Mitigating Climate Change

Competency

Educators will understand the key drivers of greenhouse gas emissions in the K-12 education system and take action to reduce the environmental impact on their school community.

Key Method

Educators will connect the key drivers of greenhouse gas emissions to an action they can take in their classroom or building. They will also create both a detailed action plan and a presentation to serve as a call to action for their students and/or school community.

Method Components

Mitigation

According to the [Environmental Protection Agency](), "human activities are responsible for almost all of the increase in greenhouse gases in the atmosphere over the last 150 years. The largest source of greenhouse gas emissions from human activities in the United States is from burning fossil fuels for electricity, heat, and transportation."

Mitigating climate change is focused on both reducing the rate of climate change and preventing further harm. This is achieved by limiting greenhouse gas emissions by taking part in and promoting activities that reduce or eliminate these gases from the atmosphere.

Key Drivers of Emissions

According to the EPA, the primary sources of greenhouse gas emissions by economic sector in the United States are:

- Transportation (28% of 2021 greenhouse gas emissions) – The transportation sector generates the largest share of greenhouse gas emissions. Greenhouse gas emissions from transportation primarily come from burning fossil fuels for our cars, trucks, ships, trains, and planes. Over 90% of the fuel used for transportation is petroleum-based, which includes primarily gasoline and diesel.[1]
- Electricity production (25% of 2021 greenhouse gas emissions) – Electric power generates the second largest share of greenhouse gas emissions. Approximately 60% of our electricity comes from burning fossil fuels, mostly coal and natural gas.[1]
- Industry (23% of 2021 greenhouse gas emissions) – Greenhouse gas emissions from industry primarily come from burning fossil fuels for energy, as well as greenhouse gas emissions from certain chemical reactions necessary to produce goods from raw materials.[1]
- Commercial and Residential (13% of 2021 greenhouse gas emissions) – Greenhouse gas emissions from businesses and homes arise primarily from fossil fuels burned for heat, the use of certain products that contain greenhouse gases, and the handling of waste.[1]
- Agriculture (10% of 2021 greenhouse gas emissions) – Greenhouse gas emissions from agriculture come from livestock such as cows, agricultural soils, and rice production.[1]

You can read more about the sources of greenhouse gas emissions in detail from the EPA's resource [here](#).

Reducing carbon emissions requires transitioning to cleaner, renewable sources of energy, such as solar and wind power as well as increasing energy efficiency. Other strategies include reducing deforestation and promoting reforestation, improving agricultural practices to reduce emissions from livestock and soil, and implementing sustainable industrial processes. Addressing transportation emissions involves increasing the use of low-carbon transportation options, such as electric vehicles and public transportation, and promoting active transportation options, such as walking and biking.

Reducing the Carbon Footprint of Our Schools

K-12 public schools have substantial resource needs that impact the environment, including land, energy, buildings, food, water, and transportation. Schools also play an important role in mitigation efforts.

Why Should Schools Reduce Their Carbon Footprint?

There are several benefits for students, their families, and the community at-large from schools working to reduce their carbon footprint. Some of these benefits include:

1. **Climate change:** Schools are one of the largest public sector energy consumers, operating a fleet of about 480,000 school buses and serving 7 billion meals annually. Every school's carbon footprint contributes to climate change. Reducing the carbon footprint of schools can help mitigate the impact of climate change and promote a more sustainable future.
2. **Health and well-being:** By reducing their carbon footprint, schools can improve indoor air quality, promote active transportation options, and increase access to healthy food. This can have positive impacts on the health and well-being of students, staff, and the local community.
3. **Financial savings:** Reducing energy consumption and waste can lead to cost savings for schools. Energy-efficient buildings, for example, can lower utility bills, and reducing food waste can save on food costs.
4. **Education and awareness:** By reducing their carbon footprint, schools can educate students and the wider community about the importance of sustainability and climate action. This can promote awareness and understanding of environmental issues and inspire action.
5. **Leadership:** Schools can demonstrate leadership in sustainability and climate action. By reducing their carbon footprint, schools can set an example for the community and inspire others to act.

How Can Schools and Districts Mitigate Their Climate Impact?

One way school districts can promote climate solutions is to develop a comprehensive [K12 Climate Action Plan](). Like the climate action plans adopted by a variety of city governments, local K12 climate action plans use community needs and strengths to inform school efforts to reduce carbon emissions, prepare for climate impacts, and educate students about climate change and climate solutions.

Schools can implement the following mitigation strategies:

1. **Energy efficient building design:** Schools can reduce their energy consumption by implementing energy-efficient building design, including natural light, insulation, and energy-efficient lighting and heating systems.

They can also use green building materials and design features that promote energy efficiency.

2. **Renewable energy:** Schools can install solar panels, wind turbines, or other renewable energy sources to generate electricity on-site. They can also purchase renewable energy from off-site sources.

