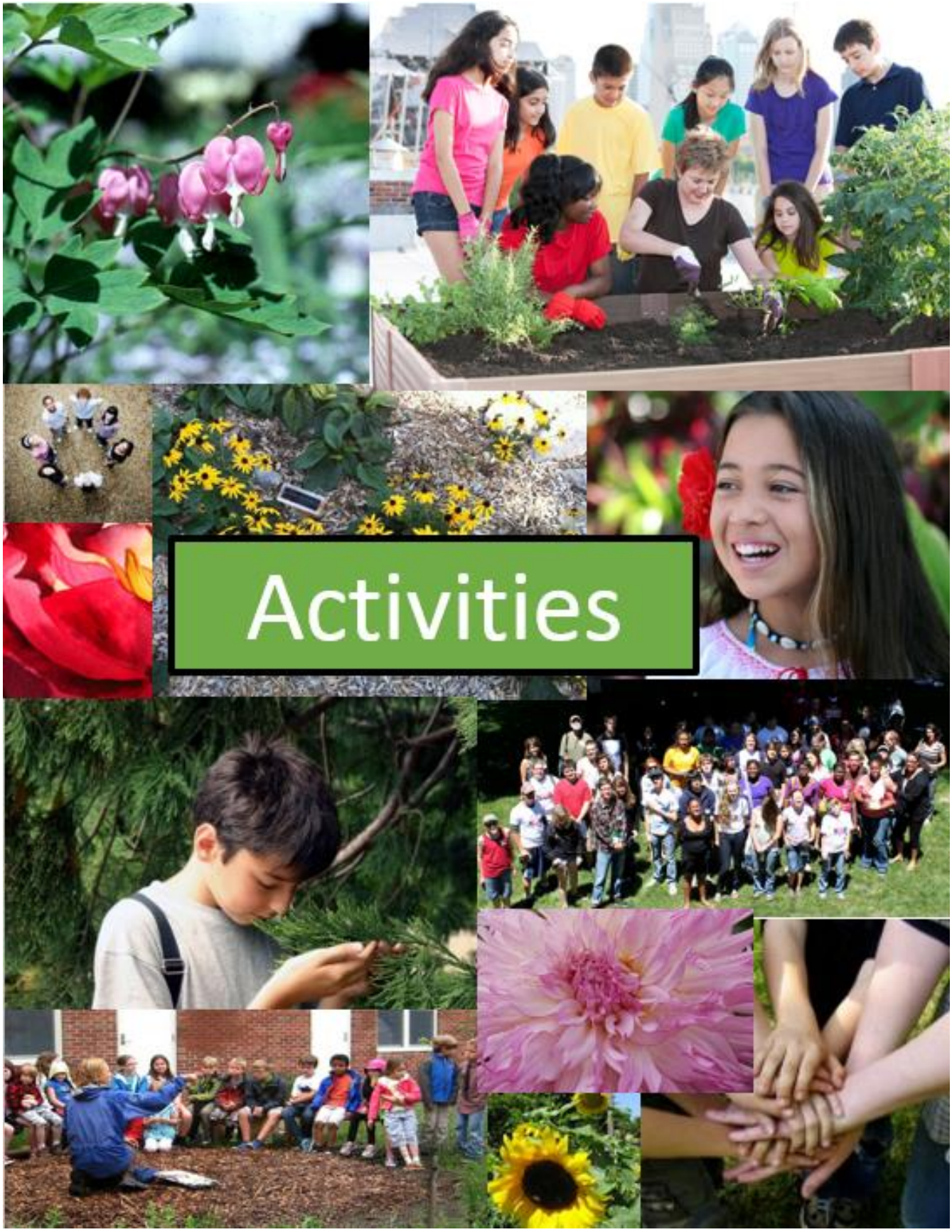
Ecological Landscaping:

- Did you know that heating and cooling accounts for about 60% of a home's energy consumption?
- Did you know that trees that are correctly positioned can save up to 25% of a home's heating and cooling costs?
- Through ecological landscaping, the right type of tree in the right position can reduce your heating and cooling costs substantially. It's a good idea to plant leafy species on the south and west sides of buildings for summer shade and warm winter sunlight, while planting evergreens on the north side and shrubbery against the building foundation to protect it from winter winds.
- Blocking the wind can make a big difference to your heating costs. A well-placed windbreak of trees can reduce wind velocity by 85%. In addition, each shade tree absorbs about 50 pounds of carbon dioxide per year as it grows!

Growing Your Own Food:

- Did you know that the average food has traveled 2,000 miles before it ends up on your plate?
- Did you know that the average family creates more than 4 tons of greenhouse emissions just by the food miles from the food they buy at the grocery store?

Growing your own food in your garden helps to significantly reduce your carbon "foodprint"! Your food will be more fresh, nutritious and delicious too!


Activities

Introducing the topic of global climate change:
Watch Arctic Tale DVD and/or read Arctic Tale children′s book

A good primer to the topic of climate change and global warming for this particular age group would be to watch the movie and/or read the book *Arctic Tale*. *Arctic Tale* depicts how the Arctic is melting due to global warming and how this is, in turn, impacting the surrounding wildlife.

1) Watch Arctic Tale DVD

Narrated by Queen Latifah, this moving film follows a walrus and a polar bear cub on their journey from birth through adolescence to maturity and parenthood in the frozen Arctic wilderness. Once a perpetual winter wonderland of snow and ice, the walrus and the polar bear are losing their beautiful icebound world as it melts from underneath them.

Cost: $24

2) Read Arctic Tale Children′s Book

This book accompanies a new Paramount Vantage motion picture from the producers of *March of the Penguins*, a 2005 Academy Award winner. The film, narrated by Queen Latifah, follows the dual drama of Seela and Nanu, a walrus calf and polar bear cub, as they embark on their astonishing journey from infancy to maturity amidst the stark beauty of the Arctic landscape. Protected by mothers who will stop at nothing to ensure their safe passage to adulthood, both cubs romp in their cold playground as everpresent threats of starvation, predators, and a harsh homeland are overcome in an unrelenting life-and-death struggle to survive.

