GLOBAL SUSTAINABILITY CHALLENGE

RECYCLING

CHALLENGE

1 million plastic bottles are bought around the world every minute, and this number is set to increase to half a trillion a year by 2021. On average, less than half are turned in for recycling. Follow the lead of the San Francisco Giants by setting up a recycling plan for your home.

ACTION

1. Make a list of all the items in your home that could be **recycled**. Include food scraps, newspaper/magazines/paper, cardboard, and anything else you throw away. Remember to check food packaging for **recycling** symbols.
2. Calculate how many items you could **recycle** and save from being dumped in a landfill in a week, a month, and a year. Use your list and addition and multiplication to calculate.
3. Create a sign to remind your family to **recycle**. Include at least two facts and two images on your sign.

Bonus Project:

Engineer an upcycled, reusable bag that you and your family can use for shopping. Consider a variety of materials (e.g., t-shirt, twine, duct tape) and a variety of methods (e.g., sewing, tying, taping). Get creative with it!

NGSS for Grades 6-8

MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Common Core for Grades 6-8

WHST.6-8.1 Write arguments focused on discipline content.
6.SP.B.5 Recognize and represent proportional relationships between quantities.

EXPLORE RESOURCES

Danielle Nkojo provides a behind-the-scenes look at what happens to waste in Washington D.C.
Beth Gingold describes her job as the manager of the recycling program for D.C. public schools.
Julienne Bautista shares how she began her career in storm-water management.
Recycling and trash cans on a city corner.

Not a current Discovery Education user?
Sign up for a Live Demo to access these resources.

GLOBAL SUSTAINABILITY CHALLENGE

LOCAL FOOD SOURCING

CHALLENGE

Food production and waste has a major impact on the environment. Currently, food production creates approximately 30% of global greenhouse gas emissions, contributes to deforestation when forest land is converted to pastures for raising livestock, and uses 70% of our available water resources. In addition, The Food and Agriculture Organization of the United Nations (FAO) estimates that one-third of all food produced for human consumption is lost or wasted.

Without action, we risk further environmental damage along with food and water shortages. Join the efforts of the Boston Red Sox to help the environment and encourage healthy eating by reducing waste and creating local gardens.

ACTION

Ready to make an impact? Take the challenge and follow the steps below to contribute to a reduction in greenhouse gases by focusing on food and waste:

1. **Become a food waste detective for a day.** What items of food is your family throwing out? Make a list of any items that could be incorporated into another meal, as leftovers or as ingredients in a new dish. What percentage of your family's food goes to waste? Calculate the percentage of food your family wastes. How much edible material is going to waste? Research the percentage of food that goes to waste in your country each day, week, or year and compare your family's percentage to the national number.
2. **Choose something edible to grow.** Although you may not have access to a garden like the one at Fenway Park, you can grow edible items on a windowsill or another small space where you live. If you want something easy, consider herbs, cherry tomatoes, or lettuce. If you want a bigger challenge and have the space, consider growing melon, zucchini, or carrots. Keep a growth chart for your seedling or plant. Celebrate your first harvest with a special snack made with the food you grew.
3. **Plan a nutritional meal for your family with a focus on local ingredients that are in season.** Create a menu that explains the nutritional value of each item. If possible and with permission, prepare and serve the meal. Be sure to write down your menu so you can use it again.

Bonus Project:

Volunteer at a food bank. Consider making it an event for your team, class, family, club members, or friends. Work with the organization to figure out scheduling and which job would be best for your group. If volunteering on site is not an option, ask about organizing a food donation drive.

NGSS for Grades 6-8
MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
Common Core for Grades 6-8
CCSS.ELA-LITERACY.W.6-8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
7.RP.A.2 Recognize and represent proportional relationships between quantities.

EXPLORE RESOURCES

Learn more about the impact of food production and waste, and how you can make a positive difference in this global challenge.

- Social Studies: World Food Day
- Fresh Food: What Is Farm to Table?
- Fighting Hunger in Los Angeles
- STEM Careers: Tambra Raye Stevenson, CEO and founder of WANDA: Women Advancing Nutrition, Dietetics, and Agriculture
- STEM Careers: Natasha Nichols, the founder of a successful community garden

Not a current Techbook or Streaming Plus user? Sign up to get a live demo to access these resources.

GLOBAL SUSTAINABILITY CHALLENGE

SOLAR ENERGY

CHALLENGE

We currently rely on a variety of sources to produce energy, but the processes to harness the power of materials like coal, oil, and gas are harming the environment. From the contamination of our air and water to the acceleration of climate change, generating power from fossil fuels and nuclear energy is not sustainable.

