

## Beyond Recycling Program

### Pre- and Post-Activities

#### BACKGROUND FOR TEACHER

Students will have an opportunity to discover the relationships between humans and the natural world. Students will focus on the difference between renewable and non-renewable energy and learn how to be sustainable at home and in the community.

Longwood Gardens is committed to the preservation and improvement of the earth's natural resources. Longwood began a compost program in the early 1990s. Today, all horticultural debris and food residuals are collected, composted and returned to the Gardens to enhance the site. The composting program collects 8,000 cubic yards of discarded organic material from on-site and local contractors annually.

The Terrace Restaurant, located on Longwood's property, works with local farmers and produce distributors to provide guests with the freshest seasonal foods while supporting local farms. Local food means a dramatic reduction in transportation emissions, days of refrigeration, and packaging. Longwood is a proud member of the [Pennsylvania Association of Sustainable Agriculture](#), working to further the connections between people and their food. Longwood seasonally grows herbs, fruits and vegetables in the Idea Garden, which are used in the 1906 Fine Dining Room. This means zero food mileage adversely affecting the environment!

Longwood commissioned a solar field to be built on the property in 2011. The field produces about 2 million kilowatt hours per year, which is the electrical equivalent of powering 181 average homes. It is expected to offset Longwood's energy consumption by nearly 28% and can reduce annual carbon dioxide emissions by 1,367 tons.

Longwood recycles the following items:

All paper products and cardboards  
Aluminum  
batteries  
Florescent bulbs

Food and horticultural waste  
Glass  
Paint  
PCs and monitors

Plastics  
Scrap metal  
Tires  
Waste oil



## VOCABULARY

Biodegradable  
Compostable  
Conservation  
Ecosystem

Energy  
Fossil fuels  
Natural resource  
Non-renewable

Recyclable  
Renewable  
Resources  
Sustainability

## NEXT GENERATION SCIENCE STANDARDS

### Standard: K-8-PS3. Energy Performance Expectations

- K-PS3-1** Make observations to determine the effect of sunlight on Earth's surface.
- 4-PS3-2** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electrical currents.

### Standard: K-8-ESS3. Earth and Human Activity Performance Expectations

- K-ESS3-3** Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.
- 4-ESS3-1** Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.
- 4-ESS3-2** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
- 5-ESS3-1** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
- MS-ESS3-3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.



## NATIONAL STANDARDS IN GEOGRAPHY

**Standard 14:** Knows the ways in which the physical environment is stressed by human activities.

**Standard 16:** Understands the changes that occur in the meaning, use, distribution and importance of resources

**Standard 18:** Understands global development and environmental issues

## PRE- AND POST-ACTIVITIES

### Natural Resources (K-2)

**Curriculum Connections:** Visual arts, language arts, science

**Materials:** Paper, colored pencils, crayons, markers, photo of a tree, *The Great Kapok Tree* by Lynne Cherry

1. Show students a photo of a tree and introduce and discuss the fact that a tree is a natural resource. Discuss places where trees can be found in nature.
2. Read *The Great Kapok Tree* by Lynne Cherry.
3. Discuss the importance of trees. Explain how trees provide us with oxygen and provide habitat for many living creatures on earth. Brainstorm ways to care for this natural resource.
4. If possible, take students outdoors to observe a tree in the schoolyard. Are there any signs of wildlife in or around the tree?
5. Once inside, give each student a piece of paper and ask them to fold it in half.
6. On one half of the paper students should use the colored pencils, crayons, or markers to draw a picture of a tree.
7. On the other half of the paper, students should draw a creature in their community that may use the tree as its habitat.
8. Once completed, allow students to share drawings and ideas.

**Extension/Modification Activity:** Discuss how the animals in our school yard are different than the animals in the story. How do trees play a role in the survival of all animals? Students may also want to brainstorm how trees are used by people. What types of things are made from trees? How can people conserve trees? Encourage students repeat this activity with water or another natural resource.