Cost: $5.95

Available for purchase online from the National Geographic Store:
http://shop.nationalgeographic.com/jump.jsp?itemID=1101&itemType=CATEGORY&path=1%2C3

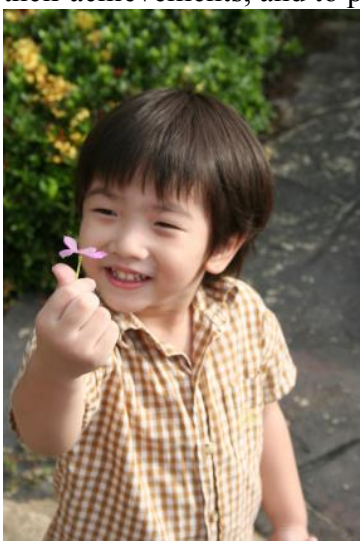
3) Read the book *How We Know What We Know About Our Changing Climate: Scientists and Kids Explore Global Warming*, by Lynne Cherry and Gary Braasch.

This book details a number of amazing success stories about children taking action on climate change and making a difference in their communities. This book would be great way to inspire your group to do the same!

Honoring children/youth and their achievements:
Host community picnic celebration on August 12th

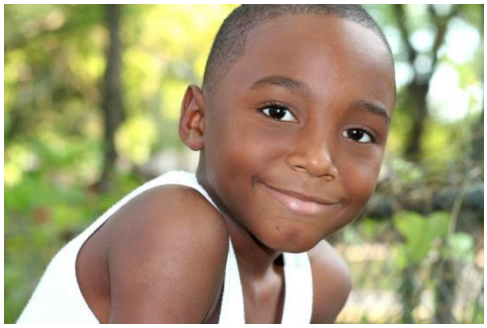
Objective:
On August 12th, the children will host a community picnic at their garden to celebration International Youth Day.

Overview:
International Youth Day provides an opportunity to recognize the potential of youth, to celebrate their achievements, and to play for ways to better engage young people to successfully take action in their communities. This year's theme for International Youth Day is "Youth and Climate Change: Time for Action". This year's theme could not be better suited toward our pilot project.



As part of the international movement of youth taking action on climate change, the children will host a party for their families and community members, to showcase what they have done in the garden and how it's helping to stop climate change and protect the environment.
At the party, youth could:
- Showcase their photo journals/ photo story board, which documents the various activities they did in the garden over the summer;
- Distribute tree seedlings to be planted throughout the community
- Commit to hosting a "low-carbon" picnic by providing foods from the garden and supplementing those with foods bought from local farmers market.

Time:
August 12th



Materials:
Picnic – food (as local as possible)
Photo-journals/ photo story-board
Tree seedlings (see Activity # for more info)

Preparation:
• Youth can make invitations to invite family, community members, etc to the picnic.
• Youth can theme the picnic as a "local foods picnic" asking people to bring things that were grown in their garden or came from local farms(as much as possible).
• Youth can plan to plant a tree at the community picnic to symbolize their commitment to fighting climate change.
• Youth can plan to sing a song about compost (see attachments to email for music and lyrics).

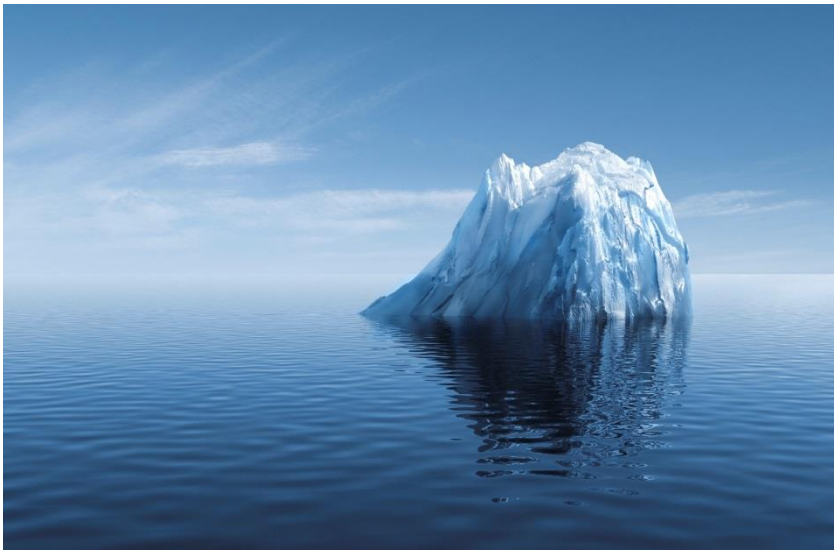
Connecting with peers in the Arctic:
Write pen pal letters to children in the Arctic

Objective:
Youth will learn about the life and culture of the Inuit in the Arctic and will learn about how climate change is affecting their community. Through learning about the impact of climate change on the Inuit, the children will gain more motivation to work to help stop climate change.

Overview:
Youth will exchange pen pal letters with their peers in the Arctic. This cultural exchange will help to demystify the world of the Arctic for the youth and will help to geographically situate the region where climate change is currently having the biggest impact.

