RIGHT HERE!

An Educator's Guide for Equitable Climate Action in the Upper Valley and Beyond

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RIGHT HERE!

An Educator's Guide for Equitable Climate Action in the Upper Valley and Beyond

PEER ASSOCIATES
Helping You Measure What Matters

Shelburne Farms
Institute for Sustainable Schools

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NEW HAMPSHIRE
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WELCOME

"The moment we decide to fulfill something, we can do anything." -Greta Thunberg

We are deeply grateful for your interest in forging new ground in education and actively responding to the climate crisis. Our community, and the world, need you and your efforts. This publication will help you engage your students in local climate solutions, develop their sense of agency, and build climate resilience in the Upper Valley of the Connecticut River and, hopefully, far beyond. We invite all who are interested to take what they can from this publication and use it as a springboard for climate change education and action, wherever they might live.

The urgency of addressing climate change cannot be overstated. According to the World Health Organization (2018), by the time our current class of first graders graduates, projected greenhouse gas emissions could result in a quarter million additional deaths per year due to climate change impacts. Tragically, the burden of these consequences fall disproportionately on marginalized communities—those who are least responsible for climate change. The time for action is now, and there are solutions available.

That's why this publication focuses on equitable climate action. Most of us learn best by doing. If we want our students to engage in more sustainable thinking and behaving, the curriculum needs to go beyond research and discussion. To gain a sense of self-efficacy, students need to *practice* making this world a better place.

Equity-centered climate action is the most direct path toward developing the knowledge and skills essential to environmental and social wellbeing. For those feeling climate anxiety and social injustices, equitable climate action also builds hope based on the visible results of student efforts. Through action, students develop confidence that they can make a difference and gain first hand insight into how to make a positive impact. Making space in the curriculum for equitable climate action signals to students that these issues are worthy of thoughtful consideration, time, and effort.

What does equitable climate action look like and how do you incorporate it into the curriculum? This was the driving question and impetus for *Right Here! An Educator's Guide to Equitable Climate Action in the Upper Valley.* We invite you to peruse this publication to see real-life, local examples that will help you and your students envision what is possible. These place-based activities offer a range of opportunities to fit your capacity and

interests. And although equity and climate change are most certainly serious topics, the experiences presented in this Guide help students find joy in community, nature, and accomplishment.

This guide does not hold all of the answers; it relies on you, with your professional experience, talents, and passions, to take these ideas and run with them. This is an invitation for educators, students, and community members to work together in the Upper Valley toward climate resilience.

ABOUT THIS GUIDE

What is it?

- *Right Here!* provides both a framework and a catalog of ideas and resources for creating curricula that engages deeply with place, climate action, and equity.
- It is designed to be useful for educators seeking anything from a brief activity to more in-depth curricular endeavors.
- The approaches offered work especially well with project-based and service-learning. See The Buck Institute for detailed guidance on project-based learning and Youth.gov to learn more about service-learning.
- This is a draft product from the first phase of a larger project. Phase 2 involves working with Upper Valley (UV) organizations, educators, and students to test, refine, and add to the content.
- *Right Here!* provides the curricular ingredients for equitable climate action with your students. Combine it with your creativity and vision to prepare a curriculum that is right for you, your students, and your community.

Where did these ideas come from?

- *Right Here!* incorporates climate change education research and education work from around the country and globe.
- Inspiration, practical wisdom, and core content emerged locally from in-depth interviews conducted in 2020-2021 with 16 educators and three student climate leaders in the Upper Valley region. Their experiences provided authentic examples of what they have found has worked in our area, given local education parameters, cultural inclinations, and ecological trends.
- See Appendix I for author bios and a list of the contributors to this guide. You might detect different voices throughout the Guide since its creation was very much a collaborative process.

Who is it for?

- Right Here! was created for educators in the Upper Valley, who would like to:
  - Connect authentically with the world beyond the classroom.
  - Support their students in taking tangible action on climate issues.
  - Engage with equity issues in ways that encourage openness to different perspectives, critical thinking, empathy, and a sense of belonging for all.

Students and community organizations are encouraged to use this guide as well. The content is generally for middle school classrooms, but it is adaptable for higher and lower grades.

How do I use it?

The goal of *Right Here!* is to develop student agency through active participation in climate change mitigation and adaptation. The right way to use the guide is whatever works best for you and your students to achieve this.

You can skip around using only what calls to you or peruse the guide step by step as follows:

1. **Take a look at the REAL Framework**. This will provide an understanding of the research-based core components (Relationships, Equity, Action, and Leadership) that help prepare students for climate stewardship.
2. **Choose a topic relevant to the content you and your students want to explore.** Climate change is a multifaceted issue that can be challenging to fully grasp. To make the issue more manageable to address, the guide breaks the issue into 5 tangible topics relevant to the Upper Valley. The topics all begin with "F" to make them easier to remember. Hopefully, one or more will resonate with you and your students. These topics are: Flora and Fauna, Food, Floods, Fashion, and Fuel.
3. **For the topic you choose:**
    a. **Read the introductory story.** This will help you visualize how other teachers in the Upper Valley have explored this topic for climate resilience.
    b. **Dive into the REAL Framework.** Explore essential questions to build student curiosity and capacity for change-making.
    c. **Check out the entry points**. These activities are designed to spark interest, provide some content background, and generate a desire to find out more.
    d. **Explore the action projects.** See examples of projects designed to engage students in solutions for climate change. To help you choose an activity that fits your current capacity and desired educational outcomes, these range from quick and simple (green circle) to more involved (blue square) to full on (black diamond).
    e. **Make use of the resources!** We collected and collated these local and more general resources to make this work a little easier. They include potential local partners in the UV, background information, other curricular ideas, and supporting materials.

How can I get more involved?

- We are looking for educators and students to try out *Right Here!* and document their experiences to create more local stories and additional resources for others following in your pioneering footsteps! Email Climate@ShelburneFarms.org to learn how you can get involved.

FUNDAMENTALS: GETTING REAL

The REAL Framework emerged from the collective wisdom of frontline educators and student leaders in the Upper Valley who were working with equity and climate change issues. In-depth interviews with these educators and students revealed that social-emotional learning is as important as other core academic knowledge and skills when it comes to meeting the challenges of climate change and its inherent inequities. While state and national standards provide the building blocks for addressing climate and equity issues, they need to be placed in a meaningful context to matter to students. The REAL Framework is designed to empower the hearts of students and help them use these academic building blocks wisely and effectively to create a healthier future for all.

The REAL framework begins with nurturing **R**elationships with self, community, and nature. Considering those relationships, we explore **E**quity narratives and paradigms which influence how living communities experience and respond to climate change. From there we move to **A**ction, focusing on climate change mitigation and adaptation efforts in the context of place to change the dynamics of extractive systems to more regenerative systems. The final component, **L**eadership, is an invitation for both educators and students to amplify their impact through collective action, recognizing that we need to encourage the voices and gifts of others to participate in climate resilience.

The REAL components naturally scaffold. As relationships develop, so does understanding and caring. From this foundation, a clearer view emerges of the systems which connect self, others, and nature. These systems might include flows of energy, resources, power, and other forces. When investigated, inequities or unhealthy imbalances in our environmental and social systems become more apparent. To change this dynamic, informed action is needed. To change the dynamic more broadly and deeply, leadership is essential.

Relationships: Cultivating a Healthy Foundation for Climate Stewardship

Healthy relationships fuel thriving systems. In order to foster strong, resilient social and ecological systems in our communities, we need people who have a growth mindset, can work with one another, and have an understanding and appreciation of the natural world.

Providing students with the tools and the practice to strengthen intrapersonal, interpersonal, and nature-based relationships empowers them to become a vibrant part of our systems of life. While these relationships all feed into one another, we'll explore them one by one to better understand their role in climate resilience.

Relationship with Self

"Courage is not the absence of fear, but rather the judgment that something else is more important than fear."
—Ambrose Redmoon

From a practical perspective, students need a healthy relationship with themselves to self-regulate and work through the obstacles inherent in equitable climate action. When students feel more calm and secure internally, they can more thoughtfully consider others and the environment when addressing their external needs. They will also tend to have more emotional capacity to persevere, focus, be courageous, and find joy in their work.

As equity and climate change are highly complex challenges, students need ample time to make sense of what they are learning, why it might matter to them, and what actions they would like to take. For the purposes of this guide, the relationship to oneself is explored by

reflecting on personal experiences with each climate topic and how that shapes beliefs about and interactions with these topics.

Starting with themselves—often a topic of great interest!—can help make the material more engaging, relatable, and meaningful to students. Connecting to what students already know (the constructivist methodology) can increase their motivation to learn and increase the retention of new information. Deep self-reflection can also help students to develop empathy for themselves and others.

As students move forward, they will inevitably make mistakes. If living in harmony with each other and with nature were easy, the world would look quite different! Explicitly framing setbacks as learning opportunities discourages feelings of inadequacy, while simultaneously encouraging a growth mindset; both are essential for generating hope and climate resilience.[1]

Finally, let's face it, we all have biases that interfere with seeing ourselves and the world clearly. Identifying and testing assumptions in a compassionate way promotes both self-awareness and good science. The examples in this guide create the "aha" opportunities for students to see firsthand how their own perceptions and actions might contribute to inequities and climate change in both positive and less than positive ways. At the same time, these experiential activities lay the groundwork for students to discover their interests and unique abilities to build a more beautiful and just future.

Relationships with Others to Build Community

"If you want to go fast, go alone. If you want to go far, go together."
—African Proverb

1. Ojala, M. (2015). Hope in the face of climate change: Associations with environmental engagement and student perceptions of teachers' emotion communication style and future orientation. Journal of Environmental Education, 46(3), 133-148. https://doi:10.1080/00958964.2015.1021662

Climate change and related equity challenges cannot be solved by working in isolation. We all need positive and nurturing relationships with others to collaborate effectively and engage in creative problem-solving to adequately address these deep-rooted issues.

During our research interviews with educators and students, the need for trust was emphasized repeatedly. Trust is a cornerstone of productive working relationships, especially for equitable climate action. Yet, as evidenced by the many youth climate strike signs, such as, "If you were smarter we would be in school now!" and, "Blah, Blah, Blah—Action Now!" many youths do not trust that adults are doing enough to fight the climate crisis and social injustices. Building trust by working in partnership with adult mentors lays the foundations for equity-centered climate action.

Trust is also a core theme when developing a sense of collective efficacy. Providing multiple opportunities for students to work with a variety of individuals helps them learn how to navigate the complicated art of group work. Many educators recommended hands-on learning spaces that allow for students to do climate work while informally connecting with each other and/or community partners. Such work might include preparing food from the school garden, sketching plans for more sustainable schoolyards, planting dune grass or trees, organizing meeting space for an environmental club, creating informational posters, etc. Even transportation "down time" (e.g., walking, hiking, bus rides) offers opportunities for relationship building.

In addition to working on relationship skills in the classroom with one another, students can have a bigger impact in "real life" by partnering with local climate leaders from different fields (e.g., law, engineering, forestry, healthcare, art, business, transportation, agriculture, journalism, etc.). Working with a variety of community members illustrates the depth and breadth of climate work that is taking place, while building trust that many adults are on it—or at least trying their dang best! Seeing the variety of people involved in climate change mitigation and adaptation locally and beyond can also help students see where their unique current and future selves might fit into this worldwide effort.

Last, but definitely not least, the climate crisis can feel overwhelming and it won't be solved with quick, easy fixes. It makes sense to invest in a mutually supportive network of fellow learners to facilitate progress over the long-term. We need one another to hold ourselves accountable, provide pep talks when floundering, brainstorm when stuck, share our experiences and talents, and make this journey as fun as possible. Whenever feasible, reach out to colleagues, community partners, parents, friends—and, of course, students!—for company on this journey rather than trying to go it alone. The connections you make will definitely pay off.

Relationship to Nature

"Nature play and learning can have a profound influence on children's values toward nature and pro-environmental behaviors. Positive experiences in nature, specifically psychological restoration (being away from everyday worries and distractions), have acted as a motivational factor enhancing children's pro-environmental behavior. This influence could also last through their adult life." [2]

The research on the benefits of connecting to nature keeps getting stronger and more compelling. Academic achievements, mental health, and physical fitness all appear to be strengthened by spending time outside in natural settings.[3] Even urban areas with green or blue (water) spaces can be healing and help students to practice mindfulness and emotional regulation.

Beyond the well-documented social emotional and physical benefits, a strong connection to the local environment allows students to observe the changes that are occurring all around them. It also helps them get a better grasp on their place in the environment, the impact of their interactions, and the regenerative opportunities that nature so generously offers. In a nutshell, nature connection promotes climate stewardship. And the earlier students engage in nature-based learning, the more adept they can become at figuring out how humans might find a better balance in our relationship with our local ecosystems.

Given the importance of being in nature for our students, community, and planet, there is ample reason to explore and expand learning outside the classroom.

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2. PEER Associates, Powers, A. L. & Ren, Q. (2018). Nature-based play and learning: A literature review. Downloaded from PEERassociates.net. https://drive.google.com/file/d/1SyVBNht2TFOumZdE-_fOHl2pqXa_qriM/view?pli=1

3. American Psychological Association. (2020, April 1). Nurtured by nature. Monitor on Psychology, 51(3). https://www.apa.org/monitor/2020/04/nurtured-nature

Equity: Exploring Climate Justice as an Integral Part of Climate Solutions

"Environmental justice [means that] no community should be saddled with more environmental burdens and less environmental benefits than any other."
-Majora Carter

At first glance, it is sometimes hard to see the connection between equity and climate change. Equity is the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment. Climate change has a disproportionate impact on marginalized communities and exacerbates existing inequalities. For example, consider:

- *Geographic distribution*: Low-lying areas and coastal regions, which are home to many marginalized communities, are disproportionately vulnerable to the effects of sea-level rise and severe weather events such as hurricanes and typhoons.

- *Socioeconomic status*: Poor and marginalized communities often lack the resources to adapt to the impacts of climate change and are more likely to live in areas vulnerable to its effects. They also have less access to services and infrastructure that can help mitigate its impact.

- *Historical emissions*: Countries in the Global North and financially advantaged communities have contributed the most to global greenhouse gas emissions, but it is often countries in the Global South and other marginalized communities that are experiencing the most severe impacts of climate change.

- *Systemic barriers*: Marginalized communities, such as indigenous peoples, women, and people of color, often face systemic barriers that prevent them from participating in decision-making processes related to climate change and limit their access to resources for adaptation.

Addressing these challenges requires acknowledging and addressing the root causes of these inequities and ensuring that all people, regardless of their background, have access to the resources and support they need to adapt to the impacts of a changing climate.

To move toward more environmentally sustainable ways of living, we need to think critically about the norms, beliefs, and social injustices that have led to the climate change crisis we now face. Only when we've dug deep to understand the origins of our systemic dysfunctions can we begin to reimagine and bravely reconsider new ways of organizing our daily lives and our communities to effectively address these challenges.

Consider something as simple as the shirt you wear. Who was involved in the design, fabrication, and shipment of the shirt? What resources were farmed, mined, and created in order to produce the product? What is the history of the design, the fabric, the production methods, and the brand that the shirt represents? What story does the shirt tell about who you are and the place you live? What is the environmental cost of the shirt and who are some of the industry pioneers in ethical and sustainable design for similar articles of clothing? How were shirts once made and how might the modes of clothing production change again? These are just a few questions to consider when thinking about something as banal and everyday as getting dressed every morning. Encourage deep inquiry into the familiar. Let there be no stupid questions.

We have organized the critical reflection on equity into two parts: Origin Stories and Alternative Stories. Each comes with a certain range of questions to explore as a class. They were developed as jumping-off points for discussing and researching any given action project from an equity perspective. As with everything in this guide, it is not expected or required to attempt to answer every single question.

Change is messy and uncomfortable and leads to a certain level of unpredictability. Embrace it. Acknowledge that you will make mistakes, and give students permission to do the same. It's an essential part of true learning. An equity-centered approach invites students to (respectfully and mindfully) question your authority and perspective on sensitive topics. Equity starts with being aware of your privileges, prejudices, and biases, and it requires that you take the time and energy to learn more about experiences that are foreign to you.

When you engage in these topics reflectively, feelings such as guilt, embarrassment, anger, and shame will likely come up. The vast majority of us are complicit in the perpetuation of climate and equity issues, whether we know it or not. This is true even though there are varying degrees of agency and influence in the matter. Making the most sustainable choice may not always be in your power. Sometimes factors like finances, community decision-making power, or limited options may hinder your efforts. It's okay. Many people fear the possibility that they are "bad" people because their choices contribute to larger problems. Ultimately, we are all humans with the potential to do both hurtful and kind things, and the more we know, the more we can live in alignment with our values. By learning about the

effects of our behaviors and actions, we have the opportunity to embrace more fulfilling habits and traditions. Modeling this for your students will inspire them to engage in the same practice.

Be kind. Be generous. Be patient. With yourself, as well as with your students and colleagues! Let this be a process of courageous inquiry, an exercise in empathic learning, and a journey towards genuine inspiration to try something new, different, and deeply considerate.

Origin Stories

"I have long understood that climate change is not only an environmental issue - it is a humanitarian, economic, health, and justice issue as well."
— Frances Beinecke

Origin stories prompt the class to question how and why we came to live as we do. Where did our traditional uses and relationships to food, fashion, floods, fuel, and flora and fauna all come from, anyway? This is a critical first step in the process, because first we must seek to understand what looks to be a product of happenstance. Yet, as we dig deeper, we learn more about the reasons why we, as a species, continue to burn fossil fuels and extract natural resources at unsustainable rates. This section is about considering the historical, geopolitical, and cultural origins of systems and practices which drive climate change. Not only do we investigate the origin stories, but also the gaps in the systems left behind by the original blueprints for these governing systems. When we can grasp a deeper understanding of the fundamental problem, we can find the confidence to think outside the box, put our minds together, and try out some solutions with our newfound knowledge.

Here are some essential questions for research and discussion that could guide investigations into the origin stories of the various topics in this guide:

- What is the history of development and land use in our area? How have people, plants, and animals been affected?
- What factors have shaped the way we produce, distribute, and consume food today?
- Where is flooding most prevalent in the local region and why? What have been its impacts?
- What is the history of production of the raw materials that our clothes are made of? Who has benefited from that production, and who has suffered?
- How have our fuel sources changed over time? How have communities where fuel sources are extracted or produced been affected over time, especially as fuel needs have changed?

Alternative Stories

"When we chop nature into bits in an attempt to understand it, we lose sight of the relationships among those bits. But ecological healing is all about the healing of relationships."
— Charles Eisenstein

There are many fantastic ways of sustainably building our communities, working with our natural environment, and restructuring our lives to accommodate changing environmental and social circumstances. We can look to various time periods, societies, and pioneers in our effort to explore these possibilities. While approaching these topics, focus on hope and inspiration for students and peers to support movement towards change. This section is meant to give permission for imagination and experimentation to prevail in the conversation around climate change. It is easy to get bogged down by the feeling that norms and traditions in building, feeding, and transporting ourselves as a global community must remain on the same track. We're all so far in, how could we do anything differently now? The truth is that it's never too late to decide on a different path. Even if it's uncomfortable or uncertain, it's worth taking the path less traveled when we have knowledge, collaboration, ethics, and imagination on our side. In your research, consider

looking to your fellow humans around the world and across time for inspiration as well. There have been wonderfully inventive ways of living in community with our fellow beings of this planet from the very beginning and under many geological conditions.

Here are some sample questions for research and discussion to guide inquiry into positive alternative actions for the various topics in this guide:

- What are some examples of heavily populated areas that integrate the needs and presence of animal and plant life in their design?
- What are some traditional and/or high tech ways of producing food that use less water and other limited resources?
- Many parts of the world have always flooded. How have the inhabitants of those regions historically lived with flooding? How is that different from our modern approach?
- What goes into making sustainable clothing? How can it be made more accessible for everyone?
- What new technologies are most promising for creating more equitable access to reducing energy consumption, using energy more efficiently, or using cleaner sources of energy?

Action: Making Meaningful & Visible Change

"Hope doesn't come from words. Hope only comes from actions."
—Greta Thunberg

We usually become proficient at something (e.g., geometry, writing, playing a musical instrument, etc.) through lots of practice. Yet, students are often not given the opportunity to practice climate stewardship by engaging directly in mitigation and adaptation activities. Practicing climate stewardship is one of the most important factors in helping students develop a sense of efficacy, which, in turn, leads to a greater agency. By participating in practical climate change mitigation and adaptation endeavors, students can:

- Gain hands-on experience and develop skills to more competently undertake equitable climate action.
- Set goals and see progress towards those goals, building comfort and confidence in their ability to make a difference.
- Collaborate with peers or mentors, to deepen their appreciation that they are part of a larger, supportive community that can accomplish something greater than if they were just working by themselves.
- Face, overcome, and learn from common obstacles related to climate change mitigation and adaptation, enhancing their ability to tackle these complex problems.
- Gain practical knowledge and insights on climate issues through their experiences, which will inform future decision-making and problem-solving for equitable climate action.

In short, providing multiple opportunities for students to meaningfully engage in local climate mitigation and adaptation efforts, directly builds agency in climate stewardship. It can also help to reduce climate anxiety as it empowers students to feel more in control of their futures.

Unfortunately, action is often the missing ingredient in climate change curricula. There's been a tendency to ignore or just study the problem but not actually practice climate mitigation or adaptation and make visible changes. Admittedly, it is easier to discuss climate change than to actually figure out what to do and actually do it. That's why we've put together this guide—to help you do just that.

The reality is, we are facing an unprecedented challenge that is rapidly changing our world. According to an IPCC press release in August 2021, the 2021 Intergovernmental Panel on Climate Change report (approved by 195 national governments), "Provides new estimates of the chances of crossing the global warming level of 1.5°C in the next decades, and finds that unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach."[4]

Serious consequences resulting from this average rise in global temperatures are already being felt around the world. Beyond a rise of 1.5**℃**, the situation is likely to deteriorate even more rapidly. Consider some of the following climate change impacts projected by the U.S. Environmental Protection Agency (EPA):

- Warmer temperatures increase the frequency, intensity, and duration of heat waves, which can pose health risks, particularly for young children and the elderly.
- Climate change can also impact human health by worsening air and water quality, increasing the spread of certain diseases, and altering the frequency or intensity of extreme weather events.
- Rising sea level threatens coastal communities and ecosystems.
- Changes in the patterns and amount of rainfall, as well as changes in the timing and amount of stream flow, can affect water supplies and water quality and the production of hydroelectricity.
- Changing ecosystems influence geographic ranges of many plant and animal species and the timing of their lifecycle events, such as migration and reproduction.

4. United Nations Intergovernmental Panel on Climate Change (2021, August 9). Climate change widespread, rapid, and intensifying [Press release]. https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/

- Increases in the frequency and intensity of extreme weather events, such as heat waves, droughts, and floods, can increase losses to property, cause costly disruptions to society, and reduce the affordability, and even the availability, of insurance.[5]

How well are we serving our students and preparing them for the future if we don't teach them how to co-create solutions and collaboratively take informed action? Please note—this is not just the responsibility of teachers. Equitable climate action works best when everyone shares part of the responsibility.

Fortunately, the Upper Valley is full of people and organizations working toward climate solutions. *Right Here!* seeks to connect the good work of these people and organizations with schools to create a unified front of climate resilience in the Upper Valley. For those community members who do not have climate change on the top of their priority list, multisolving can be a helpful approach for engagement.

