

CLIMATE CHANGE

Hudson River Solutions

Objectives and Standards

Objectives

- Describe a variety of different existing climate solutions.
- Design a climate change campaign to implement in the community that utilizes one or more climate solutions.

NYS P-12 Science and Engineering Practices

- Constructing explanations and designing solutions
- Obtaining, evaluating, and communicating information

NYS Next Generation ELA Anchor Standards

- Writing Standard 5: Draw evidence from literary or informational texts to support analysis, reflection, and research.

Materials

- [PowerPoint - Climate change: Hudson River Solutions](#)
- Gallery walk sheets printed and posted around the room
- Ranking sheet (5 copies, 1 copy per group)
- Climate Change Campaign Strategy Planning Brainstorm (1 copy per student)
- Post-survey (1 copy per student)

Engage (5 mins)

What was your favorite part of the field trip? Discuss as a class! Students can also write, draw, or talk with a neighbor about their favorite part of their field trip.

If you did not come on a field trip, an alternative way to start is to have students write, draw, or talk with a neighbor about the following question(s):

- Imagine a Martian has landed on Earth and hears people talking about climate change. The Martian asks you what climate change is. How do you reply?
- What are some solutions to climate change?



Explore (5 mins)

As a class and using the PowerPoint, recap the causes of climate change: When humans burn fossil fuels, we release greenhouse gases into the air. Greenhouse gases trap heat in the atmosphere, causing Earth's temperature to rise and the climate to change.

What are some impacts of climate change on the Hudson Valley? Have students think-pair-share to see what they remember from their field trip and the pre-field trip lesson. After the think-pair-share, ask students to report to the class what they discussed with their partners. Show images of climate change impacts on the Hudson Valley (see PowerPoint). Be sure to emphasize that climate change does not impact all people equally. People of color and low income communities experience the brunt of climate change impacts. Therefore, climate change is not only a scientific issue, but an equity issue, which must be addressed when devising and implementing solutions.

Tell students that while climate change can be a very daunting problem, that there are, in fact, many solutions. We are going to explore some of those solutions now.

Explain (25 mins)

Divide students into groups for a Gallery Walk to learn about some of the most impactful climate solutions as determined by [Project Drawdown](#), "the world's leading resource for climate solutions," as well as ways in which Clearwater is working towards climate solutions. Each station will have a reading about a different climate solution and a Ranking Sheet.

At each solution station, students will read about a climate solution and will discuss the extent to which they feel they can be a part of that solution. Then, as a group they will rank how strongly they feel as though they can participate in that solution from 1-4 (1=least likely to participate, 4=most likely to participate). Groups will write their ranking on the Ranking Sheet for each solution station, as well as a justification for their ranking.

For example, after reading about how having a plant-based diet is a solution to climate change, I might rank that as a 4 because I already don't eat that much meat and I think it would be easy to eat even less meat.

We recommend that students spend 3-5 minutes per solution station. If you do not have enough time to send students through all 5 solutions, you can use 3-4 stations, or have this be an independent activity.

Expand/Elaborate (20 mins)

How can you make a difference? Now that students have explored some climate solutions through the Gallery Walk, they will work on the Climate Change Campaign Strategy Planning Brainstorm to think about how they can put a climate solution into practice.

Evaluate (5 mins)

Possible ways to conclude the lesson are:

- Have students complete the post-survey.
- Students can report out on the Campaign Strategy Planning Brainstorm worksheet.
- Have students respond to the following question: Of the solutions that you learned about today, which one would you be most likely to participate in and why?

Extension

Have students explore our online tool, [Climate Change Virtual Sail Down the River](#) to learn more about climate change impacts and solutions in the Hudson Valley, as well as what Clearwater is doing to be involved.

This Project has been funded in part by a grant from the New York State Environmental Protection Fund through the Hudson River Estuary Program of the New York State Department of Environmental Conservation.



Gallery Walk

Plant-based diet



Every time a cow burps or farts, more methane, a powerful greenhouse gas, is released into the atmosphere. If cattle were their own nation, they would be the world's third-largest emitter! Our meat-heavy Western diet comes with a steep climate price tag: one-fifth of global greenhouse gas emissions.