Time:
1 hour

Materials:
• Globe or map to show where the Arctic is…
• PowerPoint presentation with photos of the Arctic
• Paper
• Pencils
• Computer and email
• Group photo



Instructions:
• Explain to the group that they will have the opportunity to write pen pal letters to the Arctic. Explain what a pen pal is and how pen pal exchange works.
• Explain to the youth that their pen pals live in small town called Pangnirtung, on a big island called Baffin Island, in northern Canada, near the North Pole. Show them the Arctic region of Canada on a big map or globe in the classroom. If you want, you can show them the PowerPoint photo slideshow I made of Pangnirtung – these photos will give them a visual sense of what the community looks like.
• Give paper and pencils to the group and ask the group to write pen pal letters.
They have a choice to either write as one big group, in pairs, or on their own.
They can write their own letter on the piece of paper, or can dictate a letter to the teacher.
• The letter should include 3 parts:

1) Introduction of student(s): Including names, ages, where they are from, what grade they are in, and any other information they would like to share i.e. number of siblings, pets, or favorite hobbies, food, movies, etc.
2) Explanation of their garden project: Including information about the garden, where it is, what they planted, which plants they like the most and why, what they like best about the garden and why, and how they think the garden will help to stop climate change.

3) Questions for the peers in the Arctic: Including questions about life in the Arctic, such as weather, daylight, food, culture, clothing, wildlife, language, school, etc.
Further, any questions about climate change and how it is impacting their Arctic community, such as warmer summers, more sea ice and glaciers melting, etc.

• When the youth have finished their pen pal letters, tell them that in about a month's time, they will receive a reply from a new friend in the Arctic!

Note about the letter delivery:
The mail service to the Arctic is very slow and so if you send the letters there by post, I'm afraid they might not arrive in time before I leave. So it would be best to send the pen pal letters and photos via email, so that I have time to distribute them among the local children and get letters from them to bring back to your students. So, I would suggest once they have finished writing the letter, you can either scan the hand-written letters onto the computer, or type them up. If you have a digital photo, it would be great to send some photos of the group and their garden along with their letters. When I return from the Arctic the first week of August, I will bring back letters and photos from their pen pals in the Arctic.

Eco-Meal Lesson Plan

Jamila Simon, CITY Project Coordinator
Cornell University Cooperative Extension, New York City

Gather youth and have them plan a meal on a budget of $20.00 for about ten people. Send them to the supermarket with the list of items including the seasonings. When they return have one person log in their total costs and begin preparing the meal as a team. Remember to reinforce safety tips and good kitchen practices like cleaning as you go along. Also remind them that nothing can be thrown out and that all waste must be categorized according to the audit sheet. After the meal is complete and before you all share the meal you prepared, go over the Eco Meal Audit Sheet (*On the following page*). Calculate the score for the meal and discuss different options that would have resulted in different scores. Finally, gather the recycled goods and recycle them, see what items can be reused, and gather the fruit and vegetable waste and do a quick search for a local compost site. Then repeat the exercise as necessary and have them share the experience with their friends and family!

Eco Meal Audit Sheet

Items Purchased	Price	Packaging Types	Points
		Vegetable waste	0
		Paper/Cardboard	2
		Returnable glass bottle	2
		Non-returnable glass bottle	3
		Steel cans	3
		Hard plastic	3
		Soft plastic	4
		Aluminum cans	4
		Styrofoam trays	5
		Composite packaging	5
		Subtotal for Packaging Types	
Financial Budget	**Dollars / Cents**	**Final Score**	
Amount received	15.00	Subtotal for Packaging Types	
Amount spent		Subtotal for Food Types	
Balance		Total	

Food Types Used	Interpretation of Score:	
Vegetables and fruit	0-30 points =	Eco friendly, we could use more people like you!
Bread	31-45 points =	Fairly, eco-friendly, the environment would not cope if everyone lived like you!
Sweets	46-60 points =	Your environmental impacts are high; you need to reduce your impact ☹
Meat, chicken, fish	61 and above =	We would need several more earths if everyone lived like you ☹
Cool drinks		
Ice cream and desserts		
Subtotal for Food Types		

Pilot project post-testing:

Create 'know and show' party hats for the picnic!

Objective:

Children create picnic party hats that illustrate what they know about climate change and gardening. In addition to being a helpful evaluation post-test, these hats will be fun to wear at the community picnic on August 12th!

Overview:

The objective of this activity is to make wearable works of art that illustrate children's understanding of the topic of climate change and what they can do about it in the garden. This activity is both a creative arts project, as well as an effective evaluation tool. Through making the hats twice, once at the beginning of the summer program and again at the end of the program, you will be able to identify a change in the group's knowledge and understanding of climate change and gardening.

Time:

• 1 hour during last week of program

Materials:

• 2-inch clear tape
• Newspaper
• Yarn
• Scissors
• Miscellaneous art supplies (markers, glitter, pipe cleaner, tissue paper, etc – really whatever you can think of! Try to use recycled materials wherever possible.)

Instructions:

Make the Hat

• Take two large, square sheets of newspaper and roll them into a cone-shaped party hat.
• Place the open part of the cone onto the head of the child, while continuing to hold the tip of the cone.
• Measure the open end of the cone to the child's head. Tape it in place to keep the size. Tape all along the seam.
• Cut a piece of yarn for each hat. Tape the yarn to the edge of the hat, to act as a chin strap to keep the hat in place.

Decorate the Hat

• Simply ask, without prompting, a question related to this pilot project, such as: what is climate change and how does it impact the garden? Or, what can we do in the garden to help stop climate change? Think about a question along these lines that the children will understand.
• Encourage children to decorate their hats, with different art supplies, to show what they know. Encourage them to be creative, but do not offer suggestions or prompting, as the goal here is to find out *what they have learned about the topic*.