Multisolving is when solutions to problems produce benefits in multiple arenas. For example, planting trees in urban areas can reduce heat stroke and asthma, beautify the area, increase property values, and reduce carbon pollution. Multisolving requires deep listening to others' perspectives, empathy, creative ideas that address diverse needs, and coordinated action—skills necessary for climate resilience! For more information about multisolving, visit the website of the Multisolving Institute.

Although equity and climate change are global issues, they take on a unique shape at the local level. Ecology, culture, and history all intertwine to produce the individual fabric of place and context for equity-centered climate change challenges and solutions. Action begins with exploring place to help determine relevant climate issues, impacts on local communities, realistic "student friendly" solutions, and potential partnering opportunities. You and your students can investigate place with an equity-centered climate change lens by researching:

- What are the most pressing local climate change threats?
- Who is most impacted? What are the assets and vulnerabilities of our local communities related to climate change?
- What are effective mitigation and adaptation solutions for these local issues?
- What local organizations or individuals are already engaged in these efforts?
- How can students get involved?

5. US EPA (2022, December 30). Impacts of climate change [Webpage]. https://www.epa.gov/climatechange-science/impacts-climate-change

Investigating these topics will help determine relevant issues to pursue, and help you and your students explore considerations for equity, learn about current local efforts in climate resilience, and see where the opportunities are for students to contribute.

Right Here! offers several ideas for actively addressing local climate change issues with an equity-centered approach. A few things to keep in mind as you dive into these topics with your students and practice figuring out how to successfully undertake equitable climate actions:

- Make sure the projects are designed to be manageable and the content is age-appropriate; something the students can handle intellectually and emotionally, as well as connect to personally. Students can have big ideas, and helping them learn how to shape their aspirations into accomplishable endeavors will help them learn a precious life-long skill and become more effective climate stewards. Choose tools such as SMARTIE goals to facilitate effective planning and experiences.

- Keep the focus on finding solutions and recognizing what has been achieved, rather than all that has not been accomplished, so that students feel empowered and not overwhelmed.

- Remind students that they are not alone in this endeavor. In addition to local examples, highlight efforts such as the United Nations Sustainable Development Goals and NASA's GLOBE (Global Learning and Observations to Benefit the Environment) program to demonstrate how local action by students and adults contributes to worldwide change.

Equitable climate action can build from the earliest age-levels so that students become increasingly adept at collaborative change-making. Younger students can begin by practicing all of the REAL elements without even using the term climate change. They can engage in self reflection, do group work, spend quality time in nature making observations and enjoying, think deeply about equity and being fair, learn sustainable behaviors, and take turns being leaders. It is never too early to begin learning how to be a climate steward!

Leadership: Building a More Climate Resilient Culture

"Leaders don't create followers, they create more leaders."
—Tom Peters

Let's face it: We need courageous leadership to help us avoid a climate crisis. We also need wise leadership to use the climate threat as an opportunity to re-shape our ways of existence, creating more just and healthy systems for living. And we need this leadership at the student and educator level to amplify our impact and help us transition to a more climate-resilient culture.

Effective leadership in the context of equitable climate action means distributed leadership. That is, we need to go beyond the well-spoken high achievers we all tend to lean on, and find meaningful roles for each person to lead and shine. The climate crisis is a collective problem that requires an engaged collective response. School, as the center of many communities, is a powerful place to start!

Educator Leadership

"Leadership is not about control but service. It's not about power but empowerment."
—Myles Munroe

Equity and climate change involve all of us. We each have unique talents, passions and areas of expertise to contribute. Educators of all subjects and grade levels have the opportunity to play a truly pivotal part in this consequential moment in history.

Educators who model respect and climate stewardship "normalize" a culture of sustainability and build trust that can go far beyond a do-what-I-say-not-what-I-do approach. Students really do notice even small actions such as recycling paper or making sure everyone has an equal opportunity to speak. By incorporating equitable climate action in your curriculum and school, you will be a role model for both your colleagues and students. Starting with ourselves, doing what we can to embody the values we care about, can inspire and leave impressions that last a lifetime.

Look for ways for your students and colleagues to take a distributed leadership approach. Start by asking what role they want to play in helping your school or broader community become climate resilient. According to a 2019 survey, 82% of teachers firmly agree that climate change is happening, and a clear majority (86%) think climate change should be a part of the curriculum. However, 55% said they do not teach about the issue.[6] The reasons for not teaching about climate vary—from not feeling confident about the subject matter, to feeling it is too controversial, to relying on others to cover it.

By helping your colleagues and students figure out their niches and unique contributions to climate resilience, your impact will increase exponentially, creating a powerful collective shift in culture and practice at your school and beyond.

Student Leadership: Choice and Voice

"We're just trying to spread awareness about how climate change has a really big effect on our lives. The world is slowly dying, and this is the only world that we have, so we have to take care of it."
—Alem, 14 (from The Climate Strike Kids, In Their Own Words)

6. Newall, M., & Patino, T. (2019, April). Teachers agree that climate change is real and should be taught in schools. Ipsos/National Public Radio. https://www.ipsos.com/en-us/news-polls/teachers-agree-climate-change-real-and-should-be-taught-schools-04-22-2019

Across the globe, students have risen to the challenge of climate leadership. However, during our interviews, students indicated that adult support and guidance made a significant difference in their ability to lead. When students did not feel supported, they felt doubtful and less motivated, but when educators demonstrated support, students felt proud of their work and more capable of creating positive change.

Additionally, when students are encouraged to express their own thoughts, opinions, and ideas on climate change and equity, they exercise their critical-thinking muscles and engage more strongly with the material, making the topic more relevant to them. Through such strategies as self-directed learning, students can choose (or develop their own) actions and initiatives that align with their values and priorities, fostering a sense of agency and control over their own learning and impact. Building "voice and choice" into student learning also cultivates a sense of ownership and responsibility for climate work.

"Voice and choice" does not mean no holds barred. There are often some non-negotiables in the curriculum that need to be communicated so that students are clear about the parameters in which they are working. Telling students they are in charge and then taking back the reins can be very frustrating for students, leading to disengagement and diminished trust. Creating a project structure that recognizes the "non-negotiables" while also providing scaffolding for student leadership can help projects run more smoothly. (Although some chaos, grappling, and negotiations are often the most significant parts of the learning!)

Consider where and when student-control makes sense. Can students choose the topics? Partners? Approach? Location? Timeline? Activity? A general project management outline can guide students along a productive and fruitful path. Students can even help develop the project plan so that everyone is clear how the decision-making power will be shared while they practice project management and leadership skills for climate stewardship.

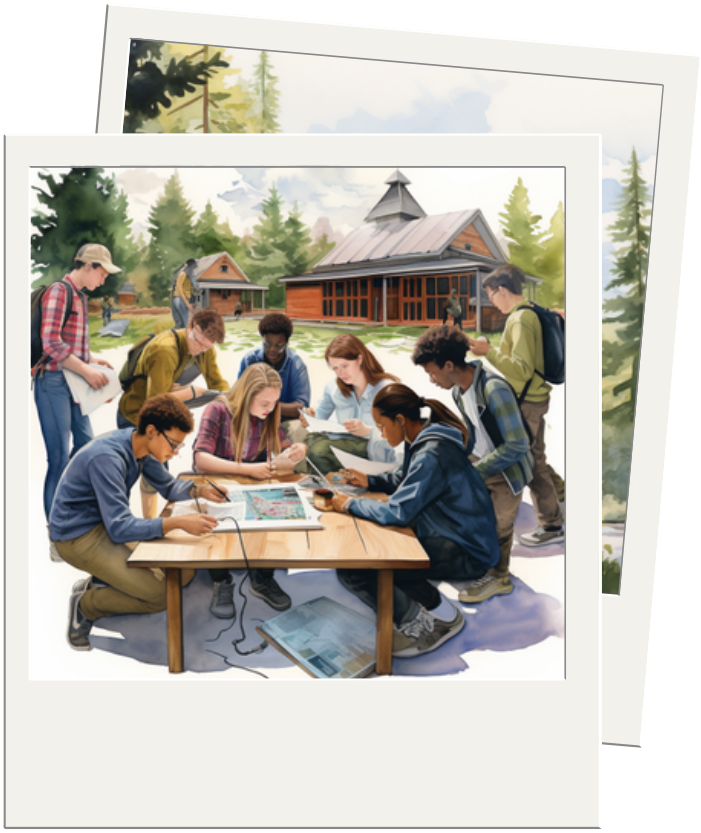
Students can hone their leadership skills by practicing facilitation, close listening, and using productive phrases for building on others' ideas. (See Appendix III for examples of productive phrases in effective communication.) These skills increase the probability of group success—deepening connections, engendering respect, and building trust for collective efficacy.

Begin with the co-creation of agreements for group interactions. By doing so, responsibility shifts from teacher to students. Posting these agreements in a prominent place and referring to them as needed, builds social capital and creates a positive classroom culture.

For a student who is quiet and does not think of themselves as a leader, leadership may look like taking charge of a small group project, offering to mentor a younger student, or speaking up about an issue that is important to them in a class discussion. It might involve taking on a behind-the-scenes role, such as organizing a fundraiser or coordinating logistics for an event.

In addition to providing leadership opportunities within the classroom, it's also important for students to have the chance to share their learning with the wider community. This could be through public exhibitions, such as art shows, performances, and science fairs, or through advocacy and meetings with community leaders. By giving our students a platform to share their voices and perspectives, we can help them feel seen and heard, and encourage them to become active participants in their own learning and in their communities. [6]

In this guide, the REAL framework will be explored through a series of questions to help learners reflect and apply the REAL components to each topic area and to their own lives. Teachers who wish to provide their students greater voice and choice in the direction of the project may wish to have students engage directly with the reflection questions provided in this section.



FLORA & FAUNA

"Nothing can teach you better lessons than the woods." That's according to one of Michelle Fountain's Woodstock Union High School students, who completed a class assignment to write about a "significant place" in their life.

When reflecting on their four days of work clearing an invasive plant from the stream bank near the local farmer's market, one of Dennis Hamilton's Brattleboro Union High School students wrote: "Since Japanese knotweed is spreading rapidly, we need to try to control it now. Controlling the knotweed could also be jobs for the unemployed. We need people who care about our environment, our native species of plants, and our wildlife, to be involved."

Or consider the Charlestown Middle School students who got up early on a hot morning during summer break to calculate the amount of carbon stored in the trees of the Clay Brook natural area near their school. These five "Carbonators," as they called themselves, mapped, tagged, and measured over 100 trees to input into NASA's Globe database. The project was "stressful" and "chaotic," to the point that one student exclaimed: "If we have to re-tag one more tree I'm going to launch myself into the brook." Yet, it was the challenging nature of the task that led to the feeling of satisfaction when the challenge was overcome. In a written summary reflection on the project another student wrote: "Overall, it was really nice being outside and working with other students. We really had very little help from the teacher, and that was on purpose. We figured it out mostly by ourselves! The whole experience was really fun but mixed with school, so it really was the best of both worlds. In the end we learned how to be a part of the community. It was a stunning experience that my peers and I will always remember."

Lisa Holtz prepares her Claremont Elementary School third graders for powerful climate stewardship activities like these by taking them on weekly half-day adventures walking to and learning in Moody Park. They do a lot of exploration and observation and question asking. Lisa's advice: "Rather than starting with climate change, start with the place and build the sense of wonder."

All of these snippets show how plants and animals, and the forests and streams where they live, can become the basic entry points to more in-depth investigations into climate change and the social issues that drive it. Helping students connect to the plants and animals (and the people!) in their local place can, in the words of high school teacher Michelle Fountain, "give a window into what matters to them in that place, then a personal narrative about their identity." Identity functions as a conceptual connective tissue for issues around place, equity/justice, and climate. Michelle Fountain sums it up: "Be rooted in place. That's the biggest thing because place is the foundation which links to who people are, which links to caring for the planet and caring for others on it."

REAL CONSIDERATIONS

Climate change is affecting the plants and animals that call our planet home. It's causing significant changes in the delicate balance of life. For instance, forests, which are like majestic guardians, are now facing hardships. Their leaves are turning dry and brittle due to rising temperatures. This affects the beautiful dance between pollinators (like bees) and flowers. They used to work together perfectly, but now their timing is off. The places where animals live are also changing, often forcing the animals to travel long distances to find food and shelter. It's like a big puzzle that's getting jumbled up. However, even in the face of these challenges, there is hope. Nature has a remarkable ability to adapt, and we can learn from it. We can make a difference by taking care of our planet, finding new solutions, and working together to restore the harmony of life.

When snuggling into the fascinating and frequently furry world of flora and fauna (or, to be honest, any engaging place-based project), there are the REAL (Relationships, Equity, Action, and Leadership) ingredients that are useful to pay attention to, regardless of the specific topic or scope of the project. Below are some questions and thoughts to kickstart your creative juices, and to shape climate stewardship projects involving flora and fauna.

Relationships

"We know that nature heals. I have a lot of children who have trauma. And when they walk into the woods, that trauma is still with them. But they are able to find ways to settle themselves, to heal themselves." —Shawn Brodeur-Stevens, Charlestown Middle School, 7th grade teacher

Plants and animals can be relatively easy to connect to. Just as we see other humans, we can see them as identifiable, unique individuals that populate the world around us. They can help us get new perspectives on who we are, how to be in community with others, and how to live a life that is more aligned with nature. Below are some questions to explore these relationships.

Self

In order to care for a place, a person has to know enough about that place to feel some kind of empathy and personal connection with the beings in that place. Then the question of "Who am I?" as an individual can become intimately connected to one's place identity, as in, "I'm from here." From there, stewardship action has much firmer ground to stand on.

You can begin by posing some or all of the following questions to your students:

- What is important to you about your environment and community?
- Who (human or non-human) do you feel connected to?
- Which plants or animals really speak to you? What are you curious to learn about those living beings? Why?
- What do you believe about the "rights of nature"?[7]

Community

Ecosystems work because of relationships. Humans are a part of our ecosystems in the Upper Valley and have a big influence on the health of the flora and fauna that live here. Consider how you can work with your local humans to build a better community for all.

- What's your role in this community of humans? Do you feel connected? Why or why not?
- What activities or experiences make you feel more connected to your fellow humans?
- How many different organizations in our community are directly or indirectly connected to protecting plants and animals? (You can bet that there are quite a few!)
- What have the people in these organizations learned, or what are they working on, that might point you in the direction of some kind of meaningful action?

Nature

The feelings and knowledge that inspire teenagers to act on behalf of their place are different from those of a kindergartener. In other words, the process of building relationships with plants and animals should mirror the unique developmental capacities of the brains of

7. For an interesting discussion of this topic, see "The Rights of Nature: Can an Ecosystem Bear Legal Rights?" by Tiffany Challe on the Columbia Climate School's website. 22 April 2021. https://news.climate.columbia.edu/2021/04/22/rights-of-nature-lawsuits/

of the particular learners. The Pathway to Stewardship and Kinship resource maps this progression out in great detail.

For young students, the home and school tend to be the right scale.

- What plants and other living beings can be observed in their backyard or schoolyard?
- What amazing beauty, adaptations, and intelligences can they find in these beings? What do they notice changing through the seasons? How do they feel when they sit quietly in these spaces? Check out Four Winds Nature Institute's Hands-on Learning activities to help children immerse themselves in the wonders of nature in the Upper Valley.

As students move through elementary and into middle school, the local community becomes a great fit for investigation and connection activities.

- What local public spaces and protected areas can provide access to nature?
- What plants and animals live there? Why are they important? Do they need care? See the Vermont Institute for Natural Sciences to see how birds in need and other wildlife are cared for in our community.

Older teenagers are developmentally primed to start connecting to more national and global issues. Consider the following:

- What happens to climate when habitats, such as forests, are destroyed?
- How does a changing climate impact flora and fauna?
- What can we learn from these natural systems about resilience? The Vermont Center for Ecostudies, right in the center of the Upper Valley, is an excellent example of local people studying and caring for species on a more national and global level through inventory and monitoring.

Fortunately, plant and animal communities abound at all these levels to help us learn how to live more sustainably and gratefully for all that our flora and fauna offer us.

Equity

"The elders were wise. They knew that man's heart, away from nature, becomes hard; they knew that lack of respect for growing, living things, soon led to lack of respect for humans, too."
-Chief Luther Standing Bear

Empathy is a very important feeling that underpins both climate and equity action. At the core of any work around equity is understanding the lived experience of other beings. Plants and animals are great ways to connect to the "otherness" of human and non-human creatures in ways that embody thought and care.

In addition, learning outdoors can level the playing field when all the students (and the teacher!) have the same kind of cold, wet feet or itchy, sweating skin!

Origin Stories

Who has access to nature in the Upper Valley? Which groups of people are most affected by the plants and animals you are studying? Which groups of people affect them the most? Why? How are those different groups of people represented (or not) in in the Upper Valley?

How did different groups of people relate to the animals and plants you are studying in other time periods? (e.g. clearing land, hunting or trapping animals, introducing new species, foraging for food, etc.) What stories have been passed down in your own family about local plants and animals? How are these stories similar or different from the present day? Which issues have changed the most in your lifetime? In your parents or grandparents' lifetimes?

Alternative Stories

Are there any aspects of the particular plants and animals you are studying that are unique to the Upper Valley? Are there examples of local people living in harmony with the plants and animals around them? If so, what does that look like? If not, are there examples

more nationally or globally you can find? What can you imagine it would look like for the Upper Valley to provide a thriving home for plants and animals? What would it take?

Action

Outdoor activities can become the fertile pedagogical soil in which climate and equity learning can sprout and grow strong. Curiosity, wonder, observation, and playfulness can be irresistible invitations to action.

Actions involving flora and fauna can also be fraught with competing values, which can spark important conversations. Some questions to pose to your students include: Do humans have more rights than animals or plants? Are animals and plants only valuable for what they can offer people (e.g. medicines, food, recreation, beauty, etc.)? Exploring values as a class can help clarify different perspectives and lead to fruitful discussions about potential action-based projects. These discussions can mirror some of the larger debates in society.

Leadership

"Climate change is the single greatest threat to a sustainable future but, at the same time, addressing the climate challenge presents a golden opportunity to promote prosperity, security and a brighter future for all."
—Ban Ki-Moon, Former Secretary-General of UN

What inspires you to take action? Why is this important to you? Do you feel strongly enough about it to try to amplify your impact? Protecting flora and fauna in the Upper Valley can engage many plant and animal lovers, but it can also lead to conflict with others who have competing economic or other interests at stake. Understanding these interests is paramount to finding common ground and making progress.

In the context of inspiring colleagues and students to protect local flora and fauna, you can use a distributed leadership approach by helping your students (or other adults) to take ownership of the issue and participate in finding solutions. Here are some essential questions to explore:

- What will help connect students and other stakeholders to flora and fauna or local ecosystems? (See Entry Points below for lots of ideas).
- Are there particular species being impacted by climate change that might motivate others to get more involved?
- How can you collaborate with local scientists, conservationists, and environmental organizations in the Upper Valley to bring real-world expertise into your classroom?
- Are there opportunities to involve local communities, Indigenous groups, and naturalists to enrich your students' understanding of the impact on local flora and fauna and their connection to it?
- How can you monitor, document, and share with others the impact of your students' conservation efforts?

ENTRY POINTS

Plants and animals are so tangible. And they're everywhere, from just outside the window to living in and moving between every biome on the planet. This makes them very relatable topics for kids (and adults!) of any age. They invite questions of uniqueness: How is this plant or this animal uniquely adapted to live where it does? What happens when the place where it lives starts to change? Any exploration of change in plants and animal lives can lead directly to the study of the roles that humans have played in these changes, as well as questions about the impact of those changes on the human community.

Below are some ideas for relatively easy starting points for investigating plants and animals in a changing world. Look for creative ways to combine them.

Sensory Explorations

We are often oblivious to our surroundings, frequently passing by many wonders. Activities that get us to tune in to our surroundings and find the extraordinary in the ordinary can spark all kinds of learning and caring. Try some of the following ideas to engage the senses:

1. Choose a subject in nature and draw it from several different distances (e.g. one inch, six inches, six feet, or sixty feet). What do you notice from the different perspectives? You can also use a microscope, hand lens, and binoculars with this exercise.
2. Make a sound map by sitting with eyes closed and noticing sounds for a few minutes. Open your eyes and make a map (you can label with words or draw) with you in the middle and the sounds surrounding you.
3. When doing outdoor learning adventures, Shawn Brodeur-Stevens at Charlestown Middle School has created a set of "woods rules" with his students. For example, If you're hungry, eat. If you're tired, sit down. What outdoor learning rules might your own students create that connects them to their natural feelings?
4. Take your students on a hike or into an outdoor setting and ask each student to make a list of scents. Encourage individuals to make sure they really exercise their sense of smell, so that when they report out, everyone can share at least one distinct scent without duplicating someone else's contribution.

5. Distribute paint swatches to each person on a hike and ask them to find those colors in nature. You'll be surprised at the wild colors out there! To avoid potentially destructive collecting, students can document their color matches with digital photographs or by pointing out the match to the group.

What's the Deal with Invasive Species?

Change is the one constant in life, but when change happens quickly, systems often struggle to adapt. Invasive species have had a dramatic effect on our local ecosystems and there is much we can learn from them!

1. The 2016 TED Talk "The Threat of Invasive Species" by Jennifer Klos explains the challenge of invasive species.
2. For more background on aquatic and land-based invasives, read National Geographic's online encyclopedia article "Invasive Species" or the U.S. Forest Service article "The Invasion of the Forest Destroyer—And How Science Is Fighting Back."
3. Invite someone from Vermont Invasives or the University of New Hampshire Extension Services Invasive Species Division to speak to the class about local invasives. Or, better yet, take a hike with one of these experts so that they can point out invasives in your neighborhood. Forests and riverbanks often offer examples.

Pollinators Make our World Work and Connect Us All

Pollinators abound in the Upper Valley and are critical to our ecosystems and agricultural production. Plus, they are active and fascinating creatures to sharpen observation skills.

1. Explore "Pollinators in New Hampshire," a brochure from NH's Taking Action for Wildlife that can be found online.
2. Watch this PBS video The Power of Pollinators for a beautiful overview of the fantastic creatures.
3. Try out the simple pollinator scavenger hunt, developed by Sullivan County Conservation District's own Dawn Dextraze, to record data relating to the color of flower petals and the insects that observed on them, as well as considering what role the insects are playing on the flower. The back of the data collection sheet is used for mapping the path of a bee in a garden.

Phenology Fun

Studying how individual organisms and species in nature change can be a good way for younger students to start understanding change in general.

1. For a variety of materials and activities developed by educators around the United States, check out Nature's Notebook Education page from the USA National Phenology Network (USPN). There is a searchable database of their activities for all ages.
2. Several short introductory videos about phenology including "What is Phenology?", a short TED Talk for younger audiences. (Note this video does not include a "What you can do about it?" component, as does the one below, so be sure to add in time for discussion to generate hope and ideas for action.) What Is Phenology? by NPN, is only 3 minutes; it's a little more technical and comprehensive than the video suggested above.
3. Budburst, a project of the Chicago Botanical Garden, offers many educational materials, including observation sheets that can be used by students to observe and track phenological changes in a variety of kinds of plants, as well as pollinator activity. You can take this in the "climate action" direction if you get students involved with collecting and sharing data.

Carbon Cycle Games

Games can be a fun way to both introduce and reinforce complex topics like the carbon cycle.

