

Welcome -----

Welcome to Cyberchase: Green It Up!

Green It Up is a hands-on program designed for children ages 6-8 to inspire a deep appreciation for nature, build STEM skills, and help them feel empowered to take action in their communities to care for the planet, just like their favorite characters from *Cyberchase*.

About Cyberchase

Cyberchase, America's longest-running math series, has engaged millions of children in the fun and challenge of math and STEM for more than 17 years. The animated series tells the story of a team of curious kids, summoned into cyberspace to outwit and outsmart the villain Hacker using math and problem-solving skills. *Cyberchase* proves that math is everywhere, and everyone can use it to make the world better.

Components of Green It Up

- 8 hands-on activity cards on different environmental topics. Each card includes an "Explore" activity (an experiment or craft) and a "Get Outside" activity (a mini field trip to explore the concept in an outdoor setting).
- A Kids Can Help! poster with kid-friendly actions to help the environment.
- Related *Cyberchase* video clips that correspond with each activity
- Take-home activity booklets that align with classroom activities

How Does Green It Up Work?

- Pick at least 4 activity cards that will work for your program. Include the "Big Finale" activity card as the last session. Guide students through activities in any order, ending with the "Big Finale."
- Pass out take-home activity booklets for families to follow along at home. Each card has a corresponding at-home activity, labeled with the same image at the top. Check in regularly with families to see if they are completing activities at-home.
- Educators are encouraged to use *Cyberchase* video clips referenced in each activity to introduce topics, give background, and engage students. Go to <u>wnet.org/Education/GreenItUp</u> to find clips. Full episodes are also available at <u>pbskids.org/Cyberchase</u>.
- Use the links on <u>wnet.org/Education/GreenItUp</u> to help you plan "Get Outside" activities. You'll find links to websites that help you locate local farms, gardens, and parks, as well as more information on the environmental topics in the program.
- During the "Big Finale" activity, your students will have a chance to reflect on what they've learned. Share what your students create with families, school groups, and the rest of your community. Share with Cyberchase by sending photos or links to <u>GreenItUp@thirteen.org</u>.

Find more tips on environmental education at wnet.org/Education/GreenItUp



Imperfect Foods ~~~



🏓 BIG IDEA

In the United States, we throw away a lot of food that could be eaten. This wastes the energy used to grow and distribute those foods and causes problems with too much food in landfills. Unattractive or slightly damaged fruits and vegetables often taste the same and are just as healthy as regular produce but are thrown away simply because of the way they look. You can help to reduce food waste by looking for "imperfect" food at the grocery store and by still eating food, like apples or avocados, even when they look a little funny.

WATCH

Watch the clip from *Giving Thanks Day* where the Cyber-Squad learns that many imperfect fruits and vegetables are wasted on a farm because people don't buy them.

- Ask students to look for the reason there was so much leftover food at the farm while they watch the clip.
- After watching, have a discussion about why so much food was wasted. Ask questions like:
 - Why was there so much food leftover at the farm?
 - How is Jackie going to use the dented pumpkin?
 - What are some other ways food is wasted?
 - How can we reduce the amount of food we waste?

GET OUTSIDE: Food Facts Interview

Visit a local farm, orchard, ranch, bakery, supermarket or farmer's market to learn more about how much energy, time and money goes into making different types of food. Make sure to contact the location first and get permission. Explain that your students are studying the food they eat and would like to ask some questions about how that food is made. Have students prepare questions before the visit to interview someone who works there about the process they use to make the food. They should write down their questions to bring on the visit.

Sample questions for a farm or orchard:

- What are the steps that go into growing this food?
- How long does it take to grow?
- How much water do you use every day to grow that food?
- How many people work on the farm?
- How long does it take to harvest food that is ready?
- Where does the food go when it is ready?
- What happens to food that you don't sell?

Or at a bakery or grocery store:

- What ingredients go into the food you make and where do they come from?
- What steps go into making the food that you prepare?
- How long does it take you to make one loaf of bread, cake, tray of chicken, etc.?
- What happens to food that you don't sell?