Describe the Hat

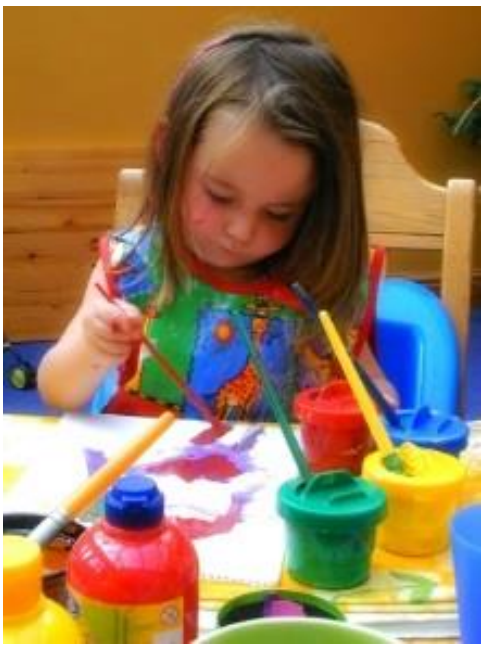
• When everyone's finished their hats, encourage them to show their creation to the group and talk about what each decoration or item means.
• As they do this, jot down the numbers and range of responses.
• For example, when asked what plants need, children may show water drops, and a sun. Note those as examples of two different needs. Note, too, any misinformation you see presented.

Wear the Hat

• Once everyone has presented their hats to the group, and you have finished writing down their range of responses, invite the children to wear their hats for the community picnic party on August 12th.

Reflect:

• Is there an evident difference between their hat decorations at the beginning and end of the program? At the end of the program, are children able to identify more, or present a broader/deeper understanding of climate change, how it relates to gardening, and how they can make a difference through gardening practices?
• For example, they may now note that plants need sun, water, nutrition, time to grow, a good location, and care.



Pilot project pre-testing:
Create 'know and show' garden sombreros!

Objective:
Children create garden sombreros that illustrate what they know about climate change and gardening. In addition to being a helpful evaluation pre-test, these hats are functional by helping to protect the children from the sun while they are working in the garden!

Overview:
The objective of this activity is to make wearable works of art that illustrate children's understanding of the topic of climate change and what they can do about it in the garden. This activity is both a creative arts project, as well as an effective evaluation tool. Through making the hats twice, once at the beginning of the summer program and again at the end of the program, you will be able to identify a change in the group's knowledge and understanding of climate change and gardening.

Time:
• 1 hour during the program pre-session

Materials:
• 2-inch clear tape
• Newspaper
• Miscellaneous art supplies (markers, yarn, glitter, pipe cleaner, tissue paper – really whatever you can think of! Try to use recycled materials wherever possible.)

Instructions:

Make the Hat
• Place the middle of two large, square sheets of newspaper on the top of a student's head.
• Lay the rest of the paper flat against the student's head.
• Tape around the newspaper starting right over the ear, and continue wrapping until the tape goes all the way around the student's head.
• Curl up the edges of the newspaper to form the brim of the hat.

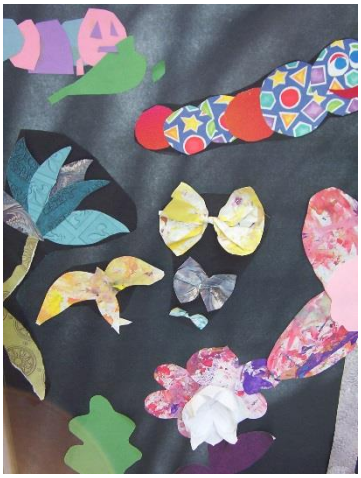
Decorate the Hat
• Simply ask, without prompting, a question related to this pilot project, such as: what is climate change and how does it impact the garden? Or, what can we do in the garden to help stop climate change? Think about a question along these lines that the children will understand.
• Encourage children to decorate their hats, with different art supplies, to show what they know.

Encourage them to be creative, but do not offer suggestions or prompting, as the goal here is to find out *what they know about the topic*. It's ok if they don't know much, as this will hopefully change by the end of the summer!

However, they might still be able to relate to the concept of climate change in a simple way, such as by drawing a very hot sun and plants drying up, or drawing how planting trees makes the planet a beautiful, green place.

Describe the Hat

• When everyone's finished their hats, encourage them to show their creation to the group and talk about what each decoration or item means.
• As they do this, jot down the numbers and range of responses.
• For example, when asked what plants need, children may show water drops, and a sun. Note those as examples of two different needs. Note, too, any misinformation you see presented.



Wear the Hat

• Once everyone has presented their hats to the group, and you have finished writing down their range of responses, invite the children to wear their hats when they go out into the garden.
• You can explain to them that these hats are called 'sombreros'. Sombrero is a
Spanish word which means 'shade'. These hats create shade and are a great way to get protection from the hot summer sun!
• It might be a good idea to have a box in the classroom where you can keep the hats, so the children can keep them there all summer and wear them out to the garden on sunny days!

Green CITY Interviews

Suggested questions

- What is your opinion of global warming?
- How would you define climate change?
- Does climate change concern you?
- What do you think causes climate change?
- Do you know what your carbon footprint is and how it's important to climate change?
- How do you think you are being affected by climate change?

Top 10 Things You Need to Know About Climate Change

1. There is agreement in the scientific community that abrupt climate change is occurring. Many of the specific impacts are still being studied, but abrupt climate change is currently changing the planet.
2. The increased rate of climate change we are presently experiencing is caused by excess greenhouse gases being released into the atmosphere, the direct result of anthropogenic (human-made) activities such as burning fossil fuels, raising large numbers of methane-producing livestock, and clearing forests across the planet.

3. Average global temperatures have risen dramatically in many areas of the world over the last several decades and will continue to do so unless immediate actions are taken.
4. Sea levels are predicted to continue rising each year as snow packs and glaciers around the world melt in warmer climates.
5. Climate variability has always occurred but the rate of change we are experiencing today is more like climate disruption.
6. The number of severe hurricanes and storms is increasing due to elevated sea surface temperatures in the oceans, affecting millions of people who live in coastal areas and destroying precious coral reef and wetland habitats.
7. Climate change is not directly a result of the depleting ozone layer, although they are indirectly related.
8. Climate change is contributing to the extinction of many species, with habitats and ecosystems rapidly being altered.
9. Disease and pest distributions are changing as a result of rising global temperatures and are having major effects on humans, plants, and animals worldwide.
10. The choices that we make every day in our lives can help reduce the effects of climate change.