1. The BEETLES Project of Lawrence Hall of Science (UC Berkeley) has many wonderful lessons to connect learners to flora and fauna. The "Matter and Energy Diagram" lesson focuses on diagramming the carbon cycle.
2. Another way to help students solidify their knowledge of the carbon cycle is to play a game about it. Sixth grade teacher Jennifer Ceven created the movement-based Carbon Cycle Game, which was adapted from Project Wet's "The Incredible Journey." Other teachers have adapted this game to their educational contexts; these materials can be found online, including one high school teacher's adaptation on the National Association of Geoscience Teachers, among many others.Biomanbio.com also has a free online carbon cycle game that students can play and then debrief by describing their paths and what they learned.

Diving Into Oceans, Chemistry, and Systems Thinking

"I never would have thought that chemistry would be the best lens to teach climate change, but now I'm totally convinced, because it's all balancing inputs and outputs and the law of conservation of mass. We can't burn all this stuff and not produce all the CO2." –Shane Heath, a science teacher at Essex High School. Shane has generously shared his lesson plans that explore the weighty role of oceans in climate change:

1. Check out these chemistry-based investigations into ocean acidification
2. Do a webquest on ocean acidification.
3. Learn about water density and the Gulf Stream and its critical importance in understanding how climate change works.
4. Use this list of instructions to help create simple carbon cycle experiments.

World Climate Summit

Climateinteractive.org is the home for a very user-friendly and robust climate simulation tool called En-ROADS, built by MIT and other super smart folks. It could be the starting point for so many different extended investigations into climate change and equity issues.

1. The En-ROADS climate simulator is the basis for a multi-day simulation game of a fictitious climate summit organized by the United Nations to address climate change. It can become the centerpiece of a unit in which students role play the policy stances and negotiations of nations across the globe.

Weekly Walk

"I can create a curriculum from a learning standard, but if I wait and provide an opportunity for them to experience the phenomena first, then that drives their learning. I still hit all the same standards, but I didn't have to do the teaching. You allow nature to do it if you allow the phenomena to drive their interest."
—Shawn Brodeur-Stevens, teacher, Charlestown MS

Although videos, readings and online games are great complementary activities for learning about nature and climate change, there's no true substitute for connecting directly with the local environment. Weekly walks get the body and mind moving, sharpen inquiry skills, raise appreciation for the natural elements and how they interact, and spur observation of changes. Consider some of the following activities to build into your weekly routine:

1. Locate a natural area within walking distance of your school. Establish a routine schedule for using that as an outdoor classroom, whether it's a Forest Friday, as kindergarten teacher Eliza Minnucci created at the Ottauquechee School in Vermont, an afternoon once a twice or week, or a specified hour on some regular basis.
2. Make maps of things or events in your outdoor learning lab. For lots of ideas that build from this simple premise, check out the book Mapmaking with Children, by David Sobel.
3. Move studies into your outdoor learning space. How many ways could you count, measure, or calculate things in or around a stream, or on a snowy slope? Lisa Holtz at Claremont Elementary (NH) says, "In the winter we got permission to build a fire in the old stone fireplaces. We would take our sled and wood, and build a fire together. Then we might do lichen study, or math facts up there, practicing division. At the end of time outdoors, kids would slide down the hill after answering multiplication questions."
4. Reach out to the local historical society as a starting point for investigating how the land was inhabited a year, a decade, or centuries ago.

Power Spots and Special Places

1. Students select and return regularly to "Power spots" or "Sit Spots" in a natural area near your classroom. Start by using the ideas and linked resources on page 9 of the 2020 School's Out(doors) brochure, which is hosted on the Shelburne Farms website.
2. Students observe and write about the ways a particular outdoor spot changes through the seasons. Use the same handful of observation prompts. Look for ways that changes throughout the annual cycle relate to observed or imagined changes from year to year (with possible links to climate).
3. Students write and share short essays about a "significant place" like these from Michelle Fountain's high school students. Choose a focus point rather than a full life story. Through these "identity narratives," Michelle lays the foundation for future conversations (often difficult) around equity and justice. She explains, "I get to

know them as students more and can appreciate them for who they are, and try to honor that, but also say that different people identify in different ways, and let's learn about them too."

4. Artistic expression like drawing and poetry can really blossom when done in a physical place that students have come to identify with through repeated visitation and contemplation. Check out natural journaling resources at johnmuirlaws.com.
5. Students can compare and extend their observations to those in the book Naturally Curious, by Mary Holland.

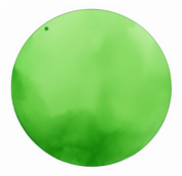
ACTION PROJECTS

"We really didn't ask for this. We didn't cause it, we're trying to solve it. One of my motivating factors is, if I ever have children I want them to see nature and beauty. I don't want them to have to do what we're doing right now."

—Elena, 15 The Climate Strike Kids, In Their Own Words

We are fortunate in the Upper Valley to have relatively easy access to natural habitats to explore, enjoy, and learn from. Taking action to safeguard our flora and fauna in response to climate change is crucial for the well-being of our planet and future generations. The intricate web of life on Earth, from the smallest insects to the largest mammals, relies on a balance that is increasingly threatened by rising temperatures, habitat loss, and shifting ecosystems. Biodiversity is essential for the health and resilience of our natural systems and for human survival, supporting food security, clean air and water, and countless other ecosystem services. Actively working towards climate change mitigation and adaptations, and protecting the diverse array of species that inhabit the Upper Valley, we help to preserve the beauty and wonder of our local flora and fauna and create a more habitable world.

Read on to learn more about what you and your students can do to help our local flora and fauna survive and thrive:



Green Circle
Simplest

Seed Bombs – Creating Pollinator Habitats

Pollinators are a key part of our ecosystems that help seeds produce much of the food we (and other animals) eat and flowers we enjoy. In fact, according to Allen Young, a leading cacao and cocoa expert, "A tiny fly no bigger than the head of a pin is responsible for the world's supply of chocolate." [8]

Some of our pollinator populations are declining due to climate change and other stressors such as habitat destruction and pesticides. Here's a fun way to help:

1. See the US Forest Service's explanation of why pollination is so important, for crops, clean air, carbon sequestration, water, soils and even human culture.
2. More locally, check out the work Vermont Center for Ecostudies (located right in the center of the Upper Valley) does with butterflies and bees.
3. Have a local Master Gardener in New Hampshire or in Vermont speak about the most beneficial seeds for your location for pollinators and how to obtain them. Contact your state's Extension Service for more information.
4. County Conservation Districts are a great resource for information about local seeds and plants. Here's a list of NH Districts and info for VT Districts: Both UNH and UVM Extension also have services to answer specific questions online.
5. Select seeds that are likely to do well being planted during the season you'll be planting and that are native to the region.
6. Once you have your seeds, make seed bombs! You'll need a bucket for mixing everything together, air dry clay, compost, and a flower pot, cup, or some other kind of holder. Students can experiment with proportions to see what holds together well. (Note: Seed bombs are also available ready-made at Target in West Leb, but if there's time, making them is half the fun!)
7. Have fun exploring your playground, your home, or appropriate public spaces with fertile enough soil to distribute your seed bombs. Make sure to ask first if it is okay to plant there!
8. Take before and after photos, and see if you can catch any pollinators doing their thing.

8. UN Environmental Programme. (2016, August 10). Pollinators under threat—so what?. https://www.unep.org/news-and-stories/story/pollinators-under-threat-so-what

For the Birds

Birds, important pollinators, are not always readily visible during the school day, but are still in need of our attention. Our migratory birds, in particular, are challenged by our changing climate, as explained in "Climate Change Altering Some Migratory Paths," a short video by The National (CBS News). Below are some ideas and resources to help you learn more about these amazing international travelers and how we can help protect them:

1. Love birds? You are not alone. eBird provides pretty much all of the information you could ever want about birds, connects you with scientists, helps you track and identify local birds and lets you play with lots of data! NH Audubon is another great local source for bird information. See their State of Birds to see how climate change and other factors are impacting local species.
2. Identifying birds and adding them to eBird helps scientists see the trends in bird movement and populations so they can figure out appropriate conservation strategies. This type of data collection helps scientists determine how birds are impacted by climate change.
3. To help protect our fine feathered friends against some of these harmful impacts, we can turn to our local experts in the bird world, the Vermont Institute of Natural Sciences (VINS). Contact them for a visit (or to request that an educator come to your school) to learn more about our local birds and climate change.
4. The VINS website offers important tips for protecting birds, as does the Vermont Center for Ecostudies, many of which your students can do!

Green Up Day

Protecting our flora and fauna from the impacts of climate change can also happen through a fun community event in the Upper Valley—Green Up Day! Green Up day is all about picking up trash, primarily along roads, to make our communities more beautiful and safe for humans, animals, and plants.

1. Did you know Green Up Day was initiated in Vermont? See the Green Up Day Wikipedia page to learn a little bit about its 50+ year history. Don't worry, New Hampshire has it going on as well. David Kotz of Lyme, New Hampshire, wrote an interesting blog about experiences with Green Up Day. Contact your local conservation commission (NH Districts and VT Districts) or town clerk to see what's going on in your area and how you can participate.

2. Decide if your class would like to join your local community to participate (it typically takes place the first Saturday in May) or if they prefer to create their own Green Up Day for their class or school.
3. Be safe, wear bright clothing and gloves, and see how much trash you can collect!
4. Were students surprised by what they found? Discuss where the majority of the trash they found seems to come from and ideas for reducing this waste. Picking it up is a great way to foster stewardship and caring, but helping students see trash as an avoidable problem (and cutting down on plastic production!) can have a much bigger climate impact.
5. Remember to take photos so you can share your good work with the local paper and make your school and community proud.

Blue Square
More In Depth

Removing Invasive Plant Species

We have plants to thank for the oxygen we breathe and food we eat. Invasive plant species aren't trying to do harm, they are just trying to survive. However, their disruption to our local agriculture and ecosystems, made more likely by climate change, can cause harm to humans, animals, and more native plants. We can help our communities adapt by slowing or eradicating the establishment of these non-native species.

1. Watch this short video on invasive species to learn more about how some species have become "invasive" even though they are harmless in their native habitats.
2. Research invasive species in your area by contacting your local county forester or exploring Vermont Invasives, University of New Hampshire's Extension on Invasive Species, or the U.S. Dept of Agriculture National Invasive Species Information Center.
3. As a class, choose a species you would like to focus on. You can do this by walking around the school and observing and/or discussing with your maintenance crew or local county forester in NH or VT. Make sure to also research how these invasives are treated. For example, you want to avoid invasives that need pesticides for removal. Choose one that your class can do safely without a lot of hard-to-secure equipment.
4. Pick your area and start digging, pulling or whatever is suggested from your research. Make sure to take before and after photos to admire your good work and share with those who may be interested.
5. Added bonus! Some invasives can be eaten, like in this recipe for foraged garlic mustard pesto from farmsteady.com. You can celebrate with a meal and entice invitees to come learn about your work!

Extension: If you want to take this to the black diamond level, see this comprehensive curriculum unit on invasive species created by former Brattleboro, VT teacher, Dennis Hamilton.

Butterflies, Butterflies, Butterflies

"Happiness is a butterfly, which when pursued, is always just beyond your grasp, but which, if you will sit down quietly, may alight upon you."
—Nathaniel Hawthorne

"'Just living is not enough,' said the butterfly, 'one must have sunshine, freedom and a little flower.'"
—Hans Christian Anderson

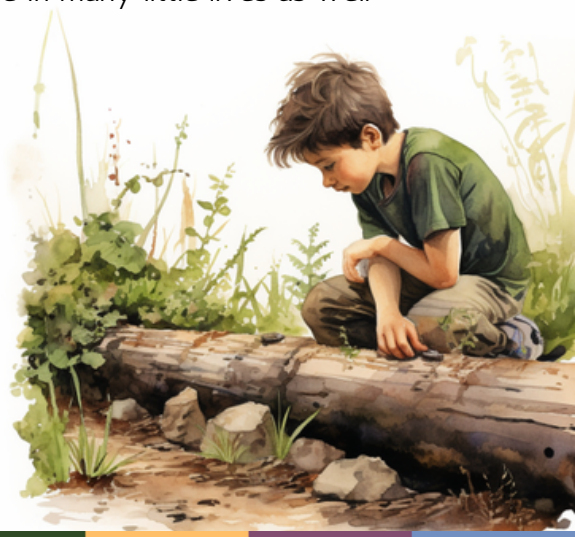
Butterflies are truly magical, plus they are important pollinators and can serve as a barometer for how our ecosystems are faring. Butterflies, like migratory birds, are finding it harder to make their migratory cycles. What can we do to help these beautiful wonders?

1. Check out Journey North, an educator-friendly site that has been tracking butterflies for years, or Monarch Larva Monitoring, a citizen science program. You can get involved with one of these national programs, or...
2. More locally, we have some butterfly experts in our own Upper Valley at the Vermont Center for Ecostudies (VCE), which created the eButterfly program where you and your students can contribute your observations of butterflies. Plus, The NH Butterfly Monitoring Network was recently created and offers workshops, field trips, and butterfly counts as well as iNaturalist projects.
3. As monarchs depend on milkweed, see if you can find places in your community to grow or help protect milkweed. Fortunately it is very easy to grow and spread milkweed. Have fun helping those fluffy white seeds fly to spots where they can find fertile soil, sunshine, and no mowers. You can also couple this activity with the seed bomb activity above or planting a pollinator garden to create butterfly habitat. Let people know how important it is for our beautiful pollinators to live!

Help Salamanders Do Their Job as Climate Stewards!

Just like pollinators, many local species are struggling with adapting to changing climate conditions. There are lots of reasons for this. For example, the change in average temperatures does not suit them, their migration patterns are disrupted, seasonal shifts make it hard for them to adapt, they are outcompeted by invasive species, or the plants and animals they rely on are less populous because of climate change. You can help scientists keep track of local species, such as salamanders, and learn with them how we can better manage our local lands.

1. Contact the Marsh-Billings-Rockefeller National Historical Park to see if you can set up a salamander tracking adventure! If you cannot visit the park, but have a forest nearby, you can still do this activity—you might even be able to get help from the national park to set it up.
2. Start with an overview of why salamanders are so important for our local ecosystems and climate change. Note that according to Amphibian Planet, it is generally not a good idea to touch salamanders as they have very permeable skin, but students can still enjoy observing these marvelous creatures.
3. Break into groups of 2 or 3. Read these super cool facts about our local red-backed salamanders.
4. Each group can share which of the facts they think are most related to climate change and why. They can also share which they find the coolest!
5. Given this information, where around your school might you expect to find salamanders? Is there a good space in a nearby forest? Can you find any if you turn over some old logs or rocks on the forest floor?
6. If you find a good space and want to monitor salamanders, make 12" x 12" (1 inch in depth) "coverboards" out of wood. Bury these cover boards loosely about 1/4 inch deep and check them when you can to see if any salamanders have hidden under there. Don't check more than 1x/week or they might get annoyed and move.
7. You can report your findings at Vermont Reptile and Amphibian Atlas or iNaturalist to help scientists and all of us learn about these special creatures.
8. Did you know some people help salamanders by helping them cross roads? You can read all about it in the Otter Creek Audubon Society's "Salamander Crossings." In the Upper Valley, The Lebanon Conservation Commission coordinates crossing brigade efforts at multiple sites in Lebanon, NH, and The Hartford Salamander Team coordinates amphibian crossing efforts in Hartford, Quechee, West Hartford, White River Junction, and Wilder, VT. If neither one is close by, contact your own town conservation commission (New Hampshire Association of Conservation Commissions or Vermont Association of Conservation Districts) or see the Harris Center for Conservation Education's Amphibian Crossing Brigade page to find a program—and great information—near you. Join one and see how you can make a difference in many little lives as well as our larger local ecosystem. Enjoy!



Black Diamond
Multi-Faceted

Project Drawdown: Focusing on Viable Solutions to the Climate Crisis

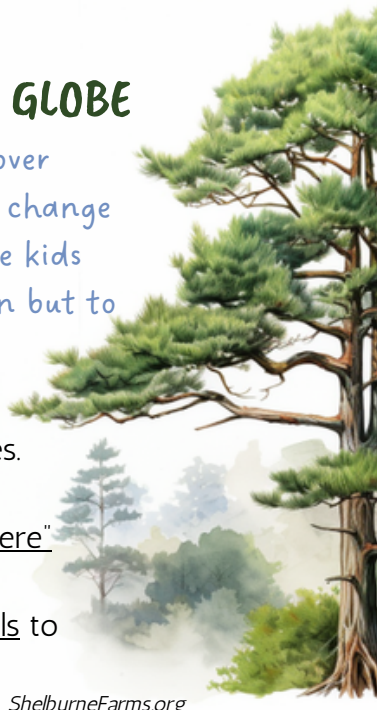
Drawdown: The World's Leading Resource for Climate Solutions is an invaluable resource with a wealth of easy-to-digest background information, including a six unit video lecture series introducing climate solutions in engaging ways and a catalog of solutions already under way. The Drawdown solutions pertain to the topical areas in this guide. For example, related to Flora and Fauna, you can explore perennial biomass production, forest protection, grasslands protection, silvopasture, temperate forest restoration, and tree plantations (on degraded land). Students will be inspired when they navigate through Drawdown's innovative approach and practical knowledge and see all of the good work that is happening out there.

1. Review this Project-Based Solutions to Reduce Climate Change Mini-Project lesson plan created by Emily Anderson, a teacher at Kearsarge High School that uses the Drawdown.org materials to help students figure out how to engage in effective climate change mitigation and adaptation strategies..
2. Consider how else you might use the resources at Drawdown.org to get your students working on local action projects.
3. See Emily's related lesson plans on using carbon to model complex systems and propose real solutions.

Forest Plots and Carbon Sequestration Explorations with GLOBE

"The students connect with a property and watch the property change over time. With the guidance of teachers, they explore what are the causes of change and what are the impacts? But then our carbon plot was vandalized. The kids cried because of their trees. It was a visceral reaction. Not to the Amazon but to their trees. In their family, community, neighborhood."

— Shawn Brodeur-Stevens, teacher, Charlestown Middle School



NASA's GLOBE program offers a wealth of community-based science activities. The GLOBE website can be a lot to navigate, but if you stick with it, you'll be rewarded with a bounty of useful tools and resources. "Introduction to Biosphere" can get you and your students started on becoming part of this worldwide network of flora and fauna scientists and stewards. See the Biosphere protocols to

learn more about Arctic Bird Migration, Biometry, Carbon Cycle, Green Down, or Green Up. To focus on carbon sequestration in trees, you can:

1. Work with your local county forester in NH or VT to identify a natural forested area near your school where you can investigate carbon sequestration. The foresters can also serve as resource experts.
2. Use the Carbon Cycle set of protocols and/or work with your country forester to collect precise, accurate, and usable data about your local land cover and carbon sequestration.
3. Share your findings with the community and/or enter your data with GLOBE so that others, including NASA scientists, can use your data.
4. Talk with your county forester partner to determine what you can do to continue to help care for the trees near you, including "adopting" a specific tree or planting more trees in areas that need reforestation.

Biomimicry Design Challenge

For almost four billion years, life has been evolving and adapting to the ever changing conditions on Earth. Nature has proved to be pretty ingenious at solving wickedly complex problems of survival. Increasingly, material and social engineering folks are looking to nature for templates for creative solutions.

1. Engage in a similar pursuit by challenging students to invent a solution to a problem that is important to them by looking to nature for inspiration. Bonus points if the problem is relevant to climate and/or equity. Use or adapt these lesson plans from local environmental education expert, Ginger Wallis, to scaffold the project.
2. The Multisolving framework (i.e., finding solutions that address multiple problems at the same time) could be used in conjunction with the biomimicry design challenge, either as a precursor, parallel exploration, or follow up to deepen understanding. Use or adapt this slide show and list of examples.

What's the Buzz? Creating a Climate Focused Special Edition Newsletter or Website

Michelle Fountain wanted to get her 9th grade students at Woodstock Union High School to learn about the local impacts of climate change from a variety of perspectives. As an English teacher who couldn't rely on the typical climate science lesson plans, she worked with her students to create a special edition newsletter. The following project is inspired by Michelle and her students:

1. Small teams research local impacts of climate change and pick an issue that resonates with them. Issues can range from decreased tourism due to diminished snow conditions to the increase in ticks and Lyme disease.
2. Each team researches the primary stakeholders connected to the issue and finds at least 3 people who are willing to be interviewed and who can provide different perspectives.
3. Each team develops interview questions to learn how each person has been impacted and their thoughts about the future and what can be done to reduce the negative impacts of this problem and otherwise adapt with resiliency.
4. Each team also takes photos to represent their issue.
5. Each team writes an article based on their research and interviews and proposes a multisolving solution.
6. Design a newspaper, webpage, or other multimedia strategy to share these articles with parents and other community members.

RESOURCES

Upper Valley Resources

- **Four Winds Nature Institute,** based in Chittenden, Vermont, provides monthly workshops on natural science for enthusiastic adult volunteers who want to bring the wonders of nearby nature to school children in communities across Vermont and neighboring states. These workshops offer a wealth of knowledge about the natural world and engaging hands-on activities.
- **New Hampshire Audubon's Educational Resources** includes an "Ask the Naturalist" series, covering a wide range of wildlife topics, as well as past newsletters with downloadable lessons.
- **Project Learning Tree in New Hampshire** and **Project Learning Tree in Vermont** offer curricula that help teachers teach complex environmental issues and inspire students to connect with the natural world.
- **Vermont Center for Ecosystem Studies** has opportunities for people of all ages throughout the state to help monitor Vermont wildlife. In addition, they have a large resource center with recent scientific research and interactive mapping and data tools.
- **Vermont Institute of Natural Sciences** (VINS) has a variety of specialized education and training programs, as well as public education offerings on wildlife rehabilitation and current conservation science issues.

Equity-Focused Resources

- ***2040*** (2019, documentary film) by filmmaker Damon Gameau is structured as a letter to his young daughter. Gameau examines the effects of climate change from 2020-2040, and how existing technologies, if used at scale, can solve this existential threat.
- ***The Animals' Lawsuit Against Humanity: An Illustrated 10th Century Iraqi Ecological Fable*** (2005 edition) is an ancient fable first written down in Arabic around the 10th century in what is now Iraq and later translated into Hebrew in the 14th century. In this tale, many animals come to the Spirit King to complain about their treatment by humans. Subsequently, the humans and the animals testify in a trial before the King,

elucidating both sides of the ecology debate. Written by Ikhwan al-Safa, Rabbi Dan Bridge, and Rabbi Kalonymus; Illustrated by Umm Kulthum; and translated by Anson Laytner.

- ***Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*** (2013, nonfiction) by Robin Wall Kimmerer (Potawatomi) provides an alternative approach to Western scientific methodologies in its examination of plant life.
- ***The Green Planet*** is a documentary TV series (3 episodes) narrated by David Attenborough that explores what it's like to be a plant.
- ***The Hidden Life of Trees*** (2020, documentary film) is based on the book *The Secret Life of Trees: How They Live and Why They Matter* by renowned forester and author Peter Wohlleben.
- ***Home*** is a documentary film that uses extensive aerial footage to explore the interconnected nature of problems on Earth, including climate change.
- ***A Life on Our Planet*** is a documentary film narrated by David Attenborough in which he traces his life alongside the evolutionary path of life on Earth. The film highlights how we are losing wild places and animals, and suggests a vision for the future.
- **"A Path"** is a short film that follows Finnish actor Jasper Pääkkönen as he travels through the mountains of Patagonia and explores the desire to protect wild places
- **Unbowed: A Memoir** (2006) is by Wangari Maathai, the founder of the Green Belt Movement in Kenya and 2004 Nobel Peace Prize laureate.
- **"Wangari Maathai and the Green Belt Movement"** (2010) is a short documentary film about Wangari Maathai's Green Belt Movement that united environmental conservation and women's rights under one banner.