Learning about where your food comes from can help you to see what is wasted when that food gets thrown away uneaten.







EXPLORE: Can You Taste "Ugly"?

Students do a blind taste-test to compare "imperfect" and "perfect" foods.

Materials:

- Images of imperfect foods
- Samples of normal-looking foods
- Samples of imperfect foods to taste—Tip: look for food that has bruises on the outside, is too small or too big, or is a funny shape. You can even make your own "imperfect" food by leaving avocado, apple, or banana slices out in the open for a few minutes until they turn slightly brown.
- A whiteboard, screen, or large paper to make a chart
- Blindfolds (optional)



- **1.** Look at the zoomed-in images of imperfect foods and have students try to guess what they are.
- 2. Flip over the images and look at the zoomed-out versions, which show the whole food. How is the whole food different/similar to what you expected?
- 3. Do a blind taste test of some "ugly" or "imperfect foods". Wash your hands. Then prepare bite-size pieces of "imperfect" foods and more "perfect" samples of the same foods. Label one sample "A" and the other sample "B". Make sure to record which is perfect or imperfect for yourself.
- 4. Ask children to close their eyes or offer a blindfold to wear.
- 5. Give each student sample A to taste and then sample B. Have them raise their hands when they think they are eating an imperfect food.
- 6. Record student responses for each food in a chart.
- 7. When all students have tasted all the food, remove the blindfolds or have them open their eyes. Look at your chart and reveal which foods were imperfect and which were not. Could they taste the difference?







🏓 BIG IDEA

Pollinators, like bats, butterflies, and bees, are animals that help to spread pollen from one plant to another so that more plants can grow. They are necessary for growing many fruits and nuts that we eat like almonds, cherries, bananas, avocados, tomatoes, and grapes, as well as most kinds of flowers. Today, many pollinators are losing their habitats (places where they live).

Pollinators ~

WATCH

Watch the clip from *Missing Bats in Sensible Flats* where Brigit explains how bats pollinate her cactus plants.

- Ask students to watch for the steps in the pollination process while they watch the video.
- After watching, have a discussion about why bats are important to Brigit:
 - What did the bats do to help the cactus?
 - How did the bats pollinate the plants?
 - What do you think might be keeping the bats away?

GET OUTSIDE: Portrait of a Pollinator

The first step to taking care of pollinators is understanding why they are important. Another important step is not being afraid of them! Many people are scared of bees and bats, but they are helping us out in many ways. Help your students to appreciate these pollinators by visiting with a local beekeeper or taking a trip to a public cave or zoo to see some bats. You can also spend time in a flower garden to observe pollinators like bees, butterflies, and hummingbirds. Some flies, beetles, and moths are also pollinators. Practice respecting the pollinators at a safe distance. Invite students to create a "portrait of a pollinator" by drawing or taking a picture of what they see. They can then do some research to add fun facts like a description of the pollinator's habitat, what it eats, how it moves, etc.





EXPLORE: Be a Bat!

Students model how bats and other pollinators help plants by spreading pollen from flower to flower.

Pollinators

Materials:

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- Cups
- Pompoms of different colors
- Colored sugar or confetti in the same colors as the pompoms

Add food coloring to sugar or make confetti with a hole punch and tissue paper.

- Kid-friendly tweezers
- 60 second timer



- **1.** Coat the inside of several cups, each with a different color of sugar. These are your flowers.
- 2. Fill the cups halfway with small pompoms (nectar) that match the color of the sugar in that cup and place around the room.
- 3. Give each student a pair of kid-friendly tweezers to be their pollinator "nose" and their own cup where they can collect pompoms.
- 4. Start a timer for 60 seconds. Students need to collect as many different colored pompoms as they can by visiting all the cups around the room. Have each "pollinator" pick up the pompoms one at a time with their tweezers, lift them out of the flowers, and drop them in their own cups.
- After 60 seconds, check the flower cups to see if any pollen (sugar) traveled from one flower to another. If the colors got mixed together, that means the flowers were pollinated.