10 Simple Things to Help Stop Climate Change and Global Warming

1. Turn off the lights when you leave a room. Use fluorescent bulbs in your room.
2. Turn off your computer or the TV when you're not using it. Unplug chargers when not in use.
3. Wait until you have a lot of clothes to wash before using the washing machine. Don't use the machine for one item just because it's your favorite shirt.
4. Take shorter showers. Heating water uses energy.
5. Close the blinds on a hot day if the sun is shining in. Dress lightly instead of turning up the air conditioning.
Or use a fan.
6. Dress warmly inside your house when it's cold, instead of turning up the heat.
7. Offer to help your parents keep the air filters on your AC and furnace clean.
8. Walk short distances instead of asking for a ride in a car.
9. Plant a tree.
10. Shop at the farmer's market!

Learning from the past:

Interview Master Gardeners to learn about gardening in the past

Objective:

Youth will:

- learn interview skills
- compare and contrast past and present approaches to gardening
- have an opportunity to interact with older gardeners
- have an opportunity to visit the Albany Master Gardener demonstration garden
- gain a historic perspective on how food and gardening practices have changed over time

Overview:

By interviewing older Master Gardeners in the community, youth will gain interview skills and will hear about gardening techniques and memories of previous generations.

Time:

- 20 minutes - preparing interview questions
- One hour - interviewing
- 20 minutes - sharing interview stories
- 30 minutes – making thank you cards

Background:

The way in which food gets from field to table has changed a lot over one or two generations. Farming has changed and so has the food we eat. There is tremendous value in learning lessons about how people did things in the past. Oral history is a great way to do that! There's no doubt that the way our grandparents ate, gardened, and related to food is much different than nowadays. Finding out what they did differently, might provide some insight to more sustainable practices that could help to stop climate change!

Preparation:

- Get in touch with some older Master Gardeners that are willing to speak with kids. Arrange to meet them at the Albany Master Gardener's demonstration garden.
- Plan for a 20-minute session to prepare the youth for the interview. During this planning session, discuss the following:

Ask the children what an interview is and what makes a good interview question. Give some examples and ask them to do the same. Tell them they will be meeting with older Master Gardeners from Albany. They will get a chance to interview them and ask them questions about the way things used to be done in the garden. As a group, develop potential interview questions with students. Here are guidelines to offer the students as they come up with their questions:

- Avoid questions that can be answered with a simple "yes" or "no." Instead build your questions around who, what, when, where, why, and how.
- Think about what you're most interested in learning from the Master Gardeners.

• Be curious about what it was like to be a kid when they were young, where they lived, and how their families gardened.
• Think about the practices you use in your school garden or that your family uses at home, and ask what techniques your elder friends used for the same purpose (e.g., weed and pest control, watering, composting, mulching, etc).
• A good way to start is to think about what might be different for the youth.
• Some sample questions:

- What is your earliest memory of food?
- Did you eat junk food?
- Where did buy food?
- Did you grow food?
- Did you store any food that you grew?
- How has life changed – gardening and food habits?
- How have gardening practices changed?
- What is different between gardening now and when you were our age? What is similar?
- Did you raise animals in addition to having a garden?
- How did the livestock relate to the garden (e.g., used manure as fertilizer, had to fence out chickens)?
- Did they preserve their harvest, and if so, what techniques did they use? Did they have a root cellar?
- Did they grow ornamental plants (flowers), or was gardening focused on food production?

- How much of their annual food supply did they grow/raise themselves?
  - How did gardeners learn to garden? From family or books?
  - Did all the neighbors have gardens?

Interview:
Meet with Master Gardeners at their demonstration garden site. Students will have their questions with them and will interview them in pairs.

Wrap-up:
Once back in the classroom, talk about the experience of meeting older gardeners. Ask the students to share the stories they heard. Ask questions to trigger their memories:

- What did you learn about gardening or plants from your elder friends?
- How has life changed – gardening and food habits?
- How have gardening practices changed?
- What was it like to spend time with a senior citizen?

After your wrap-up discussion, set aside an arts and crafts time to make thank-you cards for the Master Gardeners

Documenting the pilot project:
Create photo journals/photo story board to document pilot project

Objective:
Youth will document their project activities through their own camera lens.

Overview:
Youth will use a camera to document their summer activities and projects in the garden. These photos are an excellent way to document the garden's progress, as well as to provide an insight into the children's perspective on the program activities and garden environment.

Time:
Duration of summer program.

Materials:
Disposable cameras

Preparation:
• Discuss what makes a good picture.
• Discuss what they want to document and what they want to show to their parents and community about their garden. Suggest that these would be good photo opportunities.

Instructions:
• Distribute cameras to the youth at the beginning of the summer program. Invite them to use their unique perspective in the garden to document the exciting projects they will do over the summer.
• One focus of their photos could be to take photographs of the garden that depict sustainable gardening practices (as they relate to climate change) such as composting, mulching, less watering, less tilling, etc).
• Once they have finished taking all the photos, develop them all.
• Spread them all out on table. Invite the youth to select their favorites. They can label them, describe them, or leave them as is.
• If they are making photo-journals, then they can paste their photos into their journals with additional titling, drawings, or descriptions.

• If they are making a story-board, spread out poster board and invite the youth to paste their favorite photos that illustrate the story of their summer garden experience!
• Showcase the photo journals and story-boards at the community picnic!

Promoting a green community:
Grow, distribute, and plant tree seedlings in the community

Objective:
Youth will learn the value of planting trees in helping to stop global warming. They will also learn how to grow tree seedlings and will distribute them in their community in an effort to promote a green community.

Overview:
Youth will grow tree seedlings and distribute them at the community picnic. They will learn how trees are an amazing carbon sequester that can drastically improve our climate.