Other Educational Resources

- **Five Ways Climate Change Is Intensifying the Threat to Plant Health** (2022) is an article from the Food and Agriculture Association of the United Nations that discusses how climate change is causing an increase in plant diseases.
- **The GLOBE Program** allows students, teachers, citizens, and scientists to collaboratively contribute to a trove of environmental data, with the goals of increasing students' scientific literacy and strengthening their connections with nature.
- **Living Schoolyards and Climate Resilience** is an article from the nonprofit Green Schoolyards America that highlights the benefits of having a schoolyard with natural space and includes resources about how to build a living schoolyard at your school.
- ***"Nurtured by Nature"*** (2020) is an article by Kristen Weir published by the American Psychological Association that reviews research supporting the idea that spending time outside in nature improves cognition.

Potential Funding Sources

- **New Hampshire Fish and Game Schoolyard Habitat Grants** can help fund natural schoolyard habitats. Grant amounts can be up to $2500, and New Hampshire schools and other education-based organizations that serve young children through 12th grade are eligible to apply.
- **We NHEEd to Get Outside** awards grants for outdoor learning experiences for children and is open to schools and non-profit organizations who offer outdoor education programs. Grants are typically up to $2000.

FOOD

"Only when the last tree has died and the last river been poisoned and the last fish been caught will we realize we cannot eat money."
—Cree Indian Proverb

The tomato plants in the Food Justice Garden at Sharon Academy were feeling generous. The Sharon food shelf where the garden's produce was usually delivered, was already fully supplied. The students pondered the dilemma of this abundance, and decided that perhaps people who did not want tomatoes would prefer to have salsa. So they partnered with the local church to use their commercial kitchen, made salsa, and delivered that to the food shelf.

Kids often have a natural tendency to want to work and support their communities. An opportunity to do something real with enough autonomy to come up with a solution can be a powerful combination.

Schools and teachers want to provide their students with these opportunities, but with the numerous demands they already face, sometimes what they need is a little help from a partner. That's where the Regeneration Corps comes in. Working with schools in whatever ways align with needs, interests, and available time, they provide hands-on and place-based content that integrates agricultural literacy, community organizing, and social justice.

The Food Justice Garden at Sharon Academy perfectly illustrates how these threads come together. Students learn about soil health, regenerative agriculture and climate solutions as they grow food for local families in need. More recently, Vermont-based Regeneration Corps has provided resources and connections for the addition of a native tree nursery. When these trees mature, they will be given to local BIPOC farmers as part of a land justice project.

One student shared that she valued this work, "Because I'm interested in learning more about the problems our world is facing and what I can do to work towards the solution even on a very small scale in my own VT town."

Food is all around us and inextricably connected to the health and well-being of our communities and the environment. Through engaging with food systems at a local level, students can begin to gain a deeper understanding of the intricacies and complexities of environmental, economic, and social justice. And by engaging in hands-on activities like growing food, distributing it to those in need, and working with community partners, students are empowered to take tangible action towards creating a more equitable and sustainable future.

REAL CONSIDERATIONS

"Sustainable agriculture is not just about growing crops, it's about caring for the soil, the water, the air, and all the living things that depend on them."
- Vandana Shiva

The relationship between food, climate change, and equity gets at the core of our ability to sustain ourselves as individuals and as a civilization. Climate change affects the way we grow, produce, and access our food. When temperatures rise and weather patterns become unpredictable, it becomes more challenging to grow crops, raise animals, and provide food. This can lead to food shortages and higher prices, which severely impacts already vulnerable communities. Everyone deserves access to healthy and affordable food, regardless of their circumstances. By addressing climate change, we can also work towards creating fairer food systems.

Since we are talking about food, let's talk about recipes. The idea of the REAL "recipe" is that, if you keep coming back to these lenses, perspectives, and questions, the work becomes more "REAL," making it more authentic, relevant, thought-provoking, and effective.

Relationships

The moment that we look beyond food as just a product on a shelf, an incredible web of relationships is revealed, from the health of the soil all the way to where the uneaten scraps end up. Agriculture brings humans and nature together in an endless number of ways. Working directly with a most basic human need provides students a wealth of directions to explore and reflect on where they fit in the web and where their power is to make change.

Self

Food is a fundamental part of our lives, and our experiences with it are diverse and unique. Reflecting on and sharing our personal relationships with food will help to find ways into the more complex conversations about how our food choices impact the environment.

- What are your favorite foods, and what do you like about them?
- What is the role of food in your cultural identities and traditions?
- What sort of messages do you get about food from your family, your peers, school, and the wider society?
- What choices do you have about what you eat?
- Have you ever had to make hard decisions about food, such as choosing to eat a certain way for health or ethical reasons?
- What's the impact of your food choices on the environment and other people?

Community

As we eat, rarely do we spend much, if any, time thinking about who the food connects us with. This food likely had quite a journey through many unseen hands before ending up in our mouths!

- Where does our food come from?
- Who grew it, processed it, packaged it, distributed it, prepared it?
- Who are the farmers in our community?
- Who else in our community works in the food system?
- How do people in our community access food?
- What are the ethical considerations in our food choices, such as treatment of workers in the food industry?
- What are the economic impacts of our food choices in terms of supporting local farmers and businesses?
- Who can we work with in our community on food projects?

Nature

The environmental impact of our food choices is entirely opaque in most cases. We may have an idea that certain foods and production methods are "better for the planet" but just why that is true may not be very clear.

- What are the environmental impacts of different types of agriculture?
- Where can we see that in the Upper Valley?
- What comes to mind when you think about farmland?
- How do our different food choices (e.g. plant based vs. meat, local vs. not local, large scale agriculture vs. small scale, pesticides vs. organic) have an impact on the climate?
- How does our food waste impact the environment?
- What do you believe about the rights of animals, wild and domestic?

Equity

Food justice is a concept that seeks to address the inequities and injustices in the food system, including issues such as access to healthy and affordable food, the treatment of workers in the food industry, and the social impacts of food production. Food justice recognizes that these issues are interconnected and cannot be addressed in isolation. Food sovereignty is a concept that emphasizes the right of people to determine their own food and agriculture systems, including the right to produce, exchange, and consume their own food. It recognizes that food is not just a commodity, but a fundamental human right and a cornerstone of culture and identity. Through these lenses, there are numerous ways to investigate the complex relationships between food and equity.

Origin Stories

Different events and movements, like colonialism and the rise of industrial agriculture, have shaped the way we grow, process, and eat food today. These events and movements have affected different groups of people in different ways, benefitting some and causing harm to others.

- What is the history of food production on this land, and how has it changed over time?
- How have events like colonialism and slavery affected the global food system, and how do these legacies continue to impact the food industry today? How did colonialism and slavery impact local food production?
- What other cultural influences and historical events shaped the way that we produce, process, and eat our food today?
- How has the rise of industrial agriculture and the globalization of the food system contributed to inequalities and injustices?
- What has been the local impact of this globalization?

Alternative Stories

Food has always been a source of nourishment, connection, and cultural identity for indigenous communities around the world. At the same time, the industrial food system has had many negative impacts on the environment and public health and has replaced Indigenous foodways in many places. However, the wisdom and traditions of Indigenous practices have survived and along with other alternative food systems, they point the way toward more equitable and sustainable solutions.

- How have local Indigenous peoples historically and today used food as a source of nutrition, medicine, and cultural identity?
- What can we learn from the food practices of Indigenous cultures, both past and present, about sustainability and resilience? How can we do so in a respectful way?
- What do we mean by an "alternative" to the industrial food system? What sort of alternative food systems do we have locally?
- What challenges and opportunities do these alternatives face?
- Are there local examples of cutting-edge projects that are using innovative approaches to sustainable food production, waste disposal, and adaptation to more extreme weather conditions?

Action

"Knowing is not enough. We must apply. Willing is not enough. We must do."

—Bruce Lee

Food is a rich and accessible topic for action projects because it is a part of our daily lives. Whether we are growing it, buying it, cooking it, or eating it, food is a ubiquitous presence that surrounds us and impacts us in many different ways. This makes it an ideal subject for hands-on, experiential learning, where we can explore the complexity of our food system and the roles we knowingly and unknowingly play in it. On top of that, food is fun, tasty, and often very satisfying to engage with.

The diverse range of topics within the food system provides opportunities to take action on issues around the environment, health, culture, the economy, and many other areas. The action projects offered in this chapter are just a taste (pun intended!) of what is possible.

Leadership

"We don't have to engage in grand, heroic actions to participate in change. Small acts, when multiplied by millions of people, can transform the world."

—Howard Zinn

Your actions have the power to create a ripple of change. By exploring the following questions and embracing your leadership potential, you can change the way people think about and relate to food, climate, and equity:

- Food is a topic with which everyone has their whole lifetime of experience. Consider the knowledge and experiences you already have regarding sustainable food choices—how can you share that wisdom with others?
- What actions or initiatives are you most passionate about when it comes to addressing food-related issues?
- How can you collaborate with local farmers, organizations, food shelves or community gardens?

- How can you involve the school in becoming more mindful about food production, transportation, access, and waste?
- How can you document learning and positive changes to share with your community and policy makers?
- What are the things that prevent you from being a leader? Where in this project could you find an opportunity to start overcoming those barriers? Can you lead a group? Are you willing to speak in public?

ENTRY POINTS

Food is a vitally important issue for both climate change and equity. Project Drawdown names reduced food waste and plant-rich diets as two of the most impactful solutions for climate resilience.

What was the last thing you ate? What do you know about it? What did you think about it while you were eating it?

When it comes to food, we mostly think about how it tastes and if we feel satisfied after eating it, but behind that mouthful is a complex and profound story. **To begin to explore the connections between food, climate and equity, jump on any of the paths below to start your journey.**

Food and Climate

What sort of impact do you think how we produce, distribute, and consume our food has on the environment?

1. Try watching "What Is the Environmental Impact of Feeding the World," a short video from the CA Academy of Sciences that examines the environmental impact of feeding the world. What did you find most interesting or surprising about it?
2. Explore this great interactive online resource from the Center of Ecoliteracy, Understanding Food and Climate Change, an Interactive Guide. See page 2, "What is a food system?" and watch the ketchup video or choose an activity from the student activities section (click the icon on the bottom right).

Where Does Our Food Come From?

How many kids do you think eat school lunch every day in the US? Hint: a lot! How about 30 million! That's a whole lotta lunch. What do you know about lunch at your school? Do kids like it? Is there a lot of waste? Do you know if any of the food served is local?

1. Interview the cafeteria staff to learn where your cafeteria food comes from. You might need to look at cans and other packaging to learn the sources of local and non-local suppliers. Those who bring a bag lunch can also do this activity by speaking with their parents and doing their own sleuthing.
2. Try drawing a map of where the ingredients of your lunch come from.
3. Use Google maps to help you figure out the number of miles your food has traveled.

What A Waste!

How much food do you think is wasted in the US? Where do you think that waste happens?

1. Check out one or both of the following ten-minute videos for some ideas about why so much food is thrown away:
   a. The Big Waste: Why Do We Throw Away So Much Food? (Pulitzer Center, 2015)
   b. Food Waste Causes Climate Change, Here's How We Stop It. (Our Changing Climate, 2020)
2. What was most surprising about what you saw in the video? What else do you want to know about this topic?

What is Food Justice?

One of the main ideas of food justice is that access to healthy food is a human right. What do you imagine are the barriers to people fully enjoying this right in the Upper Valley?

1. What is Food Justice?, a 3-minute video co-produced by Twin Cities PBS, provides a very brief introduction to some basic ideas of food justice.
2. Places where there is not sufficient access to healthy, fresh, and affordable foods are called food deserts. Here's a short video from NPR about one woman's experience of living in a food desert in Washington, DC.
3. Who in your area is living in a food desert? Use Food Deserts: Causes, Consequences, and Solutions from the Southern Poverty Law Center's Learning for Justice site with your class to start to explore what access to food looks like where you live.

What is Food Sovereignty?

Food sovereignty is related to food justice, but it goes further. One of the main ideas of food sovereignty is that communities should not just have access to healthy food, but should also have control over their access to healthy food by controlling how their food is produced and distributed. Do you see what the difference is?

1. The award-winning documentary film *Gather* is about Native American communities reclaiming their food sovereignty. The Center for Ecoliteracy presents four excerpts from this film, along with an accompanying study guide on their website. Read the descriptions of the excerpts (each 10-15 minutes in length) and choose one you would like to watch.
2. The Viewing Guide to *Gather* has a bunch of great discussion questions for each excerpt from the film. Find the questions related to the excerpt that you watched, and choose some to discuss with your class.

ACTION PROJECTS

"Resilience and regeneration are not a given, they need to be purposefully nurtured. We therefore need to invest in and facilitate the creation of distributive food systems based on local needs and capacities that assure a fair redistribution of value, knowledge and power across actors and territories to deliver sustainable food for all."
-Ana Moragues-Faus

There are so many different (and potentially delicious) ways to dig into issues around food, climate and equity! Now that entry points have planted the seeds, it's time to grow an action project.

The action projects are organized into three different categories, and within each category there are projects that have different challenge levels in terms of where they will take you, who you might work with, and how long they might take. And these are just a few of the possibilities, so feel free to get creative and invent your own!

Find an activity that fits and try it on! You can start a green circle project and expand it up to a black diamond by going deeper and further into it, or you could select a good idea from a black diamond activity and just do a bit of it. Involve students in the selection process if you are able.

Green Circle
Simplest

Grow Food – Without Starting A Whole Garden!

A garden requires both infrastructure and ongoing maintenance, and sometimes that may require more resources than are available. However, the joy of growing food can be had with much less cost (and effort!) with a container garden.

1. Choose a location in the classroom or schoolyard (in warmer climates) with adequate sunlight for the container garden.
2. Gather a variety of containers with drainage holes, such as pots, buckets, or trays. These may be easy to get donated from parents and local businesses.
3. Collect soil for the containers, either using commercial potting soil or blending your own using local soil, compost, and other amendments.
4. Get ideas for classroom container gardening from a source, such as Consider Container Gardening on KidsGardening.org or Grow Your Classroom (Garden) on Green Bronx Machine's website.
5. Use the produce in the classroom or school cafeteria, or send some home.

Plants for the Planet (and the School Budget)

"If animal agriculture were phased out over 15 years and all other greenhouse-gas emissions were to continue unabated, the phase-out would create a 30-year pause in net greenhouse gas emissions and offset almost 70 percent of the heating effect of those emissions through the end of the century."
—Patrick Brown, professor emeritus, Department of Biochemistry, Stanford University[9]

That's a pretty staggering statistic. If you are still not convinced, see the compelling research that The Monday Campaigns (a public health initiative associated with Johns Hopkins University, Columbia, and Syracuse University) has compiled about eating a more plant-based diet. No wonder Meatless Mondays are a thing!

9. Than, Ker (2022, February 1). Could going vegan help reduce greenhouse gas emissions? Stanford Earth Matters. https://earth.stanford.edu/news/could-going-vegan-help-reduce-greenhouse-gas-emissions

1. Research the benefits of plant-rich diets and how such a diet can impact climate change. One potential resource is Project Drawdown. While you are at it, you can also learn about the benefits related to health, equity and water usage.
2. Use the calculator available on meatfreemondays.com to figure out how much of a difference you can make for the number of students involved and the number of days that are meat free.
3. Prepare a presentation full of the facts and rationale for Meatless Mondays (or Mondays and Fridays!). If you can, include information that the decision-makers will want to know. For example, what are the costs? How will it affect nutrition? How will it align with regulations for school meals? How will students and parents like it? Engage with the school cafeteria staff and the school community to discuss the potential for a Meatless Monday program and see how you can help (e.g. promotion, modeling for younger students, surveys to find out student preferences, evidence that it is working, etc.)
4. Collect data on average meat consumption before and after your campaign and use the calculator to see what a difference you have made.
5. Celebrate by making a fun meatless meal and sharing your successes with the community—while promoting the benefits of more plant-based diets!

Share the Food and the Love

Establish a food-sharing program where students can bring excess food from home to share with others who may not have enough. This helps reduce food waste while fostering a sense of community.

1. Find a designated space: Identify a location where students can bring excess food and others can access it easily and privately. If no such place is available, consider working with the administration to figure out the best way to provide families in need with the food items while still maintaining privacy. For example, items could potentially be donated to the local food shelf.
2. Establish guidelines: Develop guidelines for the program, including acceptable food types, storage and hygiene practices, and fairness.
3. Spread the word: Promote the food-sharing program within the school or community to encourage participation.
4. Set up a schedule: Decide on regular days and times when students can bring and take food from the sharing space.
5. Monitor and maintain: Assign responsibilities to ensure the program is organized, clean, and safe.

Blue Square
More In Depth

Food Waste Audit

The reduction of food waste is identified as one of the top ten climate solutions in Project Drawdown, one of the world's leading resources in climate solutions. And there's perhaps no better place to start than our school cafeterias. Food waste is a significant problem due to the resources and energy that are wasted in producing, transporting, and disposing of uneaten food. This action project is similar to the compost project below, taking a more comprehensive lens to the food waste problem.

1. See World Wildlife Fund's Be a Food Waste Warrior for ideas about studying the problem and how to conduct a waste audit to identify sources of food waste at school or at home.
2. Analyze the waste audit data to identify patterns and trends, and potential causes of and solutions to food waste.
3. Develop a plan to reduce food waste, based on the findings of the waste audit. This could include strategies such as more intentional portion choices, food storage, and composting or recycling .

Better Taste = Less Waste

Conducting a taste test is a fun way to encourage healthy eating and trying new foods. It also promotes student engagement in the school meal program, gives students more agency over what they eat, and has the potential to significantly reduce food waste.

1. Read about how and why to conduct a taste test. One potential lesson plan that you could use is Conduct a Taste Test, which was developed in Montana. Consider portion size (too much? too little?) provided to students, what students do and don't tend to eat, and what they throw away.
2. Meet with the food service director to discuss the details of the taste test, including the food that will be tested, the timing and location, and the number of participants. Ideally the students can do the food preparation.
3. Conduct the taste test and collect students' responses.

4. Present the results of the survey to the food service director and other school staff, and discuss any potential changes based on the feedback from the students. Make sure to thank your cafeteria staff—maybe with some healthy goodies?
5. Try out a "Community Kitchen," bringing students and community members together to prepare and serve a healthy and sustainable meal, while learning about the importance of food education and access to healthy food.
6. Extension 1: Follow up with a survey (see Center for Ecoliteracy's School Lunch Survey for ideas) so students can identify constructive recommendations for the hard-working cafeteria staff and consider how students can help reduce food waste.

Planting for the People

Practicing sustainable gardening techniques can build skills to enjoy for a lifetime—and contribute to climate resilience. These skills can also be used to mitigate food-related inequities by helping to provide fresh, local produce to underserved communities.

1. Find a community partner or partners who can help support the project and, if at all possible, engage them from the start at the planning stage.
2. Secure a location to grow the food and obtain the needed resources (soil amendments, seeds, etc.) and tools.
3. Work with the partner to develop a plan for growing, harvesting, and sharing the food. Sharing could happen through a food shelf, a CSA share, or serving a meal at a shelter.

Compost

Composting food scraps is an important climate solution. It reduces the need for artificial fertilizers that take energy to create and transport, it reduces greenhouse emissions in landfills, and by creating healthier soils for plants, it helps them become more resistant to the impacts of climate change. Drawdown.org has information and data on why composting is an important component of effectively addressing clima

1. Learn why and how to compost from the VT Agency of Natural Resources Department of Environmental Conservation.
2. If your cafeteria does not have a composting system, share this information or create a presentation for your cafeteria staff, principal, and/or school board, to help them understand why this is important and how your class can help implement it.
3. Share this information with other students, as well, to help them become composters.
4. If your school does have composting, but it is not being used correctly or fully, do some observations to learn what needs to be changed. Here are some common composting challenges to look for:
    a. Easily accessible containers are not available in the cafeteria
    b. It is not clear what should go in the compost and what shouldn't
    c. Students (and possibly adults!) are not taking the time to properly dispose of food waste into the compost buckets
    d. The compost is not being managed efficiently to turn it into soil
    e. The compost is not contained properly, potentially attracting critters
    f. The soil produced is not being used
5. All of these challenges are remediable! Once you have identified the issue, brainstorm ways to address it. If there are multiple challenges, divide up into teams to solve them.
6. Before you begin, weigh your compost to collect baseline data. Compare weekly or monthly amounts to see how much your efforts have made a difference. Remember that this kind of behavior change can take time, repeated reminders, and lots of problem-solving. That's okay! Don't give up if you don't see big results every day. You are helping to change a habit that will hopefully last a lifetime and will continually give back to our generous Earth.
7. Celebrate your successes by donating the soil to a community garden or local farmer, or use it for your own school garden.

Black Diamond
Multifaceted

Excess to Access

According to the Environmental Protection Agency (EPA), each year in the U.S., food loss and waste results in GHG emissions equivalent to the annual emissions of 42 coal-fired power plants (170 million metric tons of carbon dioxide equivalent). And this figure does not even include landfill emissions that result from food waste. Clearly the food waste problem goes well beyond school cafeterias. The good news is, working with local grocery stores and restaurants, communities have reduced food waste, while also reducing food insecurity.

1. Review the Executive Summary of the November 2021 EPA report: From Farm to Kitchen: The Environmental Impacts of U.S. Food Waste to learn more about this challenge.
2. Did you know there's an EPA regional representative who gets paid to help you figure out how to reduce food waste? Visit the EPA's Sustainable Management of Food webpage to find out who they are and contact them.
3. Partner with a local food provider (e.g., grocery store, restaurant, farmer, school, etc.) to figure out how the food they won't use can be safely donated to those in need. The EPA provides information on its Food Loss and Waste site under the topic of Donating.
4. Consider hosting a celebration of your community to showcase this work, recognize the institutions involved, and solicit donations to your local food bank.

Mapping Inequality – Farm to Food Shelf

Here's another idea for reducing food waste while increasing food security. To learn more about food insecurity, you can map food deserts in your community, and engage with local community organizations and policymakers to advocate for equitable access to healthy and affordable food.

1. Research the concept of food deserts and their connections to food insecurity and health disparities. Check out Southern Poverty Law Center's lesson plan about food deserts for some initial ideas.
2. Develop a plan for mapping food deserts in your community, including data sources, methods, and analysis tools.

3. Implement the mapping project, and analyze the results to identify areas of food insecurity and potential health disparities.
4. Research the concept of gleaning and its connections to food justice and food waste reduction. The USDA's Let's Glean Toolkit is full of ideas.
5. Identify community organizations, policymakers and other stakeholders who impact and are impacted by the challenges and opportunities of addressing food deserts in your community. Invite them to share their perspectives, experiences, and ideas for addressing this issue.
6. Try a "Farm to Table" to connect students with local farmers and other food producers to learn about the journey of food from farm to table, and to create a meal using fresh and sustainable ingredients.
7. Engage with local farmers and a local food shelf to create a gleaning project that is right for your class.
8. Use some of the food from gleaning to celebrate with the community and promote access to these resources.

Exploring Roots and Community Meals

The history, significance, and preparation of Indigenous foods helps us see alternative ways of engaging more sustainable food systems. Partnering with those who have expertise in Indigenous foodways can be an eye-opening experience that helps us envision other ways of being.

1. Research and identify a community partner who has expertise in Indigenous foodways and is willing to share their knowledge with your class .
2. Invite the community partner to visit your classroom or school, and prepare for their presentation by setting up a space for them to share their knowledge and stories.
3. During the presentation, actively listen to the community partner and ask questions to learn more about the history, significance, and preparation of Indigenous foods.
4. Plan and prepare a meal or taste test using ingredients suggested during the presentation. "Cooking with Culture " celebrates the diversity of food traditions in the community, and brings students and community members together to share cultural dishes and learn about each other's food cultures.