### Renewable Energy (3-8)

**Curriculum Connections:** Science, language arts

**Materials:** Renewable energy resource cards, laptops, poster paper (one per group), markers, pencils

1. Prepare an index card with each energy resource using words and/or photos: solar, biomass, hydropower, wind, geothermal. These renewable energy resource cards will be used by the students during the activity.
2. Divide students into five groups.



3. Give each group one renewable energy resource card, a laptop or print resource from your school library, a piece of poster paper, pencils, and markers.
4. Using the laptop or print resource from the school library, students will write facts about the renewable energy source assigned on the back of the resource card.
5. Next, instruct students to create a poster ad for new homes being built in the community that will use renewable energy instead of non-renewable fossil fuels, such as oil or coal. Students must include facts about the renewable energy source and include a design of a sample house with the energy source being used.
6. Each poster ad should include persuasive language to grab the attention of new buyers.
7. Upon completion, students will share their creative designs.
8. Hang posters if possible.

**Extension/Modification Activity:** Posters can be displayed in a public location to encourage others to think about energy use. Students may extend this assignment by writing a persuasive essay incorporating facts learned from this activity.

### Go Fish (6-8)

**Curriculum Connections:** Mathematics, language arts

**Materials:** Opaque colored cups (one per group), plastic spoons (one per group), goldfish crackers, paper, pencils

1. Give each student a pencil and piece of paper.
2. Divide students into groups of four and give each group a cup filled with sixteen goldfish crackers and a plastic spoon.
3. Tell the students that each group will represent a hungry family living in a small village that has a single small pond to fish from and the pond can hold no more than sixteen fish. Challenge the hungry family members to go fishing in the pond.
4. Each family member will have the opportunity to “fish” in the cup using the spoon; family members may take 0-4 fish during each turn. Family members need to have at least 2 fish at the end of the game in order to survive.
5. Students must not speak to each other during the game, nor may they look in the cup for the duration of the game.
6. One full round equals one year; at the end of the year, the remaining fish population in the pond will double (teacher will need to add more goldfish crackers to the family cups at the end of this round based on this rule).
7. After each round, students should record on paper the number of fish taken from the cup.
8. Play 5 rounds (or five “years”). Any student who collects fewer than two “fish” during a round will starve and cannot play the next round.
9. If there are any fish left in the pond at the end of five years, record the number of fish left on a sheet of paper. It is likely that most groups will not last the full five years, due to overfishing.
10. Discuss the process. How did it feel when family members took more fish than they needed? How did it feel when there was not enough fish left to feed the entire family? Were the fishing techniques used “sustainable”?



11. Explain that this experience simulates humans' relationship with natural resources. The demands of our consumption behaviors outweigh the supply of resources, both renewable and non-renewable.
12. What could be changed to make the fishing practices more sustainable?
13. Play the game again, this time with the goal of keeping all family members alive and the fish population stable at the end of five years.

**Extension/Modification Activity:** Students may change family members to see if the results of the game are the same. Students may extend the activity further by writing a story about the hungry family in the small village living with a pond of sixteen fish. Could this concept be applied to other natural resources?

### Recycle or Trash (K-2)

**Curriculum Connections:** Mathematics, science, language arts

**Materials:** Assorted items from the classroom (paper clip, rubber band, paper, pencil, crayon, marker, a book, a pen, a box, a plastic cup), 2 buckets labeled (recycle, trash)

1. Place two buckets in the front of the classroom and place a recycle or trash label on each one.
2. Explain what it means to throw something away as trash, emphasizing that it can no longer be used for anything.
3. Explain what it means to recycle, emphasizing that it can be used again for something else.
4. Give each student one random item.
5. Students must decide if their item is trash or if it can be recycled.
6. Once all items have been placed in a bucket, discuss the results. Were more items in the trash or recycle bucket?
7. Encourage students to go home and compare how much trash versus how much recycling their own family has per day. Discuss options for changing family behaviors. Can some of the trash items be reused? Can some of the recycled items be repurposed?