What about the sun? According to the National Renewable Energy Laboratory, the earth receives enough sunlight in one hour to meet the annual energy needs of all people worldwide. Solar energy is clean, renewable, and the costs of installation are decreasing. Shine like the San Diego Padres as you learn about harnessing the sun's energy.

ACTION

Ready to make an impact? Take the challenge and follow the steps below to work towards energy conservation and a brighter future with solar power:

1. **Build a plan for conservation in your home or classroom.** Begin by taking an inventory of light sources in the space. Think about whether you could save energy by making changes. Are there natural light sources you could maximize? Are there incandescent light bulbs you could swap out for more efficient LED bulbs? Are you conserving energy by turning lights off when they're not needed? Little things add up!
2. **Capture a bit of solar energy.** Experiment with a variety of materials you already have (e.g., clear plastic containers, pieces of construction paper of various colors, aluminum foil) to see if you can warm water to different temperatures using only solar energy. Develop a hypothesis based on your assumptions about volume, heat absorption along the color spectrum, and other factors. Use a thermometer to measure water temperatures at a minimum of two time markers, such as 5 and 15 minutes. Make a chart to represent your findings, and draw conclusions based on your experiment.

Bonus Project:

Investigate your own county, city, or state. Research how much of the current power grid is based on solar energy versus other types of energy. Research corresponding energy plans to discover whether there is an intention to increase reliance on renewable sources. Create a graph to represent the current sources of energy and the projected changes over the next 10 years.

NGSS for Grades 6-8

MS-PS3-3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

Common Core for Grades 6-8

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

WHST.6-8.1 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

EXPLORE RESOURCES

Learn more about the potential of solar energy and how energy conservation combined with a commitment to renewable sources will help you make a difference in this global challenge.

- Harnessing the Power of the Sun
- How Solar Panels Work with Tim Hebrink at 3M
- Solar Power Glass Bricks Generate Energy While Letting in Light

Not a current Techbook or Streaming Plus user? Sign up to get a live demo to access these resources.

GLOBAL SUSTAINABILITY CHALLENGE

COMPOSTING WASTE

CHALLENGE

The Environmental Protection Agency (EPA) estimates that 30% of what we throw away is food scraps and yard waste. When these organic materials wind up in a landfill, they contribute to greenhouse gas emissions, and we miss an opportunity to use them to enrich the soil. Composting a combination of plant matter and fruit and vegetable waste results in a potent mix that benefits soil and everything that grows in it.

Composting requires a mixture of materials that produce carbon and nitrogen combined with moisture to help break it all down into a usable form. Dig into the specifics of composting with the Washington Nationals and help keep beneficial materials out of landfills and in the soil.

ACTION

Ready to make an impact? Take the challenge and follow the steps below to learn more about composting and what you can do to reduce waste and keep the earth healthy:

1. **Create a chart that identifies what can be composted and what cannot.** Use the resources below to gather information about composting. Explain why some things are compostable, and some are not. Then, describe the different types of material—sometimes called the Browns and the Greens—that can be composted and what each material contributes to the process.
2. **Develop a plan that would allow you to take part in composting.** If it is not possible to compost at home, develop a proposal for your school. (If your school already composts, that's great! Ask if you can talk to the staff member in charge about successes and challenges.) Depending on where you live or the configuration of your school, you can decide whether to compost indoors or outdoors. Or, consider joining a neighborhood program or enlisting a composting service.
3. **Build or identify a container for composting.** Based on your plan, come up with a container that is appropriate. You may find a large plastic container that would otherwise be recycled to keep on your countertop, save up to buy a container specifically made for composting, or build something on your own. Then, start filling your container and take the first steps to make compost!

Bonus Project:

Take a Compost Field Trip. Do a little local research to identify locations where you can see composting in action, such as a local community garden or composting facility. If you are unable to set up an in-person visit, make it a virtual field trip and visit places online that have composting videos and information. Then, volunteer to help organize a field trip for your class or invite a professional to come talk to students at school.