Eating more plant-based foods lowers demand for meat. Lower demand for meat reduces deforestation, fertilizer use, burping cattle, and other related greenhouse gas emissions.

According to a 2016 study, emissions could be reduced by as much as 70% through adopting a vegan diet. Having a vegetarian diet, which includes cheese, milk, and eggs, could reduce your greenhouse gas emissions by 63%.

Plant-rich diets also tend to be healthier, leading to lower rates of chronic disease. \$1 trillion in annual health-care costs would be saved.

Bringing about dietary change is not simple because eating is both personal and cultural, but it is possible. Plant-based options must be available, visible, and appealing, including high-quality meat substitutes like Beyond and Impossible burgers.

As Zen master Thich Nhat Hanh has said, making the transition to a plant-based diet may be the most effective way an individual can stop climate change.

Adapted from [Project Drawdown](#).

Reducing food waste



Roughly a third of the world's food is never eaten. This means that land and resources used and greenhouse gases emitted in producing uneaten food were unnecessary. The food we waste is responsible for roughly 8% of global greenhouse gas emissions.

Losing food to one waste heap or another is an issue in all countries. In some countries, food rots on farms or spoils when it is stored. Improving food storage, processing, and transportation can dramatically reduce food waste.

In other countries, people reject food based on bumps, bruises, and coloring. They also order, buy, and serve too much. Governments in these regions can create goals and policies to encourage widespread change. On an individual level, people can buy and serve less food to ensure that food is eaten, not wasted. Organizations can work to reduce food waste, too. For example, Clearwater always composts at Revival, a music festival that Clearwater hosts.

What do you think of when you hear the term 'waste'? Do you think it means different things to different people (i.e., people with more/less power, wealth, etc.)? Why or why not?

Adapted from [Project Drawdown](#).

Health and Education



It is critical that we center human rights, like gender equality, in our work towards climate solutions. In fact, Project Drawdown has identified educating girls and women as one of the most powerful climate solutions. Research has shown that women with more years of education have fewer and healthier children. Fewer people on the planet means lower levels of greenhouse gas emissions.

Education also equips girls and women (and all people) to face the impacts of climate change. They can be more effective stewards of food, soil,

trees, and water, even as nature's cycles change. They have greater capacity to cope with shocks from natural disasters and extreme weather events. We can reduce barriers to education (and therefore other opportunities) by making schools affordable, inclusive, and accessible to everyone.

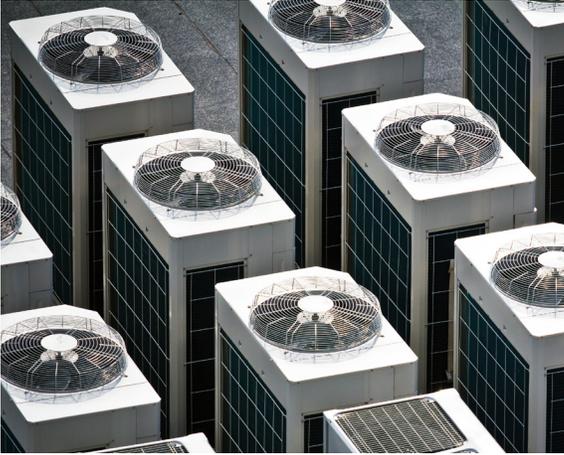
At Clearwater, we also believe in the power of educating all people about climate change as a climate solution. Our programs teach students about how climate change is impacting the Hudson River. Our Environmental Action Department has led discussions in Hudson River Valley communities to raise awareness around climate change impacts and ways to be resilient in the face of these impacts. We also participate in educational events like Sustainable Hudson Valley's Climate Solutions Week to help educate around ways to engage in climate solutions.

Individuals can be climate educators, too. If you talk about climate change with your family, friends, and community, then you are helping to build towards a greater public knowledge of climate change risks. The more people understand about climate change, the better able we will be to achieve solutions.

Adapted from [Project Drawdown](#).