RESOURCES

There are an incredible number of excellent teaching resources available on this topic, the list below is just a starting point!

Upper Valley Resources

- **Billings Farm and Museum** in Woodstock, VT, hosts many school groups, providing interactive programs that explore land stewardship and life on a 19th century Vermont farm.
- **Cedar Circle Farm** is a nonprofit educational farm in East Thetford, VT. They have a variety of ways to engage and learn about sustainable farming, from workshops to field trips to at home activities.
- **Regeneration Corps** is an academic movement that connects high school students in Vermont with regenerative agriculture organizations to give them hands-on skills and offer education at the intersection of regenerative agriculture, climate change resilience, and racial and social justice.
- **Sullivan County Conservation District** (NH) offers programs on land use, water quality, and other conservation topics to local schools, as well as training aids for educators.
- Vital Communities Food and Farm Program offers a collection of resources for building a sustainable and just local food system in the Upper Valley, and they collaborate with schools.
- **Willing Hands** is a local nonprofit that collects food from farms, grocery stores, restaurants, and wholesalers and delivers it to social service organizations in the Upper Valley, with the goal of both reducing hunger and food waste.

Equity-Focused Resources

- ***Cowspiracy*** (2014, documentary film) explores why major environmental nonprofits appear to be unwilling to tackle the problems with commercial animal production.
- **Exploring Food Justice** is an online unit designed for third graders.
- ***Fair Tomatoes*** (2014, documentary film) is about the successful organization of workers on a tomato farm in Florida to fight for more just working conditions.
- ***Follow the Food*** is a BBC series that explores how climate change is impacting food production and what can be done about it.

- ***Food Chains: The Revolution in America's Fields*** (2014, documentary film) explores the exploitation of America's farm laborers.
- **The Food Empowerment Project** provides numerous resources and many ideas for action related to creating a more just and sustainable world. Topics such as food deserts, unfair working conditions, factory farming, and healthy, sustainable food choices are included.
- **"FOOD FIGHT"** (2013) is a hip hop music video that addresses issues around corporate influence over what food is promoted and available in food deserts. FOOD FIGHT's Curricular Supplement provides a highly engaging set of questions and protocols to discuss food production and consumption.
- ***Gather: The Fight to Revitalize Native Foodways*** (2020, documentary film) traces the stories of Native Americans reconnecting with the land and their histories through food. There is an accompanying viewing guide for grades 6–10
- **GrowNYC Food Justice Curriculum** uses a series of videos to teach people about food justice and empower them to take action. Though initially designed for NYC high schoolers, the creators encourage teachers to adapt it to students of all ages and locations.
- **"What Is Food Justice and Why Is It Necessary?"** (2018, updated 2021) is a short article that explains how current inequalities in access to food relate to historical injustices. It also connects the food justice movement to racial and Indigenous justice efforts.

Other Educational Resources

- **Be A Food Waste Warrior,** from the World Wildlife Foundation, offers K-12 lessons, activities, and resources that explore the impacts of our current food system on our planet.
- **Cook What You Love, Love What You Eat** is a food justice workshop series from FoodShare that includes lesson plans and supporting documents that link anti-oppression, anti-racism, and the food system. It is Canadian and will need some adaptation for local use.
- **"The Farm Next Door | Urban Farming in Atlanta"** (2019) is a 5-minute video about urban farmers and their work to address food deserts in Atlanta, GA.
- **Food and Farming | Our Changing Climate** - A YouTube channel of short videos (6-15 minutes) about food and sustainability. One video from this channel specifically making the connection between food waste and climate change is "Food Waste Causes Climate Change. Here's How We Stop It."
- **Food Deserts: Causes, Consequences, and Solutions** is a lesson plan from Learning for Justice that is suitable for middle and high school students. It addresses food deserts and how they impact a community's health.

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- ***Food, Inc.*** (2008, documentary film) explores the industrialization of the food system in the US and paints it in a very unflattering light. The Center for Ecoliteracy has developed the Food, Inc. Discussion Guide for educators using this documentary film.
- **FoodSpan** is a free, downloadable high school curriculum all about the food system and how it intersects with issues like human health, the environment, equity, and animal welfare.
- ***Just Eat It: A Food Waste Story*** (2014, documentary film) is about the astonishing amount of food waste generated in the USA. The Just Eat It Curriculum Guide offers a number of pre- and post-viewing activities, as well as additional resources about this topic.
- **Nourish** is a program that aims to increase food literacy and help build healthy communities. They use PBS television, curriculum resources, web content, short films, and professional learning in their education offerings.
- **School Lunch Survey** is a lesson meant for students in grades 6-8. Students conduct surveys about school lunch and use the results to make recommendations as to how to improve lunch offerings.
- **Soul Fire Farm** (Petersburg, NY) aims to grow young people's relationships with their communities and the natural world and empower them to take actions that make a difference. In addition to offering programming at the farm, they have many educational materials available on the Youth Program portion of their website.
- **Understanding Food and Climate Change** is an interactive guide from the Center for Ecoliteracy which explores the intersection of climate change with food production, consumption, and waste.

Potential Funding Sources

- **Local Food, Local Places** is a program sponsored by the EPA and USDA that helps communities reinvest in local food systems by supporting projects like community kitchens, farmers markets, co-ops, and more.
- **USDA Funding Opportunities** includes grants opportunities for projects and research related to reducing food loss and waste.

FLOODS

"You could hear in their voices, the confidence [the project] had given them. To be able to acquire something so important and at such a young age. To know that they had the expertise in this area allowed kids who would normally not speak in a room of people to speak. To say, 'I have' and 'I can.'"
—Shawn Brodeur-Stevens, Charlestown Middle School,
7th grade teacher

Increased flooding may be one of the most immediately visible and tangible impacts of climate change in the Upper Valley. We know the mighty power of water, and its ability to significantly change all in its path. Flooding from Tropical Storm Irene in 2011 and deluges during the summer of 2023, as well as numerous other storms, have vividly illustrated what's at stake for many towns in the Upper Valley.

What many may not know is that we can help limit the destruction caused by that excess water by helping it get to where it needs to go—all thanks to the vital, yet often overlooked workhorse of water management, *the culvert.*

And, as it turns out, culverts and kids make a good combination!

Shawn Brodeur-Stevens is a highly skilled practitioner of place-based education who has been teaching science at Charlestown Middle School for almost three decades. He knows what good place-based science education looks like. He puts it this way, "I'm a scientist and a science teacher. It's got to be real, it's got to be data driven, it has to have a positive effect on our community, and it has to bring the community together."

One morning on the drive into school, an NPR story about culverts helped crystallize a bunch of different pieces kicking around in Shawn's mind into the next great student-driven project. And the Community Culvert Youth Experience was born!

The students started in the classroom, working with a 120-question culvert assessment protocol. They distilled it down to 2.5 pages to make it understandable to themselves and explainable to others. Most importantly, their work made the protocol into something they could implement themselves with simple tools. Working with a variety of community partners, they mapped, assessed, and reported out on the town of Charleston's culverts. Their work helped the roadcrew develop a maintenance and improvement plan, better preparing the town for regular and extreme weather events.

REAL CONSIDERATIONS

Floods are a big deal. They reshape our perceptions of the very ground we walk on. They create drama and leave trauma behind when the waters recede. To engage fully with such a topic, we need to get REAL and look at flooding with an eye on relationships, equity, action, and leadership. This will help students to dig into the content and the projects in ways that are authentic and engaging, as well as challenging and rewarding.

Relationships

Floods are a natural phenomenon that can have far-reaching effects on individuals, communities, and the land. They can test our relationships with ourselves, with others, and with the natural world. By exploring these relationships, we can better understand how to think about the natural flow of water, the threats of flooding caused by many human-made structures, the impacts of flooding, and how we should go about preparing ourselves and our communities to be flood resilient.

Self

Our personal relationship to floods will likely be driven by whether or not we or people we know have been personally impacted by them, and/or the degree that we have seen or experienced them firsthand.

- What are your personal experiences with floods?
- How have floods impacted you or people you know?
- If you don't have any personal experiences, what have you heard about floods?
- What is your relationship with bodies of water like streams, rivers, and lakes? Are you comfortable with them, cautious about them?

Community

Floods are definitely a community event. When they happen, they tear communities apart, but they can also bring them together. They will be significant memories for community members who have lived through them. Beyond that, there are the many members of a community who study the watershed and how we live with and impact it, and those who maintain the infrastructure that helps move excess water through our human developments.

- Who can we ask about the history of flooding in our community?
- How, if at all, has flooding impacted our community?
- Who are the experts on watersheds in our community? What can they teach us about flooding and what we can do about it?
- Who in our community is responsible for the infrastructure (culverts, drainage, riparian buffers, etc.) that keeps water flowing where we want it to? What can they teach us?

Nature

The nearest stream, brook, or river to your school could be a good place to start to explore and get to know how your local watershed works. If time is sufficient, start at the top of your local watershed and work your way down to the bottom to develop a deeper understanding of and a closer connection with the water in your community. If this isn't possible, just jump in (literally, if you like) to the nearest stream!

- How did the movement of water shape your place? In geologic history? In human history?
- How does our local natural environment shape how floods happen? In turn, how do floods affect the natural environment?
- Where does the water come from? Where does it go? What does it pass through on the way? What are the natural and built features of your locale that could create or prevent flooding risk?

Equity

Floods have an impact on communities and ecosystems in various ways. They can cause physical damage to infrastructure and homes, contaminate water sources, and displace communities.

But floods can have, and often have had, a disproportionate impact on marginalized communities, including low-income communities, communities of color, and Indigenous communities. This can often be due to historical and ongoing systemic inequalities such as inadequate infrastructure, lack of access to information and resources, and discrimination in disaster response and recovery, in addition to the compounding challenges of being more likely to live in flood-prone areas and less likely to have the resources to prepare for and recover from floods.

Climate change is exacerbating the frequency and severity of floods, making it all the more important to understand and address the intersection of floods, equity, and social justice.

Origin Stories

Due to discriminatory housing policies, zoning practices and lack of affordable housing options, historically, marginalized communities were often forced to settle in low-lying areas, near waterways and in floodplains. This has left these communities more vulnerable to the impacts of floods. Additionally, communities of color have often been excluded from decision-making processes related to land-use and flood management, leading to inadequate infrastructure and/or preparation and response efforts.

- What is the history of floods in this area in the past few hundred years and how have they affected different communities?
- How have different communities been impacted by and responded to floods in the past, and what can we learn from these experiences?
- What is the history of land use and zoning in our community, and how has it contributed to the current vulnerability of certain communities to flooding? How have discriminatory housing policies and lack of affordable housing options contributed to the current vulnerability of certain communities to flooding?
- How did people use flood waters to transport timber in our area (super important part of the colonial/US NE economy for a long time).
- What areas have been flooded intentionally and permanently (e.g. dams, reservoirs)?

- What is the history of community participation in flood management and decision-making processes in our area, and how, if at all, has it contributed to the current vulnerability of certain communities to flooding?

Alternative Stories

Floods do a lot of damage, but they can also bring communities together and ideally create opportunities for community-led solutions that are more equitable and sustainable. Alternative approaches to flood management, such as green infrastructure, community-led planning, and equitable disaster recovery planning, can not only mitigate the impact of floods on marginalized communities, but also promote social, economic, and environmental justice.

- How have people who live in very flood-prone areas of the world adapted? Who are those people, and what do they share with me/us? What can we learn from them?
- What are some community-led solutions to flood resilience that have been successful in other places?
- What are some examples of community participation in flood management decision-making?

Action

"The future depends on what you do today."
—Mahatma Gandhi

While it may not seem immediately obvious how to take action on flooding, there is actually quite a bit we can do, from capturing and slowing rainwater runoff on our school campuses to assessing the readiness of culverts in our communities.

- Where are the flood-prone areas in your community?
- Who has been or would be most impacted by floods?
- What flood mitigation measures are currently in place?
- Where might you be able to help?

Check out the action projects for a bunch of ways to dive into the rising waters. (Yeah, that's a terrible pun.)

Leadership

"The future depends on what you do today."
—Mahatma Gandhi

Leadership in the area of flood mitigation and preparedness may not be seen as a role for students, which makes such a project potentially all the more powerful for both students and the wider community. While floods may not feel like the day-to-day business of the other topic areas in this guide, they are also one of the most potent and immediate threats created by climate change. For students to take or support meaningful action in this area can be very empowering.

- What diverse leadership roles can you imagine students undertaking in projects like the Community Culvert Youth Experience? Tasks included developing a data protocol, handling administrative paperwork, networking with community adults, organizing and presenting at the Community Watershed Night, managing equipment, and teaching the next year's group.
- How did students challenge expectations by actively participating in assessing community preparedness and infrastructure, uncovering opportunities for involvement at various levels?
- What would it take for you to support students in taking on leadership roles in more involved projects within this topic area?
- How could you involve others in helping guide students in developing and implementing meaningful, impactful, and feasible projects, demonstrating your school's commitment to climate action and community-based learning?

By exploring these questions, both students and teachers can reflect on the varied leadership roles undertaken by students, the potential for youth engagement in unexpected areas, the level of support required for more involved projects, and the demonstration of educators' commitment to climate action and community-based learning. These inquiries foster a deeper understanding of the importance of student leadership and the role of educators in empowering and supporting students in their leadership journeys.

ENTRY POINTS

Water. Essential to human life, and also a huge threat to it as well! We hear all about the enormous flood risk of sea level rise that may happen due to climate change, but the more immediate flooding risk in the Upper Valley will be from extreme weather events, such as heavy and sustained rains.

We know that water has shaped our landscape in geologic time, and extreme water events give us a real-time taste of that incredible power. One thing we can say for sure about floods is that they are not boring! Let's jump in—to the topic, that is, not the rushing water!

A Flood of Facts

1. There is a lot to learn about flooding! Sometimes a few surprising facts can bring, yes, a flood of ideas and questions. Check out one of these sources for flood facts:
    a. American River's website provides 10 Facts about Flooding .
    b. In case 10 just wasn't enough for you, DoSomething.org has 11 Facts about Floods on its website.
    c. If you would prefer a video, Getty Images' 4-minute Top 5 Important Facts About Flooding is available on YouTube.
2. Once your brain is flooded with facts, take a moment to reflect:
    a. What was most surprising and why?
    b. What are you interested in learning more about?
    c. How, if at all, did these facts change how you think about floods?

Types of Floods

Here in the Upper Valley, we are most likely to see flooding due to heavy rains raising river levels, or due to ice dams. Floods happen for other reasons too!

1. Check out this short video from The Weather Network, a Canadian weather channel: The 5 Types of Flooding Explained.
2. What did you find most interesting about the different types of floods? What's most relevant to your local landscape, soil types, built structures, and weather patterns? What else would you like to learn about?

Tropical Storm Irene and 2023 Flooding Events

Tropical Storm Irene (2011) was the biggest flood event in Vermont in recent history, although the storms during the summer of 2023 certainly rivaled, and sometimes exceeded, this "100-year storm." Studying the local impacts of Irene or, alternatively, the flooding of 2023, can help students understand the extensive damage floods can cause close to home. (Note: Tread carefully in this exploration as some students might have experienced traumatic events or great loss during these storms.)

1. Discuss local impacts of Irene or more recent flooding and how it affected the community. Were some areas more impacted than others?
2. Watch documentaries, such as "Tropical Storm Irene Hits Vermont", from the Stuck in Vermont series produced by *Seven Days*. or "After Irene: Reflections and Lessons from Vermont's Historic Flood," which was created by VTDigger in 2021, ten years after this historic flooding event.
3. It is possible that students or other members of your community gathered reflections and stories from the community after these floods. These collections can be an interesting starting place for your work; ask your school and community librarian if there are any such materials.
4. What thoughts and feelings come up for you watching these videos?
5. What happened after the floods? Who responded and how?
6. How did changes made to the infrastructure after Tropical Storm Irene hold up during the summer of 2023 floods?
7. How can we be more prepared for something like this next time it happens?

Waterworld

Floods happen everywhere, all the time. When they are far from home, we may or may not hear about them, or we may learn just a little before the news focuses on something else.

1. Take a look at flooding worldwide in recent years. The videos below are a tiny sampling of the vast amount of documentation available of worldwide flooding. Warning, these videos can be pretty intense.
2. "The Kerala Flood—The Complete Picture" (Manorama Online) is about the 2018 flood in Kerala, India.
3. For coverage of the 2019 Midwestern US floods, see "Roads, Towns and Livelihoods Are Washed Away in Midwest Floods" (PBS NewsHour).
4. "Venice Floods: 70% of Historic Centre Under Water" (SkyNews) tells about the flood of Venice, Italy in 2019.

5. Watch CBS Morning's "Germany Hardest Hit by Worst Flooding in Europe's History" to learn about the 2021 flooding in Germany (and other parts of Europe.
6. For coverage of the 2022 floods in China, see WION's "Close to half a Million People Displaced as Rainstorms, Floods Batter Southern China."
7. "California Faces New Round of Rainfall, Flooding" (MSNBC) provides coverage of the 2023 flooding in California.
8. These sorts of videos can bring up a lot. Here are some questions for reflection and further research:
    a. How does watching these floods make you feel?
    b. Are there any human activities that you think may have contributed to the severity of these floods?
    c. How do these floods relate to climate change?
    d. In what ways do these floods demonstrate the interconnectedness of our global community?
    e. What are some common themes in these stories of floods?

High Water Today

If there isn't flooding somewhere right now, there probably has been recently. Let's investigate...

1. Go to local news sources, such as your town newspaper, The Upper Valley News, The New Hampshire Union Leader, or The Burlington Free Press, and search "flood."
2. Read a few articles and/or watch a few videos, then choose some of the questions below to spark your thinking:
    a. How do the images and videos you saw affect your emotions? Why do you think that is?
    b. How does your perspective on the flood change if you read about it from different news sources?
    c. What are some of the common causes of flooding mentioned in the articles you read?
    d. Were there any examples of individuals or communities taking action to prevent or mitigate flooding in their area?
    e. How might these current flood events be connected to larger issues such as climate change or land use?
    f. How does reading about floods happening in other parts of the world change your understanding of the issue and its potential impact on your community?

ACTION PROJECTS

"The students knew what they were doing would have an impact; that somebody was going to be able to take their work and findings and do some good with this information. Working in their community towards solving a real-world problem created a personal connection to a time and a place in their neighborhood. That put a smile on their face and made them feel important. You have 14-15 year old kids who can feel validated in their skills and work and feel as though they have an impact. That drove it home to me that I needed to continue to do this work the rest of my career, to help them discover that for themselves."

—Shawn Brodeur-Stevens, 7th grade teacher, Charlestown Middle School

In the wake of the devastating 2023 floods and Tropical Storm Irene, flood mitigation and adaptation have become priorities for the Upper Valley. These catastrophic events served as stark reminders of the region's vulnerability to extreme weather conditions, underlining the urgent need for proactive measures. Flood mitigation efforts, such as improved infrastructure and enhanced river management, are crucial to reducing the risk of future floods and safeguarding communities, homes, and businesses. Additionally, adaptation strategies, such as working with communities to create and support emergency response plans, are vital for building preparedness in the face of changing climate patterns. Hopefully the action projects below will create a cascade of ideas for working with students and local partners on flood resilience, protecting local lives, property, and the environment.

Green Circle
Simplest

Keeping Our Watersheds Clean and Healthy

According to the Connecticut River Conservancy, clean and healthy rivers are more resilient to the impacts of climate change. In addition, when there is flooding, the cleaner the river and its banks, the less pollution will be caused when waters breach their banks. Investigate your local watershed to get to know your streams and rivers and contribute to their clean up.

1. Research the local watershed that your school is situated in by using online resources such Google Maps, Model My Watershed, or other resources developed by state or local agencies. You can also purchase the White River Map and Guide from the White River Partnership for a modest fee.
2. Identify the major rivers and tributaries that flow through the area, as well as any major bodies of water that are part of the watershed. Check out Lake Lessons 2021: What is a watershed?, which is hosted on storymaps.arcgis.com. It is specific to northwestern Vermont, but the materials and activities in it make it a valuable resource, even if you don't live and teach there.
3. You can make your own physical or digital map, including:
    a. Where do your students live in the watershed? What are their favorite places in the watershed, like swimming holes, fishing spots, scenic views, etc.?
    b. Where are places that development has potentially altered the flow of water?
    c. Where does the water come from in the watershed? Where does it go? How does water connect us? This tool from River Runner Global allows you to place a rain drop anywhere in the world and observe its path and where it ends up.
4. After getting an appreciation for water in your community, join or organize a From Source to Sea River Clean Up (Connecticut River Conservancy) in the Upper Valley. Have fun and enjoy a cleaner, healthier, more beautiful river in your community!

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Create A Watershed Valley Quest

Questing is a fun way to get to know a place and develop a narrative about unique local features of a community. There are more than 160 Quests developed for places in the Upper Valley; these are called Valley Quests. Your class can make a quest to explore the local watershed and communicate findings related to climate change, equity, and funding.

1. Research the history of flooding in Vermont or New Hampshire. According to the White River Partnership's Dan "Rudi" Ruddell, Watershed Scientist, most towns now have a regularly updated Hazard Mitigation Plan, and there is usually a one- or two-page "Previous Occurrences" table or list; these have become a good source for local flood history.
2. See what you can find out about your local area and read how to make a Valley Quest. There is already a curriculum on the Valley Quest site for developing a watershed quest that will help you get started.
3. Work with Vital Communities to tap into their questing expertise and help you create a Quest for your area.

4. Submit your finished Quest to Vital Communities so that they can make it accessible to the public and others can learn about the history of flooding in your area, understand who has been the most impacted, and explore the relationship between flooding and climate change.

Teach Others About Streaming

No, we aren't talking about something online, we are talking about playing with a stream table, a fun hands-on tool to realistically simulate a wide range of river processes and gain a first-hand understanding of the mighty power of water in a safe and contained environment!

- The Vermont Institute of Natural Science (VINS) has a stream table that can be rented for the classroom, or you can visit VINS and use it there. A variety of teaching materials related to the stream table are available on emriver.com, including a lesson packet for grades 3–6 developed by the Ottauquechee Natural Resources Conservation District (ONRCD).
- Alternatively, if you would like to get into some engineering, take a look at this blog "DIY Stream Table" from the University of Tennessee Knoxville, or conduct an Internet search for other similar resources.
- Everyone loves to play with water, so invite younger students or parents into the classroom and teach them what you have learned.

Blue Square
More In Depth

Design Thinking for Erosion Control

In addition to all of the other problems flooding can cause, erosion can permanently change the landscape and carry away soil that forms the foundation for our ecosystems. You can practice design-thinking to slow soil erosion at your school or in the local community. Note that the White River Partnership stresses that erosion is a natural process on streams (vs. trails), as streams are constantly changing, so they focus on trying to slow the rate of erosion rather than preventing it, as preventing it often increases impacts downstream.