Time:
Throughout summer program.

Materials:
Tree seeds/ tree seedlings – ask for donation from a local nursery or garden center

Instructions:

- Get tree seeds/seedlings from a local nursery or garden center. Explain that this is a children-led effort to help 'green' their community.
- Raise tree seedlings over the summer.
- Teach the students the right growing conditions for tree seedlings.
- Give them responsibilities for watering and caring for the baby trees.
- Ask them to make signs promoting planting trees to help stop global warming. Post these signs around the school or community.
- On the day of the community picnic, distribute tree seedlings to community members.

Prevention and Mitigation Benchmarks

Objectives:
Youth will learn a variety of ways in which they can prevent and mitigate global climate change. These benchmarks were developed as a tool you can use in your garden program that will both guide you towards developing an ecologically sustainable garden and program, as well as contextualize that sustainability work in terms of its role in preventing and mitigating further climate change. Feel free to modify as needed for your specific program and site!
Each benchmark is listed as an overall goal and then provides several concrete, tangible steps you can take to reach that goal! Feel free to reorder the benchmarks in an order that feels most feasible to you and your program. The activity of re-ordering them might serve as a good beginning group activity in your program to assess where you are at (in terms of ecological sustainability) at the garden/program/organizational level, and where would you ideally like to be in the future, and then list and order the specific steps you can take to achieve that. The benchmarks may serve as a useful starting point for that discussion, but please don't feel limited to these! Through a creative process, your group may come up with dozens of additional ways to improve energy efficiency and sustainability in your garden program!

Benchmark #1: Improve energy efficiency
Reduce your building's electricity and gasoline consumption by using more energy-efficient products.

- Replace regular outdoor and indoor light bulbs with compact fluorescent bulbs
- Install outdoor automatic light timers instead of keeping lights on at night
- Use solar- powered garden products (such as pond filters, patio lights, etc)
- Get a building energy audit done

Benchmark #2: Reduce use of gasoline-powered yard tools
Avoid using gasoline-powered tools such as lawn mowers, weed eaters, and leaf blowers.

- Start using electric-powered or push mowers, hand clippers, and rakes
- Replace part of your lawn with low-maintenance groundcover, a native wildflower patch, or a vegetable garden
- Recycle lawn clippings and leafs in your compost pile

Benchmark #3: Reduce the threat of invasive species expansion

- Remove invasive species from the garden and plant native ones instead

Benchmark #4: Incorporate a diversity of native plants into your landscape

- Plant a diverse range of native blooming and fruiting plants in your garden

Benchmark #5: Reduce water consumption
During heat waves and droughts, water resources become scarce. Reduce water consumption through:

- more mulching in the garden
- installing rain barrels
- adjusting your watering schedule to times in the day that are less hot
- using drip irrigation

- incorporate xeriscaping principles into your garden design.

Benchmark #6: Develop a rain garden

- Create a rain garden, which captures storm water runoff and helps prevent it from polluting local lakes, streams, and coastal waters.

Benchmark #7: Reduce kitchen and garden waste

Home compost operations help lighten pressure on landfills and result in more water-retentive soil for the gardener.

- Install a compost bin in your yard for all your kitchen and garden waste.

Benchmark #8: Establish a "greenroof" and plant trees to protect your house from the elements and to absorb carbon dioxide

- Commit to planting a certain number of trees each year to your property.

Benchmark #9: Minimize tillage in the garden

- Learn how much is too much in terms of tillage and working the soil. A good principle to go by, is starting from the soil and building up, instead of digging down. Add organic material to build up the soil. Use a lot of compost and mulches, and you won't need to do any backbreaking digging and will be assisting with carbon sequestration in the soil!

Benchmark #10: Encourage local home and garden retailers to carry energy-efficient products.

- You can help increase the availability of energy-efficient garden products, as well as native plants, by encouraging your local home and garden retailers to carry them.

Benchmark #11: Actions for Your Elected Officials

- Contact your elected officials at the local, state, and federal levels and urge them to implement a strong plan of action to combat global warming, such as placing mandatory limits on the nation's global warming pollution and raising fuel economy standards for cars and sportutility vehicles.

Benchmark #12: Go organic

- Stop using products like synthetic fertilizers that use fossil fuels in their production.
- Replace synthetic fertilizers with compost and organic mulches, supplemented with organic, slow-release fertilizers when an extra boost is needed.

Benchmark #13: Grow some of your own food

- Commit to buying your program food from local farmers and markets. Grow some of your own. Food transportation causes tremendous amounts of greenhouse gas emissions.

Benchmark #14: Buy your electricity from sustainable energy sources

Benchmark #15: Stop and think when you shop.

Choose products that generate the least waste and make sure that you compost all organic waste. Recycling paper, cardboard, cans, and bottles also helps reduce the greenhouse gas emissions associated with landfills.

- Learning to take a soil test to ensure you're not adding inputs you don't need.
- Planting the three sisters to experience a system that is environmentally sustainable, as well as nutritionally sound.

Adapting a garden to climate change:
Design a plant superhero that can adapt to global climate change

Objective:
To explore concepts of plant adaptation, as they relate to gardening in a changing climate.

Overview:
Youth will learn how plants are affected by the climate and how they adapt to climatic changes. They will then design and create a "Plant Superhero" that has all of the characteristics of an adaptable plant for the local region. They will design, illustrate, name, and describe it.

Time: 1 hour

Materials:
- Flipchart and marker
- Art supplies (construction paper, markers, glue, scissors, and any else that could be used in designing and creating a plant)
- Updated garden zone map from the National Arbor Day Foundation (available at http://www.arborday.org/media/zones.cfm - it can be printed or viewed online).

Preparation:
Print garden zone map or locate the map online. The online version may be preferable since it shows the transition of zones from 1990 to 2006. This transition of colors will help to illustrate the phenomenon of global warming to the youth.