Refrigerant



Every refrigerator and air conditioner contains chemicals called “refrigerants” that absorb and release heat to enable chilling. HFCs (hydrofluorocarbons) the primary refrigerant used today, have 1,000 to 9,000 times greater capacity to warm the atmosphere than carbon dioxide.

In October 2016, officials from more than 170 countries met in Kigali, Rwanda, to address this problem. They decided that the world will phase out HFCs—starting with high-income countries in 2019, then some low-income countries in 2024 and

others in 2028. Substitutes are already on the market, including natural refrigerants such as propane and ammonium.

In the meantime, what should you do with your refrigerator at home? Keep an eye out for leaks. If your refrigerator is leaking refrigerants, you can call a refrigerator repair service to come fix it. If you need to get rid of your refrigerator, look up how your city or town wants you to dispose of it. It is critical to dispose of refrigerators properly so that refrigerants don’t end up leaking out in landfills and contributing to greenhouse gas emissions.

Adapted from [Project Drawdown](#).

Advocacy



Advocacy means making your voice heard about an issue that is important to you. When you make your voice heard, you can influence decisions made by government officials, policymakers, and community stakeholders about those issues.

Being an advocate about climate change is a climate solution. When you make your voice heard by participating in marches, calling your elected officials, or urging your adult family members to vote for particular people or laws, you can affect positive change.

Clearwater has a deep history of advocating for the health of the Hudson River. This legacy continues today, often in the form of advocacy around climate change topics. For example, in August of 2021, we organized a flotilla to protest the potential expansion of Danskammer, a greenhouse gas-emitting power plant. Kayakers, paddleboarders, and canoers accompanied the *Clearwater* and another sloop, the *Woody Guthrie*. It was like a march, only on water!



Ranking Sheet

How likely are you to participate in this climate solution? As a group, check one of the boxes (1, 2, 3, or 4) and then write a justification: why did you select that number?

	1 = very unlikely	2 = not likely	3 = likely	4 = very likely	Justification
Solution 1 _____ _____ _____					
Solution 2 _____ _____ _____					
Solution 3 _____ _____ _____					
Solution 4 _____ _____ _____					
Solution 5 _____ _____ _____					



Climate Change Campaign Strategy Planning Brainstorm

GOALS

What are the long-term climate goals of your campaign? (ex. reduce community food waste, protect native species, raise awareness of a particular climate change problem or solution...)

What are the benefits of accomplishing your goal? Are there ways that accomplishing your goal can provide additional benefits that are not directly related to climate change? (ex. saves money or time, helps someone else accomplish something, gives people a voice where they previously had none, provides health benefits...)

OPPORTUNITIES

Brainstorm places that you already have influence to make changes happen (ex. at home, school, in an organization you are involved with...)

Are there places where you have noticed a need or opportunity to implement a climate change solution? How will your solution serve people most impacted by climate change?

PARTNERS

Who can help you and what resources will they provide? (ex. teachers, coaches, friends...)

TACTICS

Brainstorm simple things you can do to work towards your goal in the places you spend most of your time (ex. put up signs reminding others to conserve energy, get classmates to sign a pledge committing to eat less meat, write to elected officials...). Are you using any of the climate solutions you learned about during the Gallery Walk?



OBSTACLES

What are some obstacles you might encounter and how would you overcome them?

DESIGN YOUR CAMPAIGN

Using everything you have brainstormed, design an achievable project that you can put into action to address the climate problem you are concerned with. In your campaign design, which you can do on a separate sheet of paper, make sure to include the following:

- Your goal(s)
- What your project is
- How your project will achieve your goal(s)
- Who will be involved in the project
- A timeline
- A visual component to advertise your project (ex. A poster, flyer, social media post...)



Climate Change Post-Survey

Date: _____

School: _____

Grade _____

Questions	1= Not at All	2= A little	3= Somewhat	4= Yes	5= Absolutely
I am knowledgeable about environmental issues.					
I understand the causes of climate change.					
I know how climate change will affect my community and the Hudson River					
I know what I personally can do to help address the causes of climate change.					
I feel prepared to talk with others about climate change and what we can do to address it.					