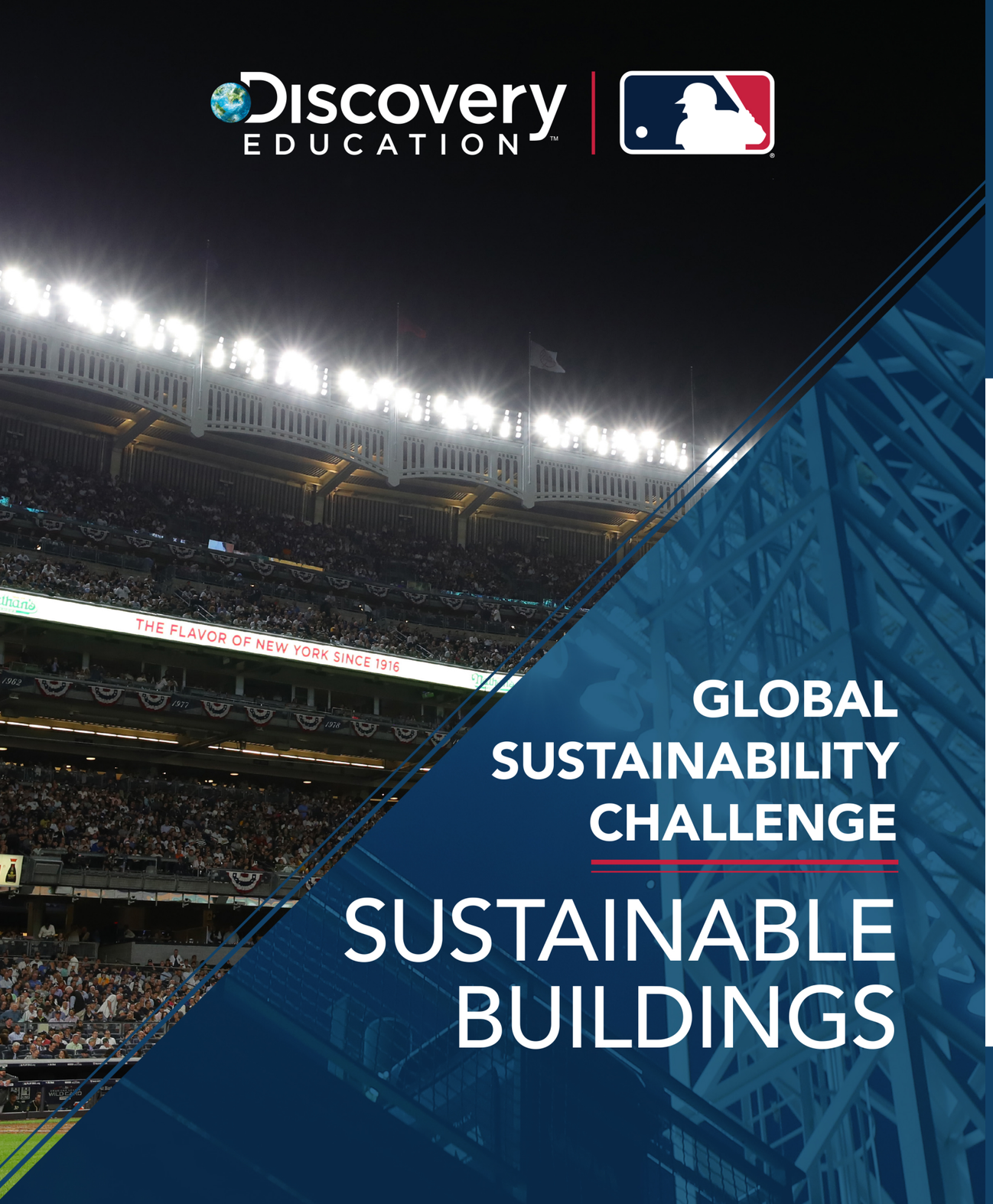
NGSS for Grades 6-8
MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
Common Core for Grades 6-8
WHST.6-8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

EXPLORE RESOURCES

Now that you've learned how the Washington Nationals are putting a focus on composting in their stadium, learn more about composting at home and in your community.

- Reuters News: 2018-11-02: Two UK Farmers Create Compostable Crisp Packets
- Composting Facility: Behind the Scenes
- Food Waste: Save Food to Save the Planet

Not a current Techbook or Streaming Plus user? Sign up to get a live demo to access these resources.



GLOBAL SUSTAINABILITY CHALLENGE

SUSTAINABLE BUILDINGS

CHALLENGE

Building a sustainable facility takes a variety of practices that all contribute to one goal. LEED certification is one way to measure and recognize buildings that meet exacting standards of efficiency. (LEED stands for Leadership in Energy and Environmental Design.)

From water conservation to composting, to smart energy sources, the Minnesota Twins facility has received LEED certification four times. Commit to a sustainable future with the Minnesota Twins as you learn about ways to take action in your community.