1. Go to a location with an erosion problem. Local trails offer great potential—and are fun to explore. See the Upper Valley Trails Association to find one near you! Collaborate with local land managers to discuss erosion and climate change and design solutions.
2. Assess the site by describing what you notice about the problem, amelioration efforts you see, and patterns you observe. (e.g. retaining walls, water bars, drainage areas, culverts, "stay on the path" signs, bridges, trees, cleared leaves, small rocks, etc.)
3. Create teams and select spots more than 20 feet away from each other to examine the problem in more depth and work on the issue.
4. Use the design thinking process by working through the following steps:
    a. *EMPATHIZE*: Try to get as clear a sense as possible who is being impacted by this erosion, how they are being impacted, and what they would like to do. This includes all organisms. Also, try to learn who is impacting the problem, and why. Collect information by asking questions, observing, imagining, and researching. In other words, try to put yourself in other people's (or being's) shoes (or paws, roots, claws, etc).
    b. *DEFINE:* Carefully observe your area and the erosion patterns. Draw what you believe is happening with the water, soil, trail, wind, barriers, roads, etc.). See if you can create a detailed diagram of the erosion process and what is causing it. Use arrows and labels to explain. Once everyone has a good diagram, share. Based on what you learned from your teammates, add or change your diagram. Come to a common understanding of what is happening.

c. IDEATE: Individually, in your journal, draw or describe at least three ideas of what could be done to address this problem, given what you know about the problem, the tools provided, and other resources in the area. Each person shares one idea per turn until ideas run out. This is brainstorming, so all earnest ideas are accepted, no matter how impractical. As a team, decide which idea to try out.
d. PROTOTYPE: Use your ideas to try to mitigate the erosion.
e. TEST: How do you know if your idea is working? What's moving the flow of water in the intended direction? Why is this happening? What's not working? Why not? How can you adapt your model to make it better?

5. Come back together and do a gallery walk of the different prototypes in action. Have the teams explain their models, their thinking, and their assessment of their success. Apply this process to your schoolyard or other areas that need help with erosion prevention.
6. Go for a hike on a rainy day to enjoy being outside and observe how your erosion control methods are working!

Riparian Restoration

Streambank restoration and riparian buffer planting projects help reduce erosion and protect against floods, while improving habitats for a variety of plant and animal species. Learn about streambank restoration and riparian buffers, and work with a partner to identify and implement a project in your community.

1. Connect with local partners, such as the wonderful White River Partnership, to help you find a site in your local watershed that is in need of a restoration project.
2. For background on engaging in riparian restoration, see Holding onto the GREEN Zone: A Youth Program for the Study and Stewardship of Community Riparian Areas, a curriculum from the Bureau of Land Management.
3. Get inspired by examples of riparian restoration in or around the Upper Valley highlighted on the White River Partnership's website.
4. Working with local partners, develop a plan for using student power to restore a buffer area.
5. Get support to implement your idea through the National Park Service's Rivers, Trails, and Conservation Assistance Program, which is very active in the Upper Valley.
6. After the restoration efforts are complete, see if you can rent canoes to float down the river and appreciate your hard work!

Flood Stories/High Water History

Have you, or your family, or a friend, experienced or been affected by a flood? What's the story? Have members of your community, in particular elders, lived through historic floods? What are their stories? Uncover the history of floods in your community and learn how they have impacted the area. Collect these stories and make them into a video or other multimedia project to share with the community.

1. Develop a set of research questions for your flood investigation, such as:
    a. Where did floods happen and when?
    b. Why did they happen? Did land use and development have any impact on the severity of flooding?
    c. What was the damage to human and natural communities?
    d. How did human and natural communities adapt? What was done, if anything, to mitigate the impact of future floods?
2. As mentioned earlier, most towns now have a regularly updated Hazard Mitigation Plan, and there is usually a one- or two-page "Previous Occurrences" table or list; a good starting point for preparing for interviews—or to add more info found along the way!
3. Connect with a community organization that serves senior citizens as a way of making connections and organizing interviews.
4. Come up with other ways to recruit community members for interviews, for example, post on a neighborhood listserv or put up signs at the local library or town offices.
5. Learn about how to conduct interviews. StoryCorps has a nice lesson on this, which is designed for use with students .
6. Conduct interviews with the community members, recording their stories and collecting or making copies of any accompanying photos or videos they would like to share.
7. Transcribe the stories and compile a list of key takeaways and themes that emerged from the interviews.
8. Using the stories and takeaways, create a video that shares the history of floods in the community and the impact they've had on the community and its members.
9. Share the video with classmates and the community through social media, school events, or community meetings.
10. Reflect with the class on what they learned about flooding, about community members, and how the community could be more prepared in the future.

Black Diamond
Multifaceted

Community Culvert Project

When rains get heavy and streams and rivers swell, culverts can fail, often leading to significant damage. Over 1000 culverts were damaged in Hurricane Irene, mostly because they were not sized to handle a storm of that magnitude. Shawn Brodeur-Stevens' Charlestown Middle School class found many culverts in their town that weren't properly sized (see intro story) and made recommendations to their public works department. **2023 Update:** Some of the culverts identified by Shawn's students as needing upgrades, but were not yet replaced, failed--washing out in the floods of 2023.

1. Explore the Vermont Culverts website. For VT, these dashboards and maps can give a quick sense of where culverts are and how many culverts have been assessed, and when. This can be helpful prep before discussing with town officials, and help determine possible opportunities/roles for students.
2. Consider connecting with the White River Partnership to learn about their Monitoring the White River program which offers a unit on culverts. This unit is a useful resource for any culvert study project!
3. If you are in New Hampshire, connect with the Upper Valley Lake Sunapee Regional Planning Commission to see what sort of information they can provide about culverts in your town.
4. Next, check in with your town officials! Reach out to the town manager, town clerk, selectboard members, and town highway foreman. See what sort of additional information they have about the location, age, and capacity of culverts in your town, and if they are interested in more data. Emphasize that your class would like to help provide useful data about infrastructure needs, and you are not there to complain!
5. If they are interested in working with your class, request a map of town culverts. If it is incomplete or none exists, offer to add to it or start creating one. Ask if certain areas should be prioritized. If not, Shawn suggests starting at the top of the watershed and working your way down.
6. See if your town can provide needed equipment (such as measuring equipment, safety equipment, etc.) Check in with your local police department to see if they are willing to provide safety training for working on and around public roadways.
7. Go find the culverts! Locate, measure, photograph, and assess assigned culverts using the data sheet offered in the White River Partnership unit.

8. Do whatever your class has time and energy for, and report your findings back to the town.
9. Smaller scale version: If you have culverts around your school, conduct a detailed study of these. Return annually to check on them and document how conditions are evolving in the waterways above and below them.

Slow Down! Managing Water Flow at Your School

One way to help manage flooding is by slowing and catching water before it reaches an area where it can cause damage. This can be done in a variety of ways, such as landscape swales, rooftop gardening and water catchment, pervious pavement, and rain gardens. Might your school grounds be a place for such a project?

1. Start with simple observations. Get out the umbrellas when it rains, and go outside to see where and how water flows and where it puddles in the area surrounding your school. Identify natural and built features that control the flow of water, such as ditches and other drainage systems, and paved and unpaved areas.
2. Identify a spot on your school grounds where water run-off is an issue or could be a problem. See this Schoolyard Follow the Drop lesson plan for more detailed instructions for collecting information about water runoff on school property.
3. Use the Schoolyard Scorecard, developed by the Green Schools Initiative of Omaha, NE, public schools to assess how well waterflow is being managed.
4. Green Infrastructure as Outdoor Environmental Laboratories from the EPA provides an even more comprehensive deep dive into stormwater management for grades 3 - 12
5. Work with your maintenance staff to choose a climate action to better manage water flow, such as those in the scorecard or from the ideas below:
    a. Make a rain garden (*Better Homes & Gardens,* 2023)
    b. Put a green roof on the school (*Sierra* magazine, 2021)
    c. If your school will be resurfacing parking lots, promote permeable pavement. Two informative resources about these surfaces are: Soak up the Rain: Permeable Pavements (EPA.gov); Penn State Extensions' 5-minute video *How Impermeable Surfaces are Making Wildlife Habitats Unstable*.
    d. Harvest the rain (and prevent runoff) with a rain barrel (see Indiana Department of Environmental Management's webpage Rain Barrels).
    e. Landscape with canopy trees and native plants, i.e. wildflowers or tall prairie grasses mowed once a year.

6. Depending on what solution you select, you can recruit local partners to help you fundraise and/or assist with implementing your plan.
7. Organize a picnic near your new project to thank the people who helped you with this project and to highlight why your class took on this project. While people are eating yummy food, you might want to point out other areas of your community that also need this kind of work!

Are We Ready?

We know floods are a serious threat, and climate change is increasing the likelihood of extreme weather. According to Flood Ready Vermont, "It is important to understand what we face and take steps to adapt—and the time to address flood hazards is now. Otherwise, we risk losing important community assets." Is your community ready? Let's find out.

1. Flood Ready Vermont has extensive flood readiness resources and describes a process for conducting a community assessment. This may provide a good starting point.
2. Read Making it Happen: Flood Stories from Flood Ready Vermont to see how other communities have prepared for flooding.
3. Look for partners! Explore with them what students might be able to work on.
    a. Your community's public works department may be the best place to start.
    b. Both Vermont and New Hampshire have Silver Jackets, which are Interagency teams that facilitate collaborative solutions to state flood risk priorities. If anyone knows about what it takes for a community to be flood ready, it should be them!
    c. Alternately, connect directly with your state agencies that handle flood readiness, such as the NH Department of Environmental Services.
4. Develop a project that aligns with your community's needs and your students' ambitions.
5. Tell us about it so we can write it up here!

RESOURCES

Upper Valley Resources

- **After Irene: Reflections and Lessons from Vermont's Historic Flood** (2021) is a short video produced by *VTDigger* looking back at the historic flooding caused by Tropical Storm Irene.
- **Flood Ready Vermont** is a resource from the state of Vermont that provides community reports and map tools to prepare its residents for future storms and flood events.
- **Rent A Stream Table** from the Vermont Institute of Natural Sciences (VINS) to demonstrate river dynamics and conservation principles.
- **Stream Table Curriculum** from the company that makes Stream Tables, EmRiver.
- **Stream Table Lesson Packet** developed by the Ottauquechee Natural Resources Conservation District is meant for grades 3–6.
- **Teacher Resources** from the White River Partnership includes a river monitoring program that gets students out doing field work on the White River.
- **Tropical Storm Irene Hits Vermont** (2011) is a short video from the *Stuck in Vermont* series produced by *Seven Days* that shows the extent of flooding following Tropical Storm Irene.
- **Upper Valley Adaptation Workgroup** brings various parts of the community together to work on building a climate resilient Upper Valley.

Equity Related Resources

- **"Climate Change Will Displace Millions. Here's How We Prepare."** (2019) is a TED Talk by Colette Pichon Battle in which she talks about a crisis of "climate migration" the world isn't ready for.
- ***Conversations with Communities: Considerations for Equitable Flooding and Disaster Recovery Policy*** is an 11-page policy report from the American Flood Coalition about how policymakers can connect with leaders of underrepresented communities for more equitable disaster preparedness and response. Key takeaways from this report are summarized in a blog post by the same organization.
- **"Red Lined, Now Flooding"** (2021) is a well-illustrated article from Bloomberg making the connection between historic housing discrimination and current increased risk of flooding in cities across the US.

- **Segregated by Design** (2019) is a short film that explores the forgotten history of housing segregation in American cities and its continuing impacts on the present.
- **"Senate Unanimously Supports Vermont's 1st Environmental Justice Policy"** (2022) is a VTDigger article describing Hurricane Irene's disproportionate impacts on marginalized communities and legislation to address this and other environmental justice concerns.
- **"University of Vermont to Study Impact of Climate Change on Manufactured-Home Communities"** (2022) is a VTDigger article on a study being conducted by UVM, the University of NH, and the University of Maine, exploring how manufactured homes, and their owners, are impacted by a changing climate.

Other Educational Resources

- Basic Flood Facts:
  - **"Top 5 Important Facts About Flooding"** (2018) is a 5-minute video covering the basics of flooding.
  - **"The 5 Types of Flooding Explained"** (2021) is a 4-minute video in which a Canadian meteorologist explains the science behind flooding.
  - **"10 Facts about Flooding"** from the non-profit advocacy group American Rivers covers facts about floods as natural disasters and the roles that wetlands and levees can play in protecting communities.
  - **"11 Facts about Floods"** from DoSomething.org gives the very basics about floods, where they happen, and how to prepare.
- **Broken Water Cycle** is a whole unit from the Cary Institute of Ecosystem Studies about the water cycle; there are a few lessons that specifically look at the schoolyard.
- **Curriculum Library** from the Lake Champlain Basin Program is all about watersheds, with resources for educators from the elementary level to college, as well materials that can be used in settings outside of classrooms.
- **Don't Runoff** is an engineering unit for grades 6–8 focused on urban runoff. It was created by the Museum of Science, Boston.
- **Exploring Your Watershed** is a learning module for K–6 students from the EPA that includes outdoors, hand-on, and web-based features.
- **Green Infrastructure as Outdoor Environmental Laboratories** by potomacriver.org is a guide containing schoolyard-based stormwater management lesson plans for grades 3–12. It was developed by the EPA and educators in Maryland.
- **K-12 Flood Education Resources** provided by the Association of State Floodplain Managers. Resources are sorted by grade/age level.
- Regional News Stories About Past Flooding Events:
  - **"State Says Many Culverts Can't Handle Debris From Floods"** (2011) is a short VPR story about how clogged culverts contributed to the crisis following Tropical Storm Irene.

    - "When the Water Roared: Alstead Residents Recall Flood of 2005" recounts another historic New Hampshire flood.
- Mapping Your Watershed is a paper map–based activity for grades 4–12. It was designed by the Watershed Project with the aim of increasing map literacy and watershed identification.
- Model My Watershed is a watershed-modeling web app that students can use to analyze real land use and soil data in their neighborhoods and watersheds; there are instructions for using this tool.
- River Runner Global is a fun website that allows you to place a drop of water anywhere on the world map and see its path.
- Schoolyard Follow the Drop is a lesson about observing and collecting information about water runoff on the school property.
- Schoolyard Scorecard from the Green Schools Initiative offers very specific ways to assess how the schoolyard will manage rainwater.
- Storm Smart Schools is a guide from the EPA on implementing stormwater infrastructure and increasing environmental literacy.
- Stormwater and Green Infrastructure is a seventh grade science unit created by Boston Public Schools in which students investigate phosphorus pollution in the Charles River and if and how their school is contributing to this problem.
- Urban Stormwater Management is a unit on greening urban stormwater infrastructure with an applied engineering focus. It was designed by teachengineering.org and is for seventh grade students.
- Water and Watershed Units from the Cary Institute of Ecosystem Studies includes the "Broken Water Cycle" unit that offers lessons that specifically look at the schoolyard.
- Water, Water, Everywhere is an engineering lesson designed for fifth grade students from teachengineering.org. The lesson examines different types of floods that occur from different water sources.

Potential Funding Sources

- Find Funding | Flood Ready is a list of resources provided by the state of Vermont for residents to find funding to support flood-readiness measures.
- New Hampshire Department of Environmental Services Critical Flood Risk Infrastructure Grant Program provides information on how to apply for funds related to planning and assessing flood risk as well as implementing flood risk measures.

FASHION

"[Investigating our day-to-day clothing choices] helps students see their role in the world in a way they haven't thought about. It highlights the connection they have to this global society we live in, and the fact that their actions have an impact on people and on the planet. We live in this throwaway culture, this consumer culture, and people need to think about it. I feel like the only way to start trying to change it is to get kids to think about it. What's more relevant and concrete and hands on than the thing that you are wearing right now? "
—Matthew McCormick, 7th Grade Teacher, Woodstock Union High School Middle School

"It's not a T-shirt, it's a soul." After digging deep into the impact of fast fashion, this is what one of Matt McCormick's students emblazoned on a shirt that was part of a display in the school. Starting with just looking at the labels on their clothes, his students had found their way to the story of the Rana Plaza building in Dhaka, Bangladesh. Despite known structural flaws, all five garment factories it housed were full of workers when it collapsed in April 2013, killing over a thousand people and injuring thousands more.

Fast fashion, in short, is the mass production of poor quality, inexpensive clothing, the type that floods American retail outlets. We are encouraged to buy too much and use it too little. The environmental and human costs are staggering, and like so many products we use every day, these costs are hidden from the consumer. The issues include water usage, microfibers, greenhouse gasses, deforestation, toxins, and human rights. The climate impact of fashion comes not only from the manufacturing process, but the overall cultural trend towards overconsumption and waste.

Starting with the highly accessible NPR video series "Planet Money Makes a T-Shirt," Matt's class went on to investigate many further questions provoked by that initial overview. How is cotton grown? What are the impacts of the pesticides used on the environment and the communities? How do we unpack the complexity of our impact, negative and positive, of supporting the companies that both create economic development but cause damage in these places? The lines of inquiry are endless, compelling, and multidisciplinary. And that's just cotton. Polyester is made from petroleum, which opens up an entirely different investigation.

These learners connected with community organizations like VINS, Bethany Birches Camp, and the Brave Challenge, that purchase t-shirts, for uniforms, charity races, and other uses

uses and took them on as a "client." They partnered with one organization to learn about their T-shirt needs, then investigated options and provided a consultation about costs and benefits of different choices to educate and advise the client about their purchasing options. The project concluded with the partner organization reporting back to the class about the decision they made and the reasons behind it. When financial limitations prevented the organization from making the choice the students recommended most highly, the students then grappled with the nuance and challenge of decision-making that factors in what seems best vs. what is possible under certain circumstances.

REAL CONSIDERATIONS

"As consumers we have so much power to change the world by just being careful in what we buy"
-Emma Watson

Fast fashion, with its quick production and disposal of cheap clothing, contributes to carbon emissions and environmental damage throughout its lifecycle. It often exploits marginalized communities, especially in low-income countries, with unsafe conditions and low wages. We can make a difference by choosing sustainable alternatives, supporting transparency, and promoting fair trade and ethical practices in the fashion industry to create a future where fashion is both eco-friendly and equitable. Diving into the following questions will deepen the learning and make the issue more relevant and actionable.

Relationships

"Clothes could have more meaning and longevity if we think less about the latest or cheapest thing and develop more of a relationship with the things we wear."
—Elizabeth Cline

We all wear clothes, and generally they are all produced by someone else, somewhere else, as are the materials from which our clothes are made. Evidence of the local history of fiber and clothing production is also all around us in the Upper Valley. There are numerous ways to explore our relationships with clothes and where articles of clothing come from on different levels.

Self

Clothing can be a very personal way to express ourselves, yet we often don't take time to examine our relationship with clothing beyond what we choose to wear each day.

- What does our clothing say about us? What do you want it to say about you, and why?
- Do you like to dress like others do to fit in, or do you like to dress differently to stand out? How much do you think (or not) about what you wear?
- How do you take care of your clothes? Are they neatly folded in drawers or heaped in piles? Do you know how to repair your clothes when they get damaged?
- Do you keep your clothes for a long time, or replace them frequently?
- Do you feel like you have a lot of clothing? Or not enough?
- What are your favorite things to wear? Why?

Community

As clothing is a basic and universal need, there will be local businesses, individuals, and organizations that are working with it in one way or another and may be possible project partners and/or sources of information. Consider:

- Who in the community sells new clothes? Used clothes? Handmade clothes?
- What might be possible to learn from them? How might they support an investigation about clothing?
- Where do we shop for clothes? What sort of relationship, if any, do we have with those businesses?
- Local historical societies may have information about the history of textile manufacturing and fiber production in the area. Who else holds this history?
- How might your clothing choices influence others and vice-versa?

Nature

"Becoming more mindful about clothing means looking at every fibre, at every seed, and every dye and seeing how to make it better."
—Eileen Fisher

Over 95% of the clothing sold in the US is made overseas, but there are still some local manufacturers in the Upper Valley.

- What clothing is produced locally or in Vermont and New Hampshire?
- What are the companies and individuals involved in making clothing and fiber production locally, and how are they similar to and different from larger national or foreign manufacturers?

- What are the environmental/climate costs of manufacturing clothing and how do those vary in different regions? (Consider how raw materials are grown or produced, transportation costs at all levels of the production-consumption cycle, water use, and pollutants.)
- Like just about everything, there used to be much more domestic production of clothing. What is the history of textile production in the Upper Valley? What did local mills produce? Where did their raw materials come from?
- What is the Upper Valley's history with fiber production? What were the environmental impacts of that production? How were mills powered? How were waterways altered due to this manufacturing?

Equity

"Demand quality, not just in the products you buy, but in the life of the person who made it."
—Orsola de Castro

As the relationships around fashion are complex and nuanced, so are the implications for equity on all levels. These are important conversations to have, and they may surface complicated feelings, so it will be important to make space for an open and respectful conversation around personal choices and resources and the impact we have on others.

Origin Stories

We buy and throw away a huge amount of clothing in the United States, but it wasn't always like this.

- How did it get this way? What changed about the cost and availability of clothing that made this possible?
- How do our clothes get to us? What are they made of and where did the raw materials come from?
- Who grew those materials, or extracted them from the earth?
- Who does that work, and what are their working conditions like? What are the different steps in processing the raw materials? Where does that happen and who does it?
- Which companies grow or extract raw materials used in manufacturing clothing? Who benefits from the jobs they create and the profit they make? How, if at all, do they talk about or address the environmental and human impact of resource production?

- What are the communities like where the different steps, from raw materials to finished products, take place? How have local people and businesses benefited? Was wealth created that stayed in the community? What have been the negative impacts?
- How were local millworkers in the Upper Valley and New England in general treated throughout history? What were their lives like? How were their struggles for justice similar or different to today's labor movements? How did the textile industry impact the local environment?
- On the opposite end of origins, where does our clothing end up after we are done with it? What happens to clothes that nobody wants to buy at thrift stores in the US? What happens in the countries where those clothes are shipped to?

Alternative Stories

- Which Indigenous peoples have inhabited this land, both historically and today? What did they wear before colonization, and where did the materials come from? How does the environmental impact of Indigenous traditional clothing compare with modern clothing?
- What does the relationship with clothing look like in other countries and cultures around the world? Where is it most similar to the US and why? Where is it most different and why? What can we learn from other cultures about clothing? How do diverse communities in the U.S. source or maintain clothing? How have these traditions remained, changed the mainstream, or waned in popularity over time?
- What are students' own personal family histories involving the passing down or mending of certain items?
- Who is working on solutions to the problems that the fashion industry is creating? What are those solutions, and who will implement them? Who will benefit from them? There are certain brands, like Patagonia, that are working on more sustainable production and reducing waste, yet they are very expensive and thus not affordable for many people. What do equitable solutions look like?

Action

Fast fashion presents an excellent (and fun!) opportunity to actively engage in addressing climate change and promoting equity while nurturing students' sense of self-efficacy. Most students have some control over what they wear and can have a great influence on fashion culture at their school. Encouraging initiatives like clothing swaps, upcycling, and promoting responsible consumer choices empowers students to raise awareness and drive

change within their communities. By participating in these activities, students not only contribute to mitigating climate change but also work towards establishing a more inclusive and equitable environment in their own community.

- What shifts need to happen at the school to help provide more equitable clothing access?
- What can be done to encourage a more sustainable approach to clothing consumption habits?
- How can students use their creativity to make this work exciting and fun?

Leadership

"The most dangerous leadership myth is that leaders are born —that there is a genetic factor to leadership. This myth asserts that people simply either have certain charismatic qualities or not. That's nonsense; in fact, the opposite is true. Leaders are made rather than born."

—Warren G. Bennis

The good news is that no matter who you are or what you wear, you can be a leader by setting an example, sharing your enthusiasm about sustainable clothing choices, and creating alternatives for more equitable and environmentally healthy clothing consumption.