"FLOWERS"



Fruit and Veggie Container Garden



🕨 BIG IDEA

You don't need a lot of land or a complicated set-up to grow your own food. You can grow your own fruits, vegetables, and herbs in a classroom, at home, or in a community garden. Growing your own food can help you make healthy choices, save money, and help the environment. You can control what pesticides and chemicals you use (or don't use!) and the amount of water you use, so that nothing is wasted. You are also making a green space that gives you oxygen and provides homes for insects and other animals.

WATCH

Watch the clip from *A Seedy Business* where the Cyber-Squad creates gardens to grow their own food.

- Ask students to look for the three things a garden needs to grow while they watch the video.
- After watching, have a discussion about how the Cyber-Squad made their gardens:
 - What three things did the garden need?
 - What was different about the two gardens that the CyberSquad made?
 - Why do you think they wanted to grow their own food?

GET OUTSIDE: Plant Hunt

Plants can grow in all different types of environments, including indoors and outdoors, urban and rural, hot and cold, etc. Encourage students to keep a "plant hunt" journal for a day. Start off with a walk around the block. Have students take photos or draw a picture of the plants they see. Use an app like "Seek by iNaturalist" or a plant field guide to look up what types of plants they find. At the end of the day, combine everyone's notes. Ask the students to reflect on any spaces where they didn't see plants. Where could you plant more green things in your community?





Fruit and Veggie ----Container Garden



EXPLORE: Container Garden

Students create a container garden out of recycled materials.

Materials:

- Waterproof, recycled containers—milk cartons, plastic bottles, tin cans, old rainboots, etc.
- Fruit, vegetable, or herb seeds
- Soil



- Make sure each container has drainage holes in the bottom. If your containers are missing holes, use scissors (or a drill) to make small holes in the bottom.
- 2. Have students fill each container half full of soil.
- 3. Plant seeds in the soil. Larger containers can hold more than one seed. Look on seed packets to find out the right space between seeds and how deep to place them.
- 4. Encourage students to do more research to find out how much water and sunlight each plant needs, how long it takes to grow, and how big the plant will be.
- **5.** Find a place where the plants will get light from the sun.
- 6. Write out a watering schedule that lists each plant and the times it needs to be watered. Assign students to different times on the schedule and post it where everyone can see. Check your plant after a few days and change the schedule if it seems too wet or too dry.



Deforestation



🏓 BIG IDEA

Trees provide the Earth with many things that help other plants and animals (including humans) survive, like air to breathe, places to live, and food to eat. We also use trees to make paper and supply wood for building houses and making furniture. Deforestation is when people destroy forests permanently to create room for farmland, housing, and other buildings.

WATCH

Watch the clip from *Hacker Hugs a Tree* where the Cyber-Squad learns about the importance of the Northern Frontier forest and replants trees to help combat deforestation.

- While watching the video, ask students to look out for what makes forests valuable.
- After watching, have a discussion of why deforestation is a problem
 - How is the forest in the video useful and important?
 - What does it provide for Hacker? What does it do for Cyberspace? How do the kids feel about the forest? What does it do for other animals?
 - What do the kids and Hacker do at the end of the video to help?

GET OUTSIDE: Adopt a Tree

What trees make your part of the world special? Have each student pick out their own tree to "adopt". In their journal, have them record why they chose their tree and what makes it special. Have them think about animals that live near that tree, how the tree provides shade and a place to sit, how the tree makes the place more beautiful, how the tree makes them feel, etc. How would the place be different if the trees were not there? You can also have students use a field guide (online or a book) to help identify the tree they picked.



Activities adapted from Project Learning Tree Curriculum



EXPLORE: Three Cheers for Trees

Students create a mural that helps to communicate why trees are so important.