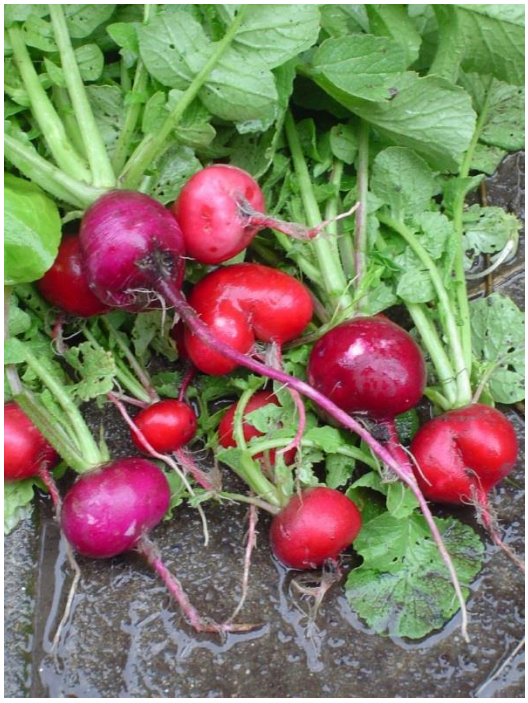
Instructions:
Explore background concepts with youth such as what a plant needs to survive and how climate zones are shifting:

- Use a flipchart and markers to brainstorm with the students the types of needs that a plant has: sun, water, soil nutrients, pollinators, etc… If they can't think of a lot, ask them what they need as human beings, and then suggest that plants need a lot of the same things!
- Talk about how just like animals and humans, different plants have adapted to different climates. Some thrive without summer rain, while others need to be constantly replenished with water. Still others are especially adaptable to a range of conditions. In this way, plants are very similar to humans. Some of us love the hot weather and full sun; some of us prefer cooler weather and rain. Some of us could live in the hot Sahara desert and others in the freezing cold Arctic. We have adapted to our local climates, just like plants.
- Show the updated garden zone map to youth and talk about the implications of changing zones on plants and gardens. Explain that as global warming increases, these zones will shift even more. Talk about the implications of this shift. Engage them in a discussion by

prompting them with questions such as: can palm trees grow here? Why not? What would happen if our current garden zone became warmer, like that of Florida? Could we grown palm trees then? If those palm trees grew here, what other plant species would those trees replace? Provide some examples of plants that thrive in both cooler and warmer climates and talk about the threat of invasive species encroachment with the rise in global temperatures. Also explain that the cycle of plants is connected to the cycle of animals and especially to the cycle of insects, which are accustomed to pollinate the plants at a certain time of year. Discuss what would happen to the insects if the plants life cycle changes (i.e. flowers bloom earlier, shift in zones is inhospitable to certain native species, etc).

Ask the youth to each design their own Plant Superhero that would have important qualities and characteristics that help it adapt to a changing climate.

- For example, the superhero plant might have a special protecting shield (like an umbrella!) for heavy rain spells. Or it might have a special inner storage unit (like camels!) to store extra water for weeks, in case of a heavy drought. Or it might have an extra thick lining (like a sweater!) to put on if there was a spontaneous frost in early summer.
- Get them to think creatively… the key here is for them to understand how plants are affected by the climate and how certain plants have developed qualities that help them to withstand spontaneous or erratic climatic changes.
- Ask them to illustrate their plant superheroes with the art supplies provided and then to name it. After they are done illustrating their superhero, give each child a chance to show and describe their superhero to the group.



Resources:
http://www.arborday.org/media/zones.cfm

Take it further:
Go visit a local garden nursery, or ask a Master Gardener to bring in some examples of plants with different growing requirements and different adaptable traits. Discuss planting a garden full of plants that could adapt to a changing climate. Which plants would you plant in the garden and why?

Sustainable gardening practices:
Learn about the importance of sustainable gardening practices

Objective:
Youth will gain an understanding of the importance of their school garden project, in helping to stop climate change. They will reflect on different gardening practices they are doing and why these help the climate.

Time: 30 minutes

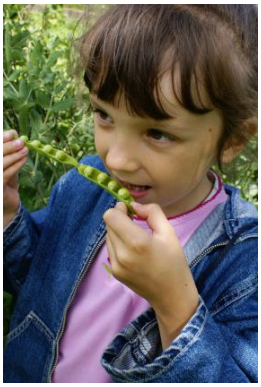
Materials:
Flip chart and markers
Garden

Instructions:
• Go hang out in the garden.
• Talk about how growing a garden is already making a big difference in helping to stop climate change! And each gardening practice has its own story and helps in its own way, to stop climate change.
• Ask the students to think about how gardening is improving the environment. Allow them to first think generally, in broad terms. Brainstorm a list together. Then refine down and reflect more specifically on different things you are doing in the garden. For each gardening practice, talk about how it benefits the garden and how it helps to stop climate change:

For example,
Gardening practice: Mulching
Benefit to garden: Mulching is a great way to reduce water usage in the garden. It is also a great way to reduce the number of weeds.
Helps stop climate change: Through mulching, the garden needs less water and pesticides. Climate change has made droughts more common, which makes water less available. Also, avoiding pesticides is good because they are made in factories and use a lot of resources and create a lot of climate pollution. They also kill many beneficial insects.
Another example,
Gardening practice: Composting
Benefit to garden: Composting is often called "Black Gold" because it adds a rich source of beneficial nutrients to the soil. It's full of rich organic matter that helps to build up the soil and make it a place where plants can grow and thrive! It's recycling nature back into the garden.
Helps stop climate change: Composting is a great way to reduce the amount of garbage we throw out. The garbage we throw out has to get trucked hundreds of miles away (which creates air pollution) and then is buried (which creates water pollution). Composting also helps to sequester carbon from the air (which is one of the biggest contributors to climate change.
**You can continue this activity by asking the students for examples of more gardening practices, such as collecting rainwater, not tilling the soil very much, growing food crops, planting trees, etc.*

Understanding carbon 'food' prints:
Create a food system map and collage

Objective:
Youth will learn that food plays a role in climate change. They will learn the benefits of a "low carbon" diet (i.e. a local food diet). They will create a food system map and collage to find out how far their food has traveled from field to table.