- As you dig into the topic of fashion, what example are you setting with what you wear? Did you ever imagine that might matter? Is it something you are comfortable talking about?
- What would it look like for you to be a leader in this work? What knowledge and experience with clothing and fashion do you have to share? What are you most interested in learning about? What are you most interested in doing about the issues you are learning about in the global fashion industry?
- Where are you willing to take risks with what you wear and don't wear, where you shop or don't shop for clothes?
- Social media has created a new sort of leader, or influencer, and these can be seen in the world of fashion, looking to set trends, promote brands, etc. What would it look like to lead in a different way, one that did not promote more shopping and less satisfaction with what we already have?

ENTRY POINTS

Think for a moment about a piece of clothing you are wearing right now. How long have you had it? Can you remember where you got it? What journey do you think it took on the way to you? What journey do you think it will make after you no longer wear it?

When it comes to clothes, we mostly think about how they make us look, their price, and how comfortable they are to wear. But just beneath that surface there is a world of discovery that is literally wrapped around us. To begin to explore that world, jump on any of the paths below to start your journey.

The Shirt Off Your Back

Although just about everyone wears clothes, few people are aware of what goes into the production of their clothing items. Becoming more aware of what it takes to produce clothing can help you be a more informed consumer

1. You have a favorite T-shirt, right? If you aren't wearing it right now, bring an image of it to mind. Now try to imagine everything that had to happen to get that shirt to you. Jot down some notes.
2. Now watch the short videos from NPR's Planet Money Makes a T-Shirt.
3. How was what you learned about in the videos similar or different to what you imagined before you watched them? What was most interesting? Most surprising?
4. What deeper questions does this bring up? (Hint, remember the REAL recipe!) How do you want to look for answers?

Who Made Your Clothes?

Are you a global fashion model? You just might be! Take a guess at where your clothes were made. We'll give you a clue: Probably not in the USA, where only about 3% of the clothes we buy are made.

1. Take a look at one of the labels in your clothing, or have a friend look if that's easier! Does it say where it was made? Write that down, as well as anything else you find on the tag that is interesting.

2. Take a look at the Where Are My Clothes Made worksheet from FashionRevolution.org and choose how you want to continue mapping and discussing what you are learning with your class or group. (This website also has many other educational materials for people of all ages.)
3. Discuss any intriguing implications that come from your findings.

What Am I Wearing?

No, we don't mean what brand, although it looks great on you! We mean what are those clothes made of? Time to find out!

1. Take a guess at the materials that were used to make the shirt that you are wearing. Jot down your guess, and share with a partner.
2. Check your labels.
3. What did you find out? Do you know what that material is and where it comes from? If not, look it up.
4. Try out Activity 2 on page 18 of the Behind the Seams Toolkit.
5. What connections do you see between the production of clothing and climate change? What else are you curious about?

Just How Bad is Fast Fashion for the Environment?

Making the connection between clothing, equity, and climate is not always obvious. Fortunately, there are many creative ways to dress more sustainably while also expressing yourself! Read on to prompt some thinking about how fashion can still be fun *and* sustainable.

1. Take a look at this infographic from Zero Waste Europe that compares the current path of clothing production to what could be.
2. How many items of clothing do you think an average American buys in a year? Find the answer, and much more, from the highly informative Textile Waste Facts by Aftermath Learning Lab.
3. If you have more time, explore the online article "The Global Glut of Clothing Is an Environmental Disaster" (2022) from Bloomberg News about the environmental impact of fashion. (And watch out for the falling boots!)
4. Or view a short video such as "Is Fast Fashion Destroying Our Environment?" from Our Changing Climate.
5. How might we go about reducing the impact of fast fashion on the environment while appreciating the artistic side of fashion?

Kids at Work

Almost all clothes and textiles are made in other countries now, but there was a time when many mills operated all over the Upper Valley. What do you imagine the life of a mill worker was like?

1. Read about the Mill Girls of Lowell on the Lowell National Historical Park's website.
2. How were the lives of those young women different from yours? What did you find most interesting or surprising about life working in the mills for those young women?
3. To learn about industrialization in the Upper Valley, check out the many resources on the Flow of History's webpage "Teaching the Industrial Revolution." Flow of History is a history education network for Vermont and New Hampshire communities along the Connecticut River Watershed.
4. Consider visiting a historic mill in the Upper Valley to learn more about how clothes used to be made. Compare now and then to consider what we've gotten better at in terms of equity and climate change, and what we can learn from the past to improve the future.

Merino Mania!

Before synthetic materials were invented, clothes were all made from natural materials like cotton and wool. While cotton won't grow around here, sheep will!

1. Learn about clothing made from wool. What are some advantages and disadvantages of wool?
2. Learn about the Merino sheep craze by reading the New England HIstorical Society's article. Why did it start? Why did it end? What impact did it have on people and on the landscape? Visit Marsh-Billings-Rockefeller National Historical Park to better understand how the sheep craze actually served as an impetus for Upper Valley superstar Gerorge Perkins Marsh to write Man and Nature, a pivotal publication that propelled the conservation movement in the U.S. and internationally.
3. Was there Merino sheep farming in your area?
4. Connect the past to the present. Where is wool mostly produced now? What sorts of materials have replaced wool in our modern wardrobe? Compare and contrast wool with those materials.

Abenaki Clothing

The land of the Upper Valley was originally inhabited by Abenaki people Their relationship to clothing was much more immediate and connected to the land, and it shifted over time as they came into contact with the different materials brought in by Europeans.

1. Develop some guiding questions and start with online and library research about the Abenaki and their customs around clothing.
2. Invite a guest presenter to your classroom who can discuss and answer questions about the history of Abenaki clothing and present day expressions of native identity through clothing. "Abenaki Clothing Wears a Rich History," hosted on the Vermont Abanaki Artists Association website, provides a starting point.
3. Find a field trip you can go on to learn more. One potential place to visit is the Mt. Kearsarge Indian Museum.

Where Does It All Go?

When you donate your clothes, it gets used by someone in need, right? Well, maybe.... Read on to learn more about what often happens to the clothes we think we are giving away to help others.

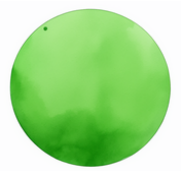
1. A huge amount of used clothing gets donated to thrift stores. What do you think happens with all the stuff they can't sell?
2. It might not be what you think. Watch ABC News In-depth's 30 minute video "The Environmental Disaster That Is Fuelled by Used Clothes and Fast Fashion" to learn what is happening in the West African country of Ghana.
3. Although this kind of eye-opening information can seem depressing, just by taking the time to be informed, you are taking a step in the right direction. Information is power. Now that you know more about Fast Fashion impacts, you can think before you buy and consider more sustainable choices.
4. Read on to find ways to have an even greater impact working together!

ACTION PROJECTS

"One day we'll wake up and green will not be the new black, it will be the new invisible. Meaning, no longer will sustainable be the exception or something that's considered au courant; instead it will be a matter of course – something that all designers incorporate into their design ethos."
– Summer Rayne Oakes

How do you feel after learning about the complicated world of where clothes come from and where they go? Ready to do something? Great! There are lots of ways to get involved in making this less of a problem.

These project ideas DO NOT give you all the details, just enough to get going. Find the one that fits and try it on! You can easily start a green circle project and expand it up to a black diamond by going deeper and further into it, and you can probably grab a good idea from a black diamond and just do a bit of it. Remember, these aren't a set of instructions to be followed exactly, but a source of ideas for you to work with. These are just a few of the possibilities. Feel free to get creative and invent your own!



Green Circle
Simplest

Wear the Knowledge, Share the Knowledge

You have probably learned a lot about the environmental impact of how much clothing is bought and how much is wasted and you might be thinking others should know about it too. What would be the best way to educate people? Here's one idea:

1. Bring in old plain t-shirts to use, and/or get some at a thrift store.
2. Come up with creative educational messages and images about what you learned and do an amazing job of decorating the shirts.
3. Display them somewhere in the school or put on a fashion show for other students where you briefly explain the story behind your design and message.

Use It Up, Wear It Out!

What do you do when your shirt gets ripped or your favorite pants start to wear out or a button pops off? Do you know how to fix it? Being able to repair your clothing, so that you can wear your clothes longer, helps keep them out of the waste stream.

1. Design a repair workshop for your class where you invite in parents, caregivers, and other community members to teach repair skills. Care to repair! Dare to repair!
2. Feel like you got the hang of it? Invite some younger students to your class and teach them how!

Making the Human Connection

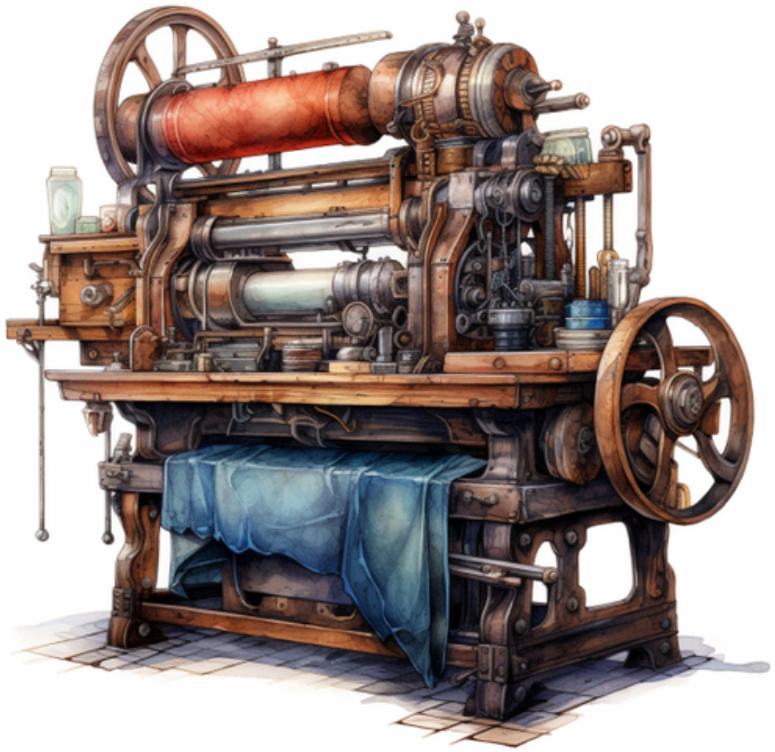
Understanding how our choices impact other people can be powerful. Share with your school what you have learned about the human impact of the fashion industry.

1. From what you have learned, choose what you think are the most powerful stories and facts. Check various sources to make sure they are accurate!
2. Choose a small action or two that you can suggest people take to reduce their fashion impact.
3. Decide how you want to communicate this information, whether through posters, art, theater, etc.

Local Fashion History

Before the days of clicking on a website and having stuff show up at our door a few days later, everything was much more local! What did that look like?

1. Investigate local and regional mill and factory history. What sorts of materials and clothing were produced around here? When? Who owned the mill? Who worked there?
2. Search for online resources like those curated by the City of Lebanon, NH about the mills of Lebanon, and the 2-part video, hosted on Historic New England's website, "Connecting the Threads" about the H.W. Carter & Sons clothing factory.
3. Reach out to your local historical society. They will have resources that you can't find online. (Believe it or not, some things are not on the Internet!)
4. Connect the past to the present. What is in those old mills and factories today?
5. Create a presentation to share what you have learned with the school community. It could be maps, posters, art projects—be creative!



Blue Square
More In Depth

Let's Go Thrifting

Got a local thrift store? That could be a great place for a firsthand investigation into the used clothing economy. And maybe get set up for a fashion show? Here are some ideas for a thrift adventure:

1. Learn about where they get clothes, what they find, and what the process is like.
2. Learn about what they do with waste (such as clothing that they can't sell) and where it goes.
3. Put together a team and a small budget. Choose one of you who will be the fashion model. Find the best new outfit for your model that you can on that budget.
4. Then design a fashion show that will include a presentation about the impacts of fast fashion, the benefits of buying used, and of course, a showcase of your team models.

Wanna Trade?

Have you ever been to a clothing swap? Everyone brings a bag of clothes, you get them all nicely organized, and everyone finds some new stuff that they will love to wear! Although it will take some work, this could be the most fun you have ever had doing a school project....

1. Find someone who has organized a clothing swap and get their advice on how to do it.
2. Create some informational posters about the impact of clothing on climate so the swap attendees can pick up some knowledge as well.
3. Figure out creative uses for the clothing that is left over.

Where Are We Getting Our Clothes?

Where do the clothes you and your classmates are wearing come from? What are the impacts of different shopping choices?

1. Where is the school getting clothes? It is pretty likely that your school is purchasing uniforms for sports teams, and possibly shirts for other things like events or clubs.
2. Find out where your school is sourcing any clothing they are buying, and see what you can learn about what those choices mean in terms of environmental, social, and economic impacts.
3. Investigate other options and create a comparison of the costs and benefits and share that with school decision makers.

Before There Were Malls, There Were Mills

Have you seen old mill and factory buildings in your town, in the Upper Valley, or the wider region? Odds are good they might have had something to do with textiles or clothing.

1. Find someone who can take you on a guided tour of a local mill or factory that was involved in clothing or textile production.
2. Invite experts and elders to your classroom to talk to you about their knowledge and personal experiences with the mill.
3. When that mill shut down, where did the production move to? How does the current day production compare to the historic production? What is different? Is anything the same?
4. Create an educational resource for the community about what you have learned. It could be a video, a presentation you give, a web page, a play, or a Valley Quest.

Black Diamond
Multifaceted

Fashion Influencers

One of the reasons that people buy so many clothes is because fashion is full of trends, and trends are set by various people and industries who stand to benefit when more clothing is sold. With the explosion of social media, now there are influencers in the game too. What would it look like to try to influence people to buy less and not more?

1. Partner with a local advertising or media production company to learn more about effective messaging, how to organize a campaign, how to make the best videos, etc.
2. Investigate how fashion influencers on TikTok and other platforms are trying to promote products. Investigate how sustainable fashion activists are trying to do the opposite—see Global Citizen's "10 Sustainable Fashion Activists You Should Definitely Follow" (2021).
3. Work with your expert community partner to develop materials for your campaign (e.g., videos, posters, etc.)
4. Run your campaign in real life and online—and go viral and change the world!

Clothing Consultants

Organizations and businesses in your community are buying T-shirts and other articles of clothing for uniforms, for events like races, to put their own designs on to sell, etc.

1. Find a willing community partner who would like your consultation to learn about their options for purchasing T-shirts and other clothing, and the costs and benefits of different decisions.
2. Work with the partner to learn about their plans to purchase T-shirts, their budgets, and their priorities.
3. Dig as deep as you can to learn about the options. What are the costs in dollars, and what are the hidden costs in environmental and social impacts? Develop a portfolio of different options with a summary of costs vs. sustainability impacts.
4. Present your findings to your "client."
5. Once they have made their decision, invite them back to your class to explain why they chose what they did.

RESOURCES

Upper Valley and Regional Resources

The history of textile mills in the UV and the region offers the opportunity to investigate what clothing manufacturing looked like when it was a significant local industry. Comparisons may also be drawn between local history and current conditions elsewhere in the world.

- **Flow of History,** a history education network for Vermont and New Hampshire communities along the Connecticut River Watershed, has many resources related to industrialization in the Upper Valley on their webpage "Teaching the Industrial Revolution."
- **Heritage Winooski Mill Museum** (Winooski, VT) may be out of range for some in terms of a field trip, but their website offers many ideas for educational materials that could be developed for any mill.
- **"Lebanon Mills"** is a web page on the town of Lebanon's website with links to more in-depth information on the history of Lebanon Mills.
- **"Migrants and Millworkers: The French Canadian Population of Burlington and Colchester"** (Beattie, 1992) is an in-depth article from the Vermont Historical Society about French Canadian migrants coming to Winooski to work in the mills during the Civil War era.
- **"The Mill Girls of Lowell"** is a short article from Lowell National Historical Park about the many young women from VT and NH who moved down to Lowell to work in the mills.
- **Monadnock Mills Area Quest** guides you through a "Valley Quest" at the site of Monadnock Mills in Claremont, NH. With rhyme-filled stanzas, you explore the site's physical features and its history.
- **"New England Mill Workers"** from the website of the Vermont History Museum includes a first hand account from Mary Paul, a young woman from Woodstock, VT, who moved to Lowell for mill work in 1845.
- ***Overalls to Art at the H.W. Carter and Sons factory*** (2013) is a 2-part documentary totaling less than an hour that details the history of the H.W. Carter and Sons factory in Lebanon, NH, and its transformation into a home for the arts.

- **Regional Manufacturers**: What can we tell about companies from their missions?
  - Darn Tough Socks (Northfield, VT)
  - Burgeon Outdoor (Lincoln, NH)
  - Johnson Woolen Mills (Johnson, VT)
  - Local fiber and clothing artisans and craftspeople
- "**The Spanish Sheep Craze That Forever Changed Vermont**" is a brief introduction from the New England Historical Society's website tracing the story of "Merino Mania."

Equity-Related Resources

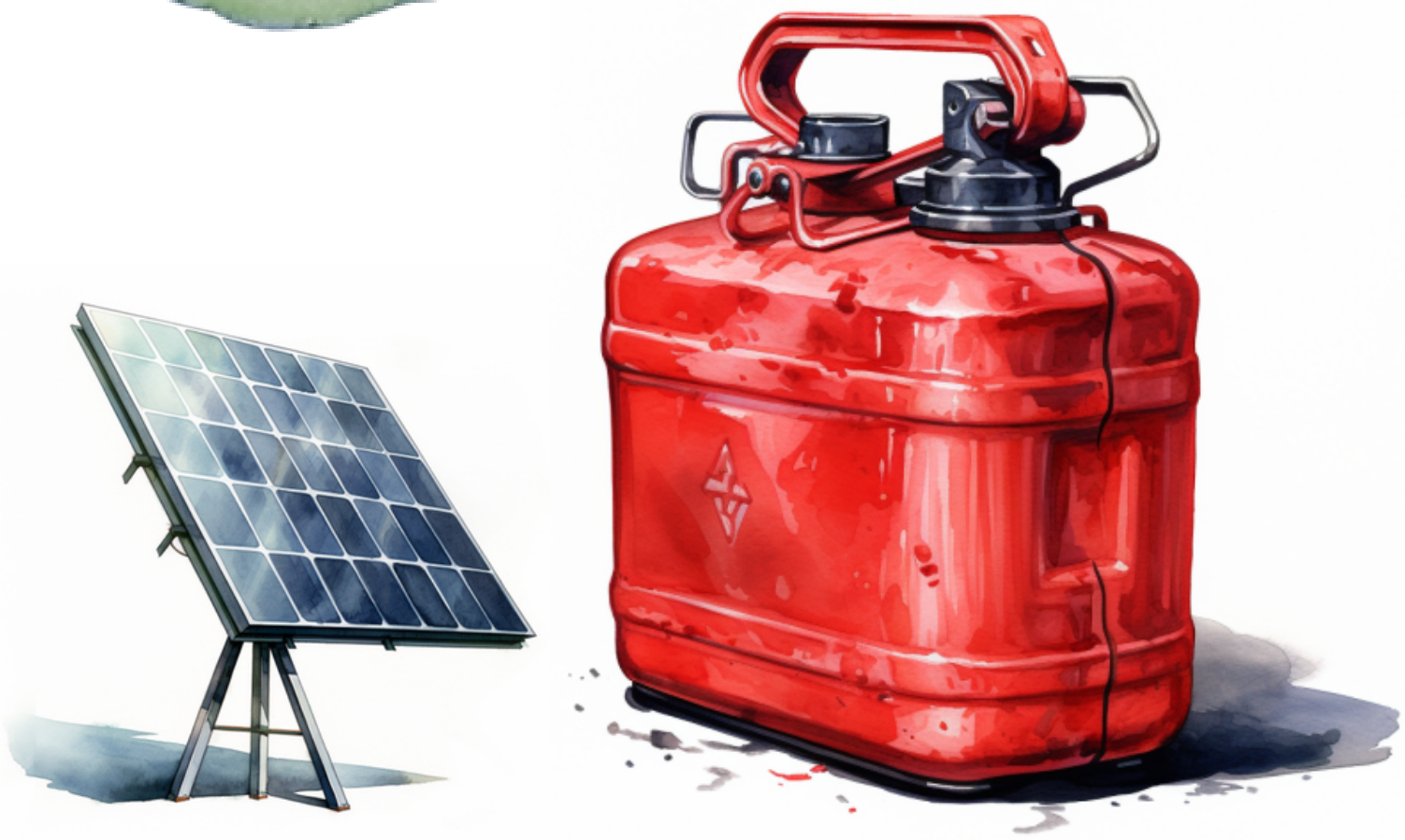
- "**Climate Town: Fast Fashion is Hot Garbage**" is a 20-minute video from Climate Town that traces the history of the fashion industry and its devastating impacts on climate and human rights.
- "**The Environmental Disaster that is Fuelled by Used Clothes and Fast Fashion**" (2022) explores the dark side of the world's fashion addiction. From the Australian Broadcasting Company, this is a 30-minute video about how many of our old clothes, donated to charities, end up in rotting textile mountains in West Africa.

Other Educational Resources

- **Behind the Seams, a TRAID Education Toolkit** is a complete curriculum, organized around the UN Sustainable Development goals. Lesson plans include multiple activities organized around the topics of clothing production, consumption, and waste. From the UK.
- **Circular Fashion Education Toolkit** contains numerous resources and lesson plans, organized around the topics of overconsumption, environmental impacts, and solutions for the future. Created by Redress, a nonprofit in Hong Kong.
- **Fashion Revolution** is the world's largest fashion activism movement and their website offers a wealth of resources, opportunities to participate in campaigns, and many ideas for action. (be sure to check out the US Chapter's website.)
- "**Greenwashing Examples: 8 Notorious Fast Fashion Claims and Campaigns**" (2022) examines how fashion brands greenwash; it provides tools for a critical analysis of what you are being told.
- **NPR's Planet Money Makes a T-Shirt** (2014) is a series of very short and engaging videos with some additional content that tell the story of T-shirt production and distribution.
- ***RiverBlue*** (2016) is a documentary film that follows the environmental impact the fashion industry is having on rivers and the people who depend on those rivers. Available to rent or buy on Vimeo.

- ***RiverBlue*** (2016) is a documentary film that follows the environmental impact the fashion industry is having on rivers and the people who depend on those rivers. Available to rent or buy on Vimeo.
- **The Story of Microfibers** (2017) is a short video from The Story of Stuff Project about the impacts of clothes made of synthetic fibers; it is a great example of the complexity of trying to solve one problem and creating another.
- **The Sustainable Fashion Toolkit** has links to hundreds of vetted resources about fashion and sustainability.
- **What My Jeans Say About the Garment Industry** is a comprehensive lesson from Fashion Revolution that guides students through understanding the issues of fast fashion by examining their own clothing.
- **A YouTube search for fast fashion** brings up a wealth of videos exploring the many impacts of this trend.

FUEL



"Turn off the lights when you are not using them!"
—Jill Kurash, former 5th and 6th grade teacher at Woodstock Elementary School and current 5th grade teacher at The Prosper Valley School

Growing up, Erica Kurash remembers this as a constant refrain from her mother. Fortunately Jill did not confine her passion for energy conservation to her home. Since 2007, Jill has been working with her students to notice their classroom's energy consumption and do some creative problem solving to reduce it. As a result, her efforts to reduce fossil fuel consumption (while saving the school some money!) have a much broader impact.

One of her favorite projects started with a school-wide energy audit. With help from the Vermont Environmental Education Program (VEEP) and the support they provide (e.g. infrared sensors, grants, coaching, etc.), Jill and her students measured and monitored energy being used by the school. During weekly lunch gatherings, her "Green Team" of volunteer 5th and 6th graders discussed how the school could reduce its carbon footprint.