3. **Reduce waste:** Schools can reduce their waste (food, paper, plastic, electronics, and more) by implementing recycling and composting programs, using reusable dishes and utensils, and reducing paper use. They can also donate or recycle outdated electronics and other equipment.

4. **Sustainable transportation:** Schools can encourage sustainable transportation options, such as walking, biking, or taking public transportation. Further, a transition to electric school buses would reduce greenhouse gas emissions. They can also provide secure bike storage, promote carpooling, and purchase electric or hybrid vehicles for school transportation.

5. **Food and agriculture:** Schools can promote sustainable food choices by serving locally sourced, organic, and vegetarian meals. They can also implement school gardens or greenhouses, compost food waste, and reduce food waste through portion control and meal planning.
   a. Schools should encourage, through policy and practice, consumers to receive only what they know they will eat in an effort to throw away less food. Schools can also donate to a homeless shelter so that food does not go to waste. When it goes to waste, it gets thrown to the landfill and creates methane and other gases that go into our environment.
   b. Schools should encourage, through policy and practice, that farm products are brought straight to the cafeteria so that consumers eat less processed food from factories. This would reduce the carbon footprint of food that is transported from long distances and factories making food. It would also help decrease plastic use.

6. **Education and outreach:** Schools can educate students, staff, and the surrounding community about sustainability and the importance of reducing their carbon footprint. They can also provide opportunities for students to engage in sustainability projects and initiatives across subjects and grades.

7. **CTE programs:** CTE programs can be leveraged to implement mitigation strategies in schools and to prepare students for the increasing demand for high-skill, high-wage jobs in the clean economy.

How Can Educators Model Practices in Their Classroom?

While educators can work with state and district leaders and school administrators to implement large-scale change, educators can also model practices to students from their own classroom. Some ways how include:

1. **Teach sustainability:** Teach students about sustainability and the importance of reducing their carbon footprint. Encourage them to act on their own and advocate for sustainability in their community.
2. **Teach climate solutions:** Teach students about climate solutions, such as renewable energy and energy efficiency, that they can see in their schools, communities, and homes. Engage students in hands-on and interactive learning about climate solutions, including career and technical education curricula.
3. **Reduce energy consumption:** Turn off lights and electronics when not in use, use natural light whenever possible, and use energy-efficient bulbs and appliances.
4. **Reduce paper use:** Use electronic resources, such as online textbooks, and communicate with students via email or online platforms to reduce paper use.
5. **Recycle:** Place a recycling bin in the classroom and encourage students to recycle used paper, plastic, and other materials.
6. **Use eco-friendly products:** Use non-toxic cleaning products and encourage the use of eco-friendly school supplies, such as refillable pens and pencils.
7. **Encourage sustainable and share transportation:** Encourage students to walk, bike, ride the bus, or carpool to school. Provide incentives for those who use these forms of sustainable transportation.
8. **Green your classroom:** Add plants to your classroom to improve air quality, and use environmentally friendly décor and furniture.
9. **Advocate:** Advocate directly to school and district leaders for climate mitigation, and support students in doing the same.
10. **Student voice:** Uplift student voices and concerns regarding climate change, and ensure they are safe in raising these opinions.
11. **Partner:** Partner with parents and parent groups, families, school leaders, and community members—especially with those in communities most affected by climate change—to implement solutions.

Funding

There are many funding streams currently available that schools can leverage to support the implementation of climate mitigation solutions, particularly the [Inflation Reduction Act (IRA)](), the [Infrastructure Investment and Jobs Act (IIJA)](), and the American Rescue Plan Act (ARPA). Here is a summary of funding stream options:

- The Inflation Reduction Act includes tax credits that will support schools in mitigating their climate impact by transitioning to clean energy and transportation, including:

- ○ [Investment tax credits](#), which can be used for energy investment and installation and can help schools reduce the cost of transitioning to renewable energy, like solar panels, geothermal heat pumps, and energy storage systems. This tax credit has the potential to fund up to 60 percent of a renewable energy project.
  - ○ [Clean transportation tax credits](#), which can aid schools in purchasing clean light- and heavy-duty vehicles, including school buses or other vehicles owned and operated by school districts. These credits can reduce the upfront cost of electric vehicles by up to $40,000 dollars, making electric school buses more affordable and accessible.
- The IRA offers grant opportunities that schools can directly apply for, or they can work with community partners to ensure that the projects benefit students.
- [The Infrastructure Investment and Jobs Act (IIJA)](#) also provides billions of dollars that can be used to help schools address climate change.
  - ○ Schools can take advantage of [grants for energy efficiency and renewable energy improvements](#) that will improve indoor air quality, save energy, and reduce energy costs.
  - ○ Another opportunity, the [clean school bus program](#), provides $5 billion in funding to help schools transition to zero-emission school buses.
- [The American Rescue Plan Act](#) includes $350 billion in state and local fiscal recovery funds to support a range of pandemic response and recovery efforts, including school improvements to ventilation and building energy systems that reduce costs and support healthy environments.