Deforestation ~

Materials:

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- Paper and drawing materials
- Recycled paper materials like paper towel rolls, paper scraps, paper cups, magazines, catalogues, etc.
- Other craft materials like pompoms, pipe cleaners, markers, paint, etc.
- Glue, tape, or stapler to attach
- Pens or makers for labels



- 1. Brainstorm with students the different places that they find trees in their neighborhoods, at school, in the park, by the side of the road, on a farm, in a forest, at the zoo, etc.
- 2. Invite each student, or pair of students, to choose one location. Have them draw a picture of that location without any trees.
- 3. Have each student make a model of a tree using paper towel rolls, construction paper, paper cups, pipe cleaners, pompoms, tissue paper, etc. To save paper, use as many recycled materials as you can.
- 4. Display the students' drawings next to each other on the wall behind a table or by the floor. Then, have students place their trees in front of the drawings. Ask students how things changed when they added the trees. Where would they rather spend their time? Why?
- 5. Discuss with students the benefits that trees provide. For example, a home for an animal; food; shade; protection from the wind; roots that help keep the soil healthy; leaves/bark/ roots that provide medicine, etc.
- 6. Have each student pick 3 favorite benefits and write them on labels to attach to their model tree.







🏓 BIG IDEA

When we throw food away in the trash, it goes to a landfill where it breaks down slowly, takes up space, and can release harmful methane gas. We can turn food scraps into new soil ourselves by composting. Composting is a process where tiny creatures, called microorganisms, help to break down food and other scraps safely outside of landfills to create healthy soil. Worms can help speed up the process!

WATCH

Watch the clip from *Composting in the Clutch* where Jaden explains how to set up and use a composter.

- Before playing the video, ask students to look for what needs to go into a composter to make new soil.
- After watching, have a discussion of how the composter worked:
 - What did Jaden put into the composter? What are some "brown" materials? What are some "green" materials?
 - Why did Jaden want to compost his food scraps?
 - What else do you need to do to make sure the composter is working?

GET OUTSIDE: Real Life Composter

A great way to learn about composting at home or school is to see it in action. Take students to visit a farm, garden, or garden center near you that composts. Encourage them to learn about the things needed to compost, what foods can and can't be composted, and what are the different stages of the process. Have the students compare this compost process to the classroom worm bin. Ask them if they noticed any differences on their field trip compared to the classroom bin. What was the same? Challenge students to create a composter at home.



Activities adapted from Project Learning Tree Curriculum





- EXPLORE: Make a Worm Bin

Students set up a classroom compost bin and make observations over time to explore what happens to food scraps as they turn into soil.

Materials:

- Earthworms (collect these from garden soil, so that they are native to your area.)
- A glass or clear plastic container (like an aquarium)
- "Green" waste scraps (fresh grass clippings and food scraps of all colors like vegetable peels, cores, etc. No meat, dairy, fat, or oil products)
- "Brown" waste products (dried leaves, pine needles, recycled paper)
- Soil
- Rubber gloves
- Thermometer
- Water

- Encourage students to bring in food scraps from home or collect scraps from lunches or snacks. These are your "green" scraps. You can chop the scraps into some small pieces and some large pieces. Ask students if they think the different sizes will change what happens to the scraps.
- 2. Pass out 3 cards to each player to start and put the rest of the cards in the middle face down. Players may look at their own 3 cards.

- 3. On each player's turn, they have 3 options:
 - Draw a new card from the deck and discard one card from their hand, placing it face up in a designated discard pile.
 - Draw a card from the discard pile and discard a different card from their hand.
 - Swap a card from their hand with one chosen from another player's hand, without getting to look at the other player's cards.
- 4. Repeat these layers until the bin is 2/3 full.
- 5. Water the bin until the materials are moist but not soggy, like a damp sponge. Finish with another layer of soil.
- 6. Add the earthworms.
- **7.** Place the bin so that it will be at room temperature (not in the direct sun).
- 8. Once a week, have a student wearing rubber gloves gently mix the pile and add water if needed.
- 9. Have students make a "Compost Observation Journal" to record changes in the compost bin over time. Each week, they can make a journal entry that includes the temperature of the compost, photos or drawings of food scraps, changes in size of food scraps, what the worms are doing, how many worms they see, etc. If you notice a weird or bad smell, check your bin to make sure that it isn't too wet and that the worms are healthy.
- **10.** It will take about 3 months for all of your food scraps to break down into soil. Then you can release your earthworms back into nature, if you got them from outside. Do not release worms that you bought at a store. Leave your soil in the freezer for a month to make it safe to use for planting.