Overview:
We have a tremendous impact on the environment through the food we eat. The average American meal has traveled more than 2000 miles before it arrives on your plate. We can make a big impact to help stop climate change by committing to eating as locally as possible. A good way to eat local is to start growing as much food as possible in your garden. This activity will highlight how growing vegetables in the garden is cutting down on global carbon emissions.

Activity #1 - Map a chocolate cake!

Time: 2 hours

Materials:
• Chocolate cake ingredients
• Kitchen to bake cake
• Paper-sized maps printed from the computer
• Small stickers
• Rulers
• Pencils

Preparation:
Find a recipe for a chocolate cake.
Go to a local supermarket and find the cake ingredients. If there are different brands available for an ingredient, choose the one that is the most local.

Instructions:
• In the classroom, put all the ingredients out on the table.
• Follow the recipe and make the cake.
• Be sure to save the packaging that everything came in.
• While the cake is baking, take the time to map the chocolate cake to see how far it traveled to your classroom!
• Distribute paper-sized maps of the world and small stickers.
• Locate NY on the map and put a sticker there.
• Talk about each cake ingredient, inspecting the package to find out where it came from.
• Put a sticker on that location.
• Using the ruler, draw a straight line from NY to the place where the ingredient came from.

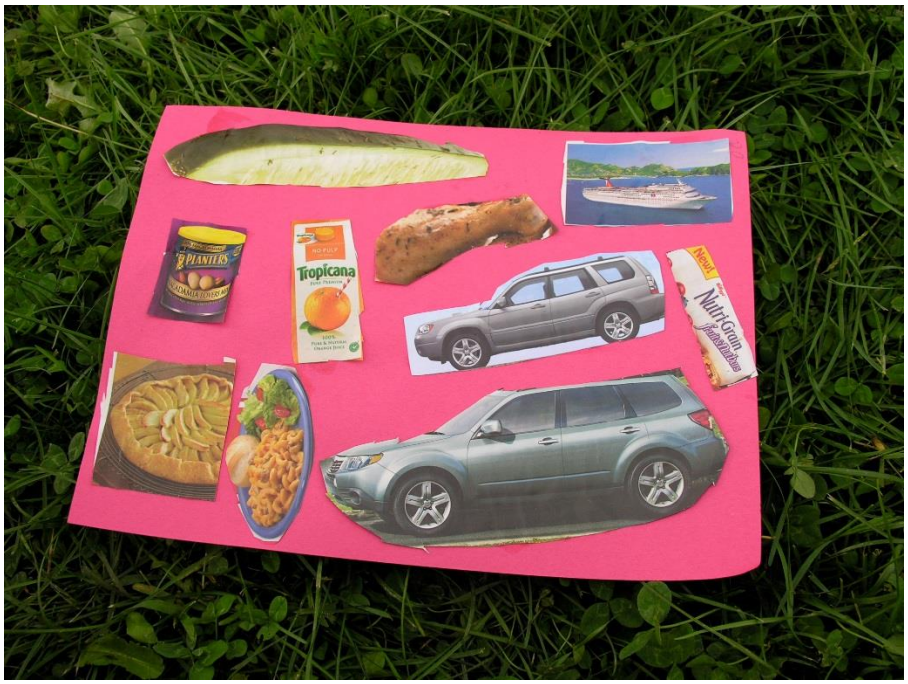
• Do the same for all the ingredients. By the end, there should be a web of lines connecting to NY from around the world.
• Ask the students how far they think the ingredients traveled. Ask them to make guesses… 100 miles, 1000 miles, 1 million miles?
• Measure the lines and add them up: i.e. 8 inches + 4 inches + 3 inches = Total distance of 15 inches.
• Based on the legend of the map, i.e. 1 inch = 100 miles, calculate that 15 inches = 1500 miles traveled. Discuss how the total carbon "food" print of the cake is 1500 miles of travel. That's a long way to go!
• Additional questions to ask for each ingredient are:
• What steps did this go through between being picked in the field and sold in the store? List as many as you can think of.
• How do you think this item was transported (Truck, plane, train, etc?)
• How much time do you think it took to get from field to table?
• What resources might have been used in getting it here (topsoil, gasoline, fuel, oil, water, coal, etc..?
• Is the container recyclable?
• What happens to the waste products from making this?
• It's now time to eat the chocolate cake and be mindful of how far it traveled your plate!

Activity #2 – Create a local food system collage

Time: 30 mins

Materials:
• Magazines and newspapers with pictures of food, trucks, farms, people, stores, etc.
• Glue, scissors, markers, paper, etc.
• Food items: popcorn, cereal, bread

Instructions:
• Begin by talking about the long adventure that food takes from seed to table (i.e. planting, harvesting, processing, packaging, transporting, etc).
• Ask students to identify what's locally grown in NYS.
• Give each student a food item as a starting point to create their own food system collage.
• Invite them to use the magazines, newspapers, and art materials to illustrate a collage of their local food system.
• After they are finished making the collage, they can share what the different photos mean to them.
• To wrap up the activity, talk about how growing food in your garden or buying from local farms means it doesn't have to be transported as far (by truck, plane, or boat) and how this is good for the climate!



Take it one step further…
If these activities have inspired you to reflect on the food system, try one or all of the following:
• Commit for one week to eat as locally as possible.
• Try mapping the food you eat at home for a week.
• Commit to featuring local foods at the summer end picnic