To learn more about funding opportunities, check out the [US Climate Resilience Toolkit](#).

To view education grants that have been awarded, see [Explore Environmental Education Grants](#).

Tips for Gathering Baseline or Standard Data of Usage

To understand the current carbon footprint of their schools, educators can take the following steps.

1. **Define your scope:** Clearly define the boundaries of your data collection efforts. Determine what specific energy or water usages you want to measure, such as electricity, natural gas, water consumption, or wastewater generation. Identify the time and location (for instance, your school or office building) for which you want to collect data.

2. **Identify data sources:** Identify the sources of data available to you, such as utility bills, meter readings, historical data from previous records, or data from monitoring equipment or sensors.

3. **Use standardized measurement units:** Use standardized measurement units to ensure consistency and comparability of data. For example, use kilowatt-hours (kWh) for electricity, cubic meters (m³) for water consumption, and therms or joules for natural gas.

   Contact your local electric or natural gas company (or obtain utility bills or meter readings) and gather the data for consumption of kilowatt-hours (electricity) or therms/joules (for natural gas) currently at your school or office building and what is suggested based on their standards.

   Contact your water company (or obtain utility bills/meter readings) to gather data on current usage. Determine from the water company the ideal water usage. Connect with departments in your school district for school usage information.

This resource can help educators understand what practices their district already has in place: [Questions to Help You Start Taking Action - This Is Planet Ed](#)

[1] Sources of greenhouse gas emissions | US EPA. (n.d.). https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

Supporting Rationale and Research

Agrawal-Hardin, N., & Green, M. (October 10, 2022). The Hechinger Report.https://hechingerreport.org/student-voices-why-education-must-lead-in-addressing-climate-change/

Akopian, N., Faggert, M., & Schifter, L. (2022). The Aspen Institute: Washington, DC. https://www.thisisplaneted.org/blog/school-climate-provisions-in-the-inflation-reduction-act

Katz, E., Neuberger, J., & Schifter, L. (2022). The Aspen Institute: Washington, DC. https://www.thisisplaneted.org/blog/education-and-climate-iija

Katz, E., Schifter, L. & La Pinta, A. (2020). The Aspen Institute: Washington, DC. https://www.thisisplaneted.org/blog/state-policy-landscape-2020

K12 Climate Action Commission. (2021). The Aspen Institute: Washington, DC. https://www.thisisplaneted.org/blog/climate-action-plan-2021

Resources

Resources for Climate Change

Climate Action Plan: Advancing Equity

Climate Literacy: The Essential Principles of Climate Science

Climate Solutions 101

IPCC Report on Mitigating Climate Change

The Most Important Thing You Can Do To Fight Climate Change: Talk About It.

MITIGATION K-12 Climate Action Plan

Probable Futures website

Questions to Help You Start Taking Action

Research and resources from the Harvard Center for Climate Health and the Global Environment.

Subject to Climate

United Nations: What Is Climate Change?

Yale Center for Climate Communications

Reducing the Carbon Footprint in Our Schools

National Action Plan for Energy Efficiency

Food Insecurities and How They Are Impacted by Climate Change

Climate Change, Global Food Security, and the U.S. Food System

How Climate Change Affects the Food Crisis

What You Need to Know About Food Security and Climate Change

School Programs

[Renew Our Schools - Resource Central](#)

Submission Guidelines & Evaluation Criteria

To earn this micro-credential, you must receive a passing score in Parts 1 and 3 and be proficient in all components in Part 2.

Part 1. Overview Questions (Provides Context)

(500-750 words)
Do not include any information that will make you identifiable to your reviewers.

Please address all of the following prompts:
1. Define the needs of your school within one area, such as energy efficiency, building type material, transportation, food waste, local food sources, or agriculture.
2. Provide a detailed explanation of how the use of or design of your school is adding to the problem.
3. Identify programs or grants that your school has to support climate change mitigation.
4. Describe your school and provide information on where you live (e.g., west or east coast, mid-country, north or south part of the country) and weather type.

Passing:
The educator answers all four prompts in detail with specific examples and demonstrates they understand what their school needs, factors about the school environment that are contributing to an ecological issue, and steps their school is already taking (or could be taking if no steps are currently in place) to respond to climate change.

Part 2. Work Examples/Artifacts/Evidence

To earn this micro-credential, please submit the following three artifacts as evidence of your learning. See the rubric for the criteria for passing.

Do not include any information that will make you or your students identifiable to your reviewers.