🏓 BIG IDEA

Green It Up

Where does the food you eat come from and how does it get from there to your plate? Many people don't know that the foods they eat travel long distances to get to the local store or market. When food travels by plane, boat, or truck, it uses a lot of energy and creates pollution along the way. You can help by choosing, when possible, to eat local foods in the season when they grow.

WATCH

Watch the clip from *Journey of a Thousand Food Miles* where Jackie and Inez map out their journey for Digit and explain how far some cherries traveled to get to their local store.

- While they watch the video, ask students to look out for the different places the cherries travel.
- After watching, have a discussion of why food miles are an environmental issue. Here are some questions to get you started:
 - Where did the cherries go in between the farm and the store? How did they travel between those places?
 - What happens when a lot of trucks are driving back and forth to deliver food? How do you think this impacts the plants, animals, and people who live near the road?

GET OUTSIDE: Find Local Flavors

Take students to visit a local farmer's market or grocery store. Make a list of local foods and challenge students to find out where they come from. They can look on store signs or food labels for the specific names of farms, cities, or states. Have them record the location each food came from on a map. Students may use Google maps or another online tool to calculate the minimum number of food miles each food had to travel to get to your local store or market. Encourage them to find the foods that have traveled the fewest miles to get to you.





Food Miles

- EXPLORE: Digit's Menu Madness Card Game

Students practice planning meals that use more local ingredients through a food miles card game.

Materials:

Food Miles Cards for every 3-4 students



- In this game, groups of 3-4 players make a menu for Digit's Restaurant that includes a main dish (green), a side dish (yellow), and a dessert (blue). Each card has a part of the meal on it with the number of miles (from 10-100) that food has traveled to get to the restaurant written underneath. Each person tries to make a complete meal that adds up to the lowest number of miles traveled.
- 2. Pass out 3 cards to each player to start and put the rest of the cards in the middle face down. Flip over the top card from the deck into a new pile face-up. This will be the discard pile. Players can look at the cards in their hand. At the end of every turn, players should still have 3 cards in their hands.
- 3. On each player's turn, they have 3 options:
 - Draw a new card from the deck and discard one card from their hand
 - Draw a card from the discard pile and discard a different card from their hand
 - Swap a card from their hand with one chosen at random from another player's hand.
- 4. After each player has had 5 turns, everyone puts their hand face up on the table. Each meal must have a main dish, a side dish, and dessert to be complete (a blue, green, and yellow card).
- 5. Add up the miles for each complete meal. The person who has a complete meal that traveled the least food miles wins! If no one has a complete meal, keep going for another 5 turns, then add up the meals again.



Flower Gardens -----



-BIG IDEA

Flower gardens are not just beautiful places to enjoy nature, they also create food and homes for insects and other animals. Gardens also help to clean the air by changing carbon dioxide into oxygen for us to breathe. You can plant a garden almost anywhere, even in some unexpected places.

WATCH

Watch the clip from *A Garden Grows in Botlyn* where the CyberSquad creates an urban community garden.

- Ask students to ask students to watch for the benefits of a community garden while they watch the video.
- After watching, have a discussion of why the CyberSquad wanted to make a garden in Botlyn. Here are some questions to get you started:
 - What animals did you see that might make a home in the "Carroll Street Garden"? What did the garden have that those animals needed?
 - What did the kids and other people living in Botlyn get from the garden?

GET OUTSIDE: Garden Observation

Visit a local botanical garden or community garden to see their benefits in real life. If you don't have a local garden, you can spend time in a park or backyard space that has some flowers or plants.