**Extension/Modification Activity:** Have students collect recycled materials from home. Students can use the recycled materials to design and create unique pieces of art. Display artwork to promote recycling in school.

### Sun Prints (3-5)

**Curriculum Connections:** Visual arts, mathematics, science, language

**Materials:** Dark colored construction paper, natural items from outside (leaves, grass, flowers), a sunny windowsill, clear tape

1. Begin this activity with a walk outdoors. Each student needs to collect 2-3 natural items in the area. (Items from the classroom would work as well)
2. Give each student one piece of dark colored construction paper and a few pieces of clear tape.
3. Allow students to use the collected items to create a design on the dark colored paper. Use the clear tape to hold the items in place.
4. Place each design in a sunny location for 3-5 days.



5. Students can check results daily. They should be able to see an image of the taped objects as the sun bleaches the dark paper around the items placed on the paper.
6. Once sun prints are completed, ask the students why the paper faded. Discuss the sun's energy and how we can use it to generate power.

**Extension/Modification Activity:** Students can research facts about the sun. Have students create a chart to compare the months of the year and average days of sunshine for a given area. Would your community be a good location for a solar energy field? Why or why not?

### **Imagine If..... Writing Activity (3-8)**

**Curriculum Connections:** Language arts, science

**Materials:** Globe, pencils, paper, *On Common Ground* by Molly Bang

1. Use the globe to discuss the fact that water covers most of the earth and is one of the most important natural resources we have. Discuss other natural resources available to humans. List these resources for students to see. Point out that less than 1% of all water on earth is available for human use.
2. Read *On Common Ground* by Molly Bang.
3. Discuss the natural resources mentioned in the story. Ask students to choose one natural resource to write about.
4. Each student will be responsible to create a writing piece on the future of the natural resource. Students should think about the availability of the resource ten years or one hundred years from now and how its availability might impact their home, their school, and/or their community.
5. Once writing pieces are complete, ask students to share their visions.
6. Discuss the importance of using natural resources sustainably. What actions can we take now to make a difference in the future of our natural resources?

**Extension/Modification Activity:** Students may create posters that can be displayed to urge other students to conserve natural resources at school.



## WEB RESOURCES FOR TEACHERS AND STUDENTS

### Longwood Gardens

[longwoodgardens.org/SustainabilityatLongwood.html](http://longwoodgardens.org/SustainabilityatLongwood.html)

### Pollinator Partnership

[pollinator.org](http://pollinator.org)

### Ask Nature

[asknature.org](http://asknature.org)

### U.S. Energy Information Administration: Energy Kids

[eia.gov/kids/](http://eia.gov/kids/)

### Natural Resources Defense Council Reference Link for Kids

[nrdc.org/reference/kids.asp](http://nrdc.org/reference/kids.asp)

## SUGGESTED PRINT RESOURCES FOR TEACHERS

Amsel, Sheri. *The Everything Kids' Environment Book: Learn How You Can Help save the Environment--by Getting Involved at School, at Home, or at Play*. Avon, MA: Adams Media, 2007. Print.

Montez, Michele, and Lorraine Bodger. *The New 50 Simple Things Kids Can Do to save the Earth*. Kansas City: Andrews McMeel Pub., 2009. Print.

## SUGGESTED PRINT RESOURCES FOR STUDENTS

Bang, Molly. *Common Ground: The Water, Earth, and Air We Share*. New York: Blue Sky, 1997. Print.

Bang, Molly, and Penny Chisholm. *Living Sunlight: How Plants Bring the Earth to Life*. New York: Blue Sky, 2009. Print.

Cherry, Lynne. *The Great Kapok Tree: A Tale of the Amazon Rain Forest*. San Diego: Harcourt Brace Jovanovich, 1990. Print.