Artifact 1: Select a Problem and Identify Baselines

What is an issue in your classroom or building that is a key driver of emissions that could be reduced? For the issue you selected, research your state or local standards and investigate related methods and/or actions that your classroom or building could employ to mitigate the current impact on our climate.

Identify the following:
- Your classroom/building's baseline data;
- The recommended minimum standard from your state or local standards;
- Your goal for the method and action you have selected; and
- The predicted impact of reaching your goal.

If you chose volume of wastewater as your issue, answer the following:
- What is the daily volume of wastewater in your classroom/building?
- What is the minimum recommended volume of wastewater a day?
- If you employ a recommended action to reduce wastewater, what would be your goal for the volume of wastewater a day?
- When you reach your goal, what is your predicted impact?

Artifact 2: Write an Action Plan

What are the specific steps and actions your classroom/building can take to address the problem you chose? Design an action plan with your students or for stakeholders of your building. Your action plan should include:
- Background information on the importance of acting on the key driver you (and possibly your students) selected;
- A description of the problem you (and possibly your students) are taking steps to solve and your approach;
- The data you (and possibly your students) have collected on current state and projected outcomes;
- A discussion of the benefits of mitigating the problem you chose to address;
- A S.M.A.R.T. (specific, measurable, achievable, relevant, timely) goal to guide your action plan;

- Details about your plan (e.g., the who, what, when, where, and how); and
- A summary of the problem and the benefits of addressing the problem with the action plan.

Artifact 3: Advocate to an Audience
Create a presentation for the action plan created. The audience for your presentation can be any stakeholder group (e.g., your students, other educators and students in your school, building administrators, or even your school board).

Part 2. Rubric

	Proficient	**Basic**	**Developing**
Artifact 1: Select a Problem and Identify Baselines	Information is presented in a clear and concise manner, and all information is included: - Classroom/ building baseline data; - Minimum state or local guidelines for key driver and source information; - The goal for change from baseline; and - The predicted impact.	Information is presented but lacks clarity and conciseness, and all information is included: - Classroom/ building baseline data; - Minimum state or local guidelines for key driver and source information; - The goal for change from baseline; and - The predicted impact.	Only some of the information requested is included: - Classroom/ building baseline data; - Minimum state or local guidelines for key driver and source information; - The goal for change from baseline; or - The predicted impact.
Artifact 2: Write an Action Plan	The **Background** includes a compelling explanation for why taking action to address the selected key driver is important and	The **Background** is present but does not include a compelling explanation for why action is important or does not demonstrate an understanding of	one or more of the sections of the action plan (background, problem, data collection, benefits, SMART goal, details of plan, or summary) are missing.

	demonstrates an understanding of the context and relevance of the key driver. The **Problem** is clearly defined and addressed by the action plan. The **Data Collection** provides a summary of the data that has been collected and includes a desired outcome. The data is presented in an organized manner. The **Benefits** of mitigating the key driver are discussed and evidence and/or examples that support the benefits stated are provided. All elements of the **SMART Goals** (specific, measurable, achievable, relevant, timely) are presented. The goal is clear and concise and aligns with the problem definition	the context and relevance of the key driver. OR The **Problem** is not clearly defined. OR The **Data Collection** is missing a summary of the data and/or the data is not presented in an organized manner. OR The **Benefits** of mitigating the identified key driver are not discussed or do not offer examples that support the benefits stated. OR **SMART Goals** are not clear or are missing one or more elements. OR	

	and desired outcome. The **Details of the Plan** provide information about the who, what, where, why, when, and how of the action plan. It also includes the specific actions that will be taken (the timeline, location for the implementation, the resources needed, and the people responsible). The **Summary** is clear and concise and demonstrates an understanding of the key takeaways from the action plan.	The **Details of the Plan** regarding the who, what, where, why, when, and how are presented but lack specificity. OR The **Summary** is present but not clear and/or does not tie back to the key actions of the action plan.	
Artifact 3: Advocate to an Audience	The intended audience is identified. The presentation is a slideshow, a website, or another digital artifact suitable for the intended audience. The presentation contains persuasive	The audience for the presentation is identified and the presentation is suitable for the intended audience. The presentation lacks a tight alignment with the action plan created in Artifact 2.	The audience for the presentation is identified and the presentation is suitable for the intended audience. The presentation is missing one or more parts of the action plan created in Artifact 2.

	information that mirrors the action plan. Each part of the action plan in Artifact 2 is represented in the presentation.		

Part 3. Reflection

(500-750 words)

For tips on writing a good reflection, review this resource:
How Do I Write a Good Personal Reflection?

Do not include any information that will make you identifiable to your reviewers.

Answer all of the following questions:
1. What did you learn?
2. How will this impact your work moving forward?
3. How will this benefit your students and peers?

Passing:
The educator answered all questions, including examples and/or anecdotes. Answers are detailed and well-reasoned with clear plans for the continued development of ideas.