- **1.** Have each child pick a spot where they can comfortably sit for a full 5 minutes.
- 2. Start a timer and tell students to just sit and observe. Remind them to use four of their five senses (don't taste anything!) to really observe the space. Have them think about what animals they see, what colors and shapes they notice, what they can smell, what sounds they hear, what different textures they feel around them, etc.
- 3. Come back together as a group and share what they observed.
- 4. Have students record their observations by drawing a picture, writing a poem or story, or creating another piece of art inspired by their garden plot.



Flower Gardens ~~



EXPLORE: Recycled Community Garden

Students work together to create a make-believe community garden out of recycled materials.

Materials:

Sreen It

- A piece of paper for each child
- Recycled materials (paper towel rolls, yogurt containers, plastic bottles, magazines, newspaper, tissue boxes, etc.)
- Scissors
- Tape, stapler, and/or glue
- Markers or paint to decorate



- 1. Hand each student a piece of paper. Have the students fold and tear or cut the paper across the middle horizontally, so that they have two pieces.
- 2. Have each student write their name on both pieces of paper.
- 3. Pick a space for your community garden either on the floor or on a wall. It should be big enough for every child to place both pieces of paper inside. Mark off the garden space with masking tape.
- 4. In small groups, have students place their sheets of paper into the garden to plan out where they want their flowers to go. They can place both pieces of paper next to each other or spread them out in the space.
- 5. Using a wide variety of recycled materials, students should make their own flowers and other plants to fill up their plot (the two pieces of paper). Decorate with markers or paint. Use the Use the images to the left as a guide, but allow students to be creative!
- 6. Have each student place their flowers on their pieces of paper in the garden when they are ready. If the garden is on the wall, make sure that the flowers are securely attached.
- 7. As a large group, discuss what other things they would like to have in the garden, like paths, benches, fountains, animals, etc. Have students work in small groups to create insects and animals, especially pollinators, and other additions to place all over the garden.

Big Finale ~~

🏓 BIG IDEA

Sreen & U

There is a lot that we can do to impact the environment. What issues are important to your students? Help them think about what they've learned and take the time to share with others things they can do to support and protect nature in our communities.

- WATCH

Watch the clip from *Space Waste Odyssey* where the Cyber-Squad and Motherboard share what they've learned about creating less trash with the citizens of Cyberspace.

- Before playing the video, set up the story by explaining that the CyberSquad noticed a lot of trash was building up in "trash patches" in Cyberspace. They examined the trash to find out what was causing the problem.
- After watching, have a discussion of what environmental issue was important to the CyberSquad and what they did about it:
 - What was the problem that the CyberSquad saw?
 - What was one way that they thought people in Cyberspace could fix that problem?
 - How did they spread the word about making less trash to other people?
 - Why is it important for the CyberSquad to share what they've learned with other people?

EXPLORE: Use Your Voice

Discuss as a group which environmental issues the students feel most strongly about in their community and make a plan to share.

Materials:

- Research materials to learn more about a topic
- Art materials for posters or digital materials (like a cell phone camera or a blog post)

- 1. Lead your students in a reflection about their Green It Up experiences. Based on what they have learned in Green It Up, what is an environmental problem that exists in their school, neighborhood, or at home? Which issues do they think are less well-known by their family, friends, or neighbors?
- 2. Decide on one (or a few) key issues for your community. If your students are interested, encourage them to do more research to see what's happening in your community around this issue. Are there other groups involved?
- 3. Help students brainstorm ways that they can share the information they've learned with as many people as possible. Examples include short video Public Service Announcements (you can use a cell phone camera), a page for the school website, articles for a school newspaper or blog, or posters for public spaces.
- 4. Have students work in teams to create their materials. Focus on including information about *why the issue matters* and *what people can do to help*. Have students decide what to make and work in teams to create their materials.



GET OUTSIDE

Put up student posters in a physical public space (make sure to get permission before posting anything) or share their videos or blog posts through an online platform (make sure everyone in the video is ok with sharing!) You can also host a culminating event for family and friends where students share what they've learned and present their materials along with suggestions for ways that everyone can help out.

Share your finished PSA videos, posters, blog posts, etc. by tagging @Cyberchase on Facebook or sending them to: GreenItUp@thirteen.org