ACTION

Ready to make an impact? Take the challenge and follow the steps below to inventory areas that are energy efficient and innovate as you imagine what's possible for the future:

1. **Create an efficiency checklist to certify one of your spaces.** Using the LEED certification process as a model, create your own "certification" tool for one of the spaces in which you spend time (e.g., your room, your home, your school, your library). The LEED certification process includes nine areas: 1) Integrative process, 2) Location and transportation, 3) Sustainable sites, 4) Water efficiency, 5) Energy and atmosphere, 6) Materials and resources, 7) Indoor environmental quality, 8) Innovation and 9) Regional priority. After you've created the checklist, complete your inspection, and "certification."
2. **Make a video about practices you've documented or implemented in your own space.** The Minnesota Twins video talks about a variety of sustainable practices they've implemented, from using compostable products and keeping waste out of landfills to reusing rainwater. Make a video that highlights what you are doing in your personal life to contribute to global sustainability.
3. **Design a building that incorporates innovative solutions for common needs.** Select a building that you'd like to design—a home, a recreation center, a ballpark—and include existing or inventive ways to increase efficiency. Maybe you could orient the building to maximize the use of daylight or invent a product that uses the actions of visitors to generate energy. Have fun innovating!

Bonus Project:

Visit a LEED-certified building and, if possible, talk to someone that was involved in meeting the certification requirements. Be sure to send a thank you note!

NGSS for Grades 6-8

MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Common Core for Grades 6-8

WHST.6-8.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

SL.6-8.5 Include/Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

EXPLORE RESOURCES

- Kansas's First LEED Platinum Commercial Building
- Today's Green Minute: Greenest Skyscraper Ever?
- Soccket: A Green Way to Turn Play into Energy
- STEM Careers: Jaime Leal-Morales

Not a current Techbook or Streaming Plus user? Sign up to get a live demo to access these resources.

GLOBAL SUSTAINABILITY CHALLENGE

WATER CONSERVATION

CHALLENGE

When you look at a globe or map of the world, you might not realize what a truly precious resource water is. It seems like there would be more than enough, but people can only use 1% of all the water on Earth: the other 99% is salt water or frozen solid.

Water conservation is critical to our survival. Many people already lack access to drinkable water and, as the planet's population grows and agriculture needs more water for crops, our access to clean water becomes even more critical. There are simple ways to conserve water and, even if your contribution seems like a drop in the bucket, it's a drop that wasn't wasted and that all adds up.

Get in the flow with the New York Mets as you learn about ways to save water and contribute to global conservation.

ACTION

Ready to make an impact? Take the challenge and follow the steps below to identify areas where water is wasted and find out what you can do to save more of this precious resource:

1. **Adjust your brushing routine for conservation.** Just turning off the tap while you brush your teeth can save FOUR GALLONS of water! And, of course, you brush twice a day, doubling the impact. Make a chart for yourself or your family to track the amount of water saved through this practice, alone. Set a goal for the number of gallons you can save in one month.
2. **Expand your water conservation.** Take the faucet control you've developed for tooth brushing to other areas of the home. Create an inventory of all the water uses in your home (e.g., kitchen sink, washing machine, toilets) and then calculate how much water your family could save if small adjustments are made in how you used that water. For example, you could time your showers or only run the dishwasher when it's full. Propose these small changes and track which ones ultimately save the most water.
3. **Establish a simple rainwater collection system for watering plants.** From a bowl to a bucket, to a barrel, every drop of rainwater that's captured and reused makes a difference. Choose a container that won't let light in, to reduce algae growth, or use the water right away for indoor plants. Then, research what it would take to install a rain barrel system on your property, whether in your yard, on your building's rooftop, or at your school. Present your findings to the person who could help you make it happen.

Bonus Project:

Design a water conservation game. Research the question "Where does my water come from?" and design a game board that traces the path your drinking water takes (you may have to do some research on your local water supply). Then, create a game—complete with game pieces, fun facts, detours, and roadblocks—that has as its goal, a drop of water making it into your glass.

NGSS for Grades 6-8

MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing human impact on the environment.

MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

Common Core for Grades 6-8

WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems by reasoning about the quantities.

EXPLORE RESOURCES

- Human Use of Water
- Smart Cities Virtual Field Trip: Global Impact
- Sewage Water: A Valuable Resource

Not a current Techbook or Streaming Plus user? Sign up to get a live demo to access these resources.