Although reminding students and staff to turn off lights helped, students were frustrated that some people seemed unwilling to change behavior or (falsely) believed the lights needed to be kept on throughout the day. That's when the collective lightbulb clicked on! (Or rather, off?) The students decided to create light switch covers to remind everyone to turn off lights when they were not in use. The students got their creative juices flowing designing the covers. With Jill''s support, they wrote a grant to cover costs, and voilá! These covers now adorn light switches at school—a visual reminder to all that they can make a difference just by the simple act of turning off the lights when they are unnecessary.

Lights are not the only focus for Jill's energy work. She knows that by being a role model for her students (e.g. by using rags instead of paper towels, recycling, using both sides of most paper, and composting food scraps from classroom snacks) she creates a culture that encourages sustainable use of resources. In addition, she helps students learn how to reduce household expenses by engaging in these more sustainable practices, as well as thinking about how their family might reduce their use of gasoline by carpooling and combining trips. When her students enter in the fall, they are often not used to some of Jill's expectations for "green" behaviors, but within a few weeks they rise to the challenge. With a mother like Jill, it might come as no surprise that her daughter Erica went on to lead many climate change initiatives in her high school and college!

When Jill moved to The Prosper Valley School (TVPS), she joined forces with another climate-conscious colleague, Andy Wood. Andy is trying out a new route for sustainability. In front of his 5th graders, he challenged himself to ride his bike to work at least 50% of the time to reduce his use of fossil fuels. This quickly turned into a math problem, as students, eager to track Mr. Wood's progress, worked with fractions to figure out how many days he would actually have to bike before the end of the school year! Inspired by Andy's biking, two students, Isla Segal and Chloe Costello, asked Andy for help convincing their parents to let them ride to school together. To the delight of the parents, the students put together a compelling presentation. Building on their success, the students wanted to encourage other students to ride to school, too.

Andy's first reaction was: How do I support them and not step on their parents' toes? As a bike club and group rides started to unfold, the group grappled with the next question: How can students without bikes or helmets ride with us? The students put together a survey for the school community that included questions about access to bikes and gear. The "Biking Dragons" worked with parents and community organizations to ensure that if anyone needed a bike, a bike repair, or a helmet, they would get one. They looked at maps to identify the safest route, asked adults to join them on their ride, and informed local police.

Remember the term "multisolving" we used in the Getting REAL chapter? Let's take the concept for a spin using the example above.... Biking, of course, reduces greenhouse gas (GHG) emissions—but in the true multisolving spirit, it also serves many other student needs, such as community-building, physical fitness, the development of self-regulation through independent mobilization, and outdoor recreation. Andy has helped lead TPVS in a national effort to wean communities from car-centric transportation. Sam Balto, a physical education teacher in Portland, OR, who started a similar program observes, "Our principal has definitely mentioned that parents and teachers noticed that on bike bus mornings, the kids get into the building so much quicker because they've kinda had time to socialize, to get their wiggles out. By the time they get to school they are ready for the day." With strong support from the TPVS principal, Aaron Cinquemani, Jill and Andy, along with the other TPVS teachers, help to create a culture of climate resilience for their 5th and 6th grade students.

REAL CONSIDERATIONS

Fuel, in all its forms, is at the heart of many climate resilience endeavors. It is a wide-ranging topic connecting the ultra local and intimate (e.g., the heating in your home) to the far-reaching global and complex (e.g., implications of oil reserve locations on international politics). If we can reduce our fuel consumption and transition to more clean sources, we can greatly reduce the havoc our use of fossil fuels, in particular, has wreaked on our communities and environment.

The terms fuel and energy are often used interchangeably, but fuel is the substance that is used to provide energy for motion and other activity. (For a quick review of sources of energy, check out the fact sheet "What Is Energy?" available on the US Energy Information Administration's website.) Fuels can be renewable and not sustainable or sustainable but not renewable—and sometimes it depends on location! For example, hydropower might be renewable where water is plentiful, but the accompanying dams might not make it sustainable if it adversely affects the local community and environment. John Hopkins University offers a cogent explanation of this in the online article "Renewable Energy vs. Sustainable Energy" (2021). For a fun review of what energy is exactly, where else would we go but Bill Nye the Science Guy?! He has a 30-minute video entitled "Energy."

Fossil fuels, such as coal and oil, produce toxins that seep into the veins of our planet, harming both people and the environment. When burned, these fuels release pollutants into the air, including carbon dioxide and methane, which contribute to the heating of the planet. The extraction and transportation of these fuels can also have devastating impacts, damaging ecosystems and wildlife habitats, and posing risks to human health and safety. But there's no need to fuel our fears any longer—there are now more ways than ever to kick our dirty fuels habit.

The REAL framework below is intended to spark your ideas for cultivating relationships that support healthier fuel habits, drill deeper into the connections between fuel use and equity, get you moving full steam ahead on action planning, and ignite your leadership for more sustainable fuel consumption.

Relationships

We all depend on external sources of fuel to make our lives more convenient, comfortable, and to help us do the things we need or want to do. This, in and of itself, is not a problem. The problem comes when we take more energy than what we need and rely too heavily on unsustainable resources to feed our fuel appetite. The following questions explore fuel use as it relates to one's self, community, and nature—with the hope of shining some light on our energy consumption habits and their impacts.

Self

You might be wondering if changing your individual energy consumption habits really matters in the grand scheme of things. The short answer is: yes, it does! While it's true that climate change is a huge problem that requires action at the government and societal level, your personal actions still make a difference. By making choices that consider the sources of your fuel and the amounts you really need, you'll be striving for integrity in the way that you live. And that feels good. There will be areas where it does not make sense to change your habits, and that's okay. Beating yourself up about it will definitely not help. Instead, think of areas where you can make positive changes to offset your carbon footprint. For example, if you can't ride your bike to school, consider organizing a carpool. Don't waste your time and energy wringing your hands about the things you can't do; roll up your sleeves and do the things you can.

Below are a few questions to help you explore what's possible:

- What sources of energy do you use daily? (e.g. electricity, gasoline, heating oil, wood, solar, etc.)
- Where does it come from? (e.g. Is your electricity generated by hydropower?)
- What are your energy wants vs. your energy needs?
- What changes would you like to make to reduce your energy/fuel consumption?
- Where do you have the ability to make the changes that you would like to see?

Community

While individual actions, such as turning off lights and using public transportation, can help to reduce greenhouse gas emissions, they will not be enough to solve the problem on their own. To make a significant impact on climate change, it's necessary to work within our communities to implement policies and practices at the government and societal level that can reduce greenhouse gas emissions on a larger scale. The choices we collectively make about energy have far-reaching consequences on climate change, as well as on public health, the economy, and the environment.

Working with our beloved community requires perseverance, collaboration, and a willingness to challenge the status quo. We can start by learning together about how our fuel and energy systems work in the Upper Valley, their impacts, and the costs and benefits of transitioning to cleaner forms of energy. We can do this by connecting with local businesses and organizations (e.g., Green Mountain Power and Vital Communities), implementing energy efficiency measures at home or school, and advocating for clean energy policies in our community.

Below are some questions to consider as you plan to engage with your community:

- What sustainable energy initiatives are already happening?
- How can you and your community learn about other communities that are using energy more sustainably?
- Who might you partner with to work towards more sustainable uses of energy locally?
- What renewable energy sources are available in our community and how can we best utilize them?
- What energy-efficiency measures can we implement to reduce our energy consumption and lower costs?
- How can we work with local organizations and businesses to support clean energy initiatives and promote energy conservation on a larger scale?
- How can we educate and engage our community on the importance of transitioning to cleaner forms of energy and reducing fuel consumption?

Nature

Nature is a wise and generous teacher when it comes to fuel and energy. From the sun's radiant energy, harnessed by plants and consumed by animals, to the careful conservation of energy through efficient design and behavior, we have much to learn from the natural world. And, as for the use of resources, nature's systems are a model of efficiency, with waste minimized and resources recycled. Perhaps most importantly, nature teaches us the value of biodiversity—the rich tapestry of life that creates resilience in ecosystems and allows them to adapt to change. By embracing these lessons and incorporating them into our own lives, we can work towards a more sustainable and efficient future.

Sustainable energy consumption is often place-based because the availability and feasibility of different energy sources can vary significantly depending on location. For example, some places may have abundant sunlight and strong winds, making solar and wind power practical and cost-effective options for generating electricity. Other places may have access to large bodies of water, making hydroelectric power a viable option. In addition, the infrastructure and resources needed to support different energy sources can vary from place to place. A region with a well-developed electrical grid may have an easier time implementing large-scale solar or wind projects than a region with a less developed grid.

- What do you notice about how energy is used in nature? How does it flow? How does it change? Where does it go?
- What natural resources do we use in our community to provide fuel for energy? Where does this fuel come from?
- How do the sources of fuel we use impact the environment around us (consider extraction processes, waste disposal, pollution, etc.)? Where do you notice these impacts?
- Do you notice any trends (positive or negative) related to the use of energy sources in your community?
- Where do you see sustainable uses of energy that work more in harmony with nature?
- What types of energy work best for your place in the Upper Valley?

Equity

The topics of fuel and equity are inextricably tied together. For example, when you start researching energy use, you see a direct correlation between economic levels and amounts of waste. For transportation, you'll see different communities have different modes of getting from point A to point B, depending on access, culture, history, convenience, and expense. And you'll notice that many clean energy products, such as solar panels and electric cars, can be prohibitively expensive.

All members of our Upper Valley community deserve access to clean, affordable energy and transportation. However, many Upper Valley residents struggle to heat their homes, get to work, and/or switch to more sustainable energy sources. How can we surmount financial, physical, or social barriers that prevent certain individuals or groups from accessing energy services that could better serve their needs and the needs of our planet?

Policies and programs that provide financial assistance or incentives for energy-efficiency upgrades can help to make some improvements more accessible to low-income households. Similarly, installing renewable energy systems in underserved or marginalized communities can help to reduce energy costs and improve access to clean energy for these groups. By taking an equity-centered approach to energy policy and practice, we can help to ensure that all members of the Upper Valley have the opportunity to benefit from clean, sustainable energy, which will help build more inclusive and resilient communities, and a healthier future for all.

To delve into the connection between fuel and equity, read on.

Origin Stories

Historically marginalized communities have often been more impacted by dirty fuels due to a variety of factors. One factor is location—many marginalized communities are located in areas where dirty fuel infrastructure, such as power plants and refineries, is prevalent. These communities may also be located near major transportation corridors, which can contribute to air pollution. Marginalized communities may have limited economic resources, making it more difficult to invest in cleaner energy alternatives, move away from areas with dirty fuel infrastructure, or access health care to address the diseases caused by dirty fuel pollution. In addition, because marginalized communities traditionally have had limited

access to political power and representation, it is often harder for them to advocate for policies that protect their health and local environment.

By understanding these historical factors and working towards more equitable solutions, we can ensure that all communities have access to clean, sustainable energy.

Alternative Stories

As we work to reduce dirty fuel consumption and transition to cleaner energy sources, it is important to recognize that marginalized communities have often been disproportionately impacted by dirty fuels and environmental pollution. Fortunately, there are many programs and initiatives that have helped these communities to reduce their reliance on dirty fuels and transition to cleaner energy sources.

One such program is the Environmental Justice Small Grants Program, which provides grants to community-based organizations working to address environmental justice issues in their communities. One community that has benefited from this program is the West Oakland Environmental Indicators Project, which received a grant to help reduce diesel emissions from trains and trucks in the West Oakland, California, neighborhood.

More locally, in Vermont, the organization Vermont Energy Investment Corporation (VEIC) has implemented a program called "Drive Electric Vermont," which aims to increase the adoption of electric vehicles (EVs) in the state. The program provides incentives for people to purchase or lease EVs, including discounts on vehicles, rebates on charging equipment, and access to a network of EV charging stations. For example, one low-income resident of Vermont was able to take advantage of the discounts and rebates offered through the Drive Electric Vermont program to purchase an EV for her daily commute. Not only did she save money on fuel costs, but she also enjoyed the added benefits of driving a car with zero emissions.

Low-income families in the Upper Valley can apply for assistance to make their homes more energy efficient. With the help of local contractors, they can install energy-efficient windows and doors, insulate their attic and walls, and upgrade their heating and cooling system. These improvements help to reduce energy usage and lower energy bills, while also making the home warmer in the winter and cooler in the summer.

Do you know of other examples of programs that reduce environmental impacts, improve access to essential services, and increase economic opportunities in the Upper Valley? What can you imagine for our community? Below are a few questions to consider:

- Where do we see innovative energy waste reduction initiatives or clean energy use in the Upper Valley? What can we learn from them?
- What would it look like if the Upper Valley offered clean, low cost energy for everyone?
- What would it look like if the Upper Valley offered clean, low cost, and convenient public transportation?
- How might these changes impact the quality of life and the opportunities for those with more limited resources? How might it benefit everyone in the Upper Valley?
- How might initiatives such as these change health impacts for communities most affected by dirtier fuels?

Action

"The world is changed by your example, not by your opinion."
—Paulo Coelho

The goal is to engage in tangible actions that help address climate change and equity issues in our Upper Valley Community. In the realm of fuel specifically, you want to consider:

- What are your biggest energy wasters? You and your students can think about this on a household or school level, or within the wider community.
- What are cleaner fuel alternatives or ways to reduce waste?
- Who has access to these alternatives? Who doesn't? What are the barriers?
- What are some ideas for solutions to any identified inequities to effective and affordable solutions?
- Who can you partner with to help figure this out and greatly increase your capacity for change-making?
- What is possible for you and your class to tackle?

Whether we choose to reduce fuel use and transition to cleaner energy sources, or to waste energy and continue using dirty fuels, we all are a part of the Upper Valley energy consumption system, and need to examine how our actions can hinder or advance our progress toward more sustainable fuel use.

Leadership

"There are many leaders, not just one. Leadership is distributed not solely in the individual at the top, but in every person at every level who, in one way or the another, acts as a leader to a group of followers—wherever in the organization that person is, whether shop steward, team head, or CEO."

—Daniel Goleman, Richard Boyatzis and Annie McKee (2002)

The lead story for this chapter provides two examples of leadership; the first with Jill Kurash engaging her students in energy audits and the second with Andy Wood supporting the leadership of two students to start a bike commuting club. Both leadership initiatives required a kind of dance between teacher and student, with the teacher responding to student needs and vice-versa, each taking the lead at times. As the quotes in this section indicate, everyone has the potential for leadership. Our need to reduce fuel consumption and shift to cleaner sources will happen more equitably and successfully if we can nurture the leader in everyone. In schools this means opportunities to practice, both for teachers and students.

Student Voice and Agency

Students can get charged up for practicing civic engagement and leadership skills, if they believe in what they are doing and know they can make a difference. Time invested into investigating student attitudes about the topic is time well spent. Both teachers and the students can learn what floats their boats. Examine fuel from multiple angles—from art to zoology, there are few areas that do not involve fuel and energy dynamics. Guiding students into the realms that resonate for them builds both their intrigue and individual sense of efficacy. Framing projects so that their "expertise" provides a missing piece of the collective puzzle for energy conservation or cleaner fuel use endeavors, develops both a sense of individual and collective efficacy in climate resilience.

For example, if students are doing an energy audit of the school and then developing a campaign to reduce GHG emissions from fuel use, students with more interest in science can calculate carbon footprints for the school and research ways to conserve energy or use alternative fuels. Students who dig politics or psychology can figure out the best way

to persuade the school to change its polluting systems and habits. Those who are interested in art can develop an educational website or posters to teach others about the problem(s) and the solution(s) the group is proposing. Those who enjoy mechanics can perhaps interview the members of the buildings and ground team to better understand the school's HVAC and lighting systems, as well as any alternative energy resources (e.g. solar panels). Those inclined to math might enjoy crunching the numbers in the school's maintenance budget to see if some money can be saved through conservation or investment in alternative fuel sources. Using a distributed leadership approach requires careful planning and attunement with students' interests and affinities, but the payoff can be powerful. Finding and building from each student's strengths can reveal to them and others their leadership potential, paving the way to a more equitable and healthier future.

Educator Leadership

Teachers, through their profession, inherently serve as role models and leaders in their classrooms and communities. However, sometimes teachers feel less comfortable leading school-based initiatives with their own colleagues, especially if the work feels like it is falling completely on their shoulders. A distributed leadership model can lighten the burden.

Below are a few steps to consider if you are interested in getting more than just your class involved with reducing your school's GHG emissions.

These tips are adapted from John Kotter and Daniel Cohen's *The Heart of Change: Real Life Stories of How People Change Their Organizations.*

1. ***Increase Urgency***: The facts of climate change are startling enough, but when you hone in on the local impacts on your students and their families, the facts quickly become more relevant. Students can help you do the research on your school's energy usage profile and communicate how and why change is needed.
2. ***Build the Guiding Team***: Even if you just find one colleague who is passionate about reducing the school's energy consumption, by working together you are expanding capacity and influence! You can also look outside the walls of the school, to parents, alumni, elders, and other community members committed to this work. Students benefit from outside-the-school collaborations as well.
3. ***Get the Vision Right***: What are you trying to change and why? Do you want to put solar panels in the parking lot? Apply for grants for clean energy buses? Become a net zero school?

4. ***Communicate for Buy-in:*** Share what you are doing and why you are doing it, and speak from the heart. Reducing the school's consumption of dirty fuels benefits the health of your students and community—and can ultimately save tax-payer money.
5. ***Empower Action:*** A distributed leadership model means you don't have to be involved with all the action. You can stand on the sidelines and applaud as another teacher and his students decide to take on the outdated heating system.
6. ***Create Short-Term Wins:*** Going after the proverbial low hanging fruit (e.g. swapping out inefficient light bulbs, prohibiting idling of buses, creating a place for bikes to be safely parked, etc.) generates energy and continued engagement.
7. ***Don't Let Up:*** Shifting to more sustainable energy practices and systems will have multiple challenges. Collectively overcoming these challenges is where a distributed leadership model really shines through with collaborative problem-solving and encouragement. If others—be they students, teachers, or community members—feel and are truly part of the leadership, when your spirits lag, they will have the energy and desire to move forward while you reestablish your momentum. Don't forget to do the same for them when they feel like they are lagging.
8. ***Make Change Stick:*** Think about how to make the shifts in energy consumption part of the normal operations of the school. For schools, this means incorporating the idea of sustainable energy use into everything from hiring interviews to decision-making on purchases of equipment. The more you and your like-minded partners can demonstrate the benefits, the more likely others will join your efforts.

ENTRY POINTS

Who Do You Think You're Fuelin'? Look around you. See how many things you can find that are currently using energy. Do you know how that energy is being generated, where it comes from, and watts being wasted? It's shocking how little most of us know about energy, something we depend so heavily on in our daily lives. We hope all those puns didn't Hertz. Ohm, let's just move on—we hope to make some lightbulbs go off in your head (LED, of course!) as you read this section.

Waste Not, Want Not

A huge amount of energy (by some accounts over 50%) is wasted. While energy conservation alone will not solve the climate crisis, it can reduce the rate of GHG emissions to slow global warming and provide us with more time to transition to more sustainable energy sources.

1. Review 18 Ways You're Accidentally Wasting Energy from our guy, Bob Vila.
2. Break into detective teams and examine areas inside and around the school to see how many potential energy wasters your team can identify.
3. Combine the team' lists and review. Are you surprised at the amount of energy (and money) potentially being wasted? Do you recognize any of these energy wasters where you live?
4. Brainstorm reasons why this waste might be happening—and what might be some solutions.

The Psychology of Energy Conservation: It's Not What You Think

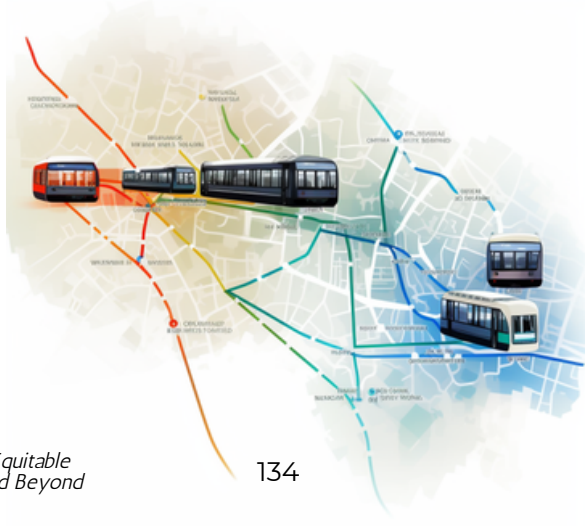
So, we just need to let people know that they are harming the environment and losing money, and they will stop wasting energy, right? Not according to behavioral scientist Alex Laskey.

1. Watch Laskey's 2013 TED Talk "How Behavioral Science Can Lower Your Energy Bill" to learn what is most effective in getting people to conserve energy.
2. Students can look into their own household's energy bills to get an idea about their own energy use. (They don't have to report this out!)
3. Each student can pick one person to interview (e.g., a teacher, administrator, member of the maintenance or cafeteria staff, student, or family member). Generate questions to learn more about what might motivate them to conserve more energy. Compile your results and discuss.

Bus-ted

Public transportation varies widely from place to place. Some locations offer many inexpensive and convenient choices, while others have very few options. Find out what your community has to offer.

1. Check out "Fast Facts from the Inventory of Greenhouse Gas Emissions and Sinks: 1990-2020," an infographic from the EPA. What sector produces the most GHGs?
2. Google map your location and a place you might like to go in the Upper Valley.
3. Use the alternative modes of transportation feature (e.g. walking, public transport, biking, or rideshare) to see what other options besides driving might be available. What did you find? Can you get to your friends' houses without using your car? Grocery shop? Enjoy a movie theater? Participate in a sports event?
4. Compare safety, cost, convenience, time to travel, and time to wait. How do these alternative modes compare? What are the barriers? Which are you and your friends likely to choose?
5. Now imagine what it would be like if you could easily go to your desired location without hopping in your car. Learn about how Advance Transit, a not-for-profit organization, is providing transportation to portions of the Upper Valley—and why they are committed to fare-free transportation. What benefits can you see to your health, environment, and community by choosing transportation alternatives?



So Many Solutions! So Little Time!

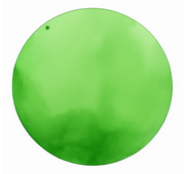
So many changes to be made! Where do we start? How should we prioritize? The first step is learning about your options so that you can make informed choices.

1. Take the climate change quiz from the U.S. Department of Energy to test your general understanding about climate change.
2. Have fun? Now take CNN's quiz about which climate solutions will have the biggest impact (based on the organization Drawdown's rankings). What surprised you?
3. The effectiveness of climate solutions vary from place to place. What combination of solutions might work best for your place?
4. Work in teams to research and propose the top 3-5 combinations of Drawdown Solutions for your community. What are the pros and cons for each? Why do you feel these would work geographically? Culturally? Who would these solutions most benefit? Who might they most harm? Which one do you think has the most potential and why?

ACTION PROJECTS

"Why is 'U' used as the symbol for Potential Energy?"
"Because 'U' have a lot of potential!"
—From the collection of energy puns on Punstoppable.com

To activate that potential, let's turn our energy to action. Our go-to recommendation is to always consider when you can refuse, reduce, reuse, and recycle. The following projects are designed to suss out these choices and help students see firsthand how energy use and transportation choices impact the Upper Valley. Students can explore the inequities that exist in our energy systems and the ways in which some communities are often disproportionately impacted by polluting fuels. Additionally, these projects provide opportunities for students to learn about how government, nonprofits, and for-profit entities work to address these issues in our communities—and how they can be a part of shaping our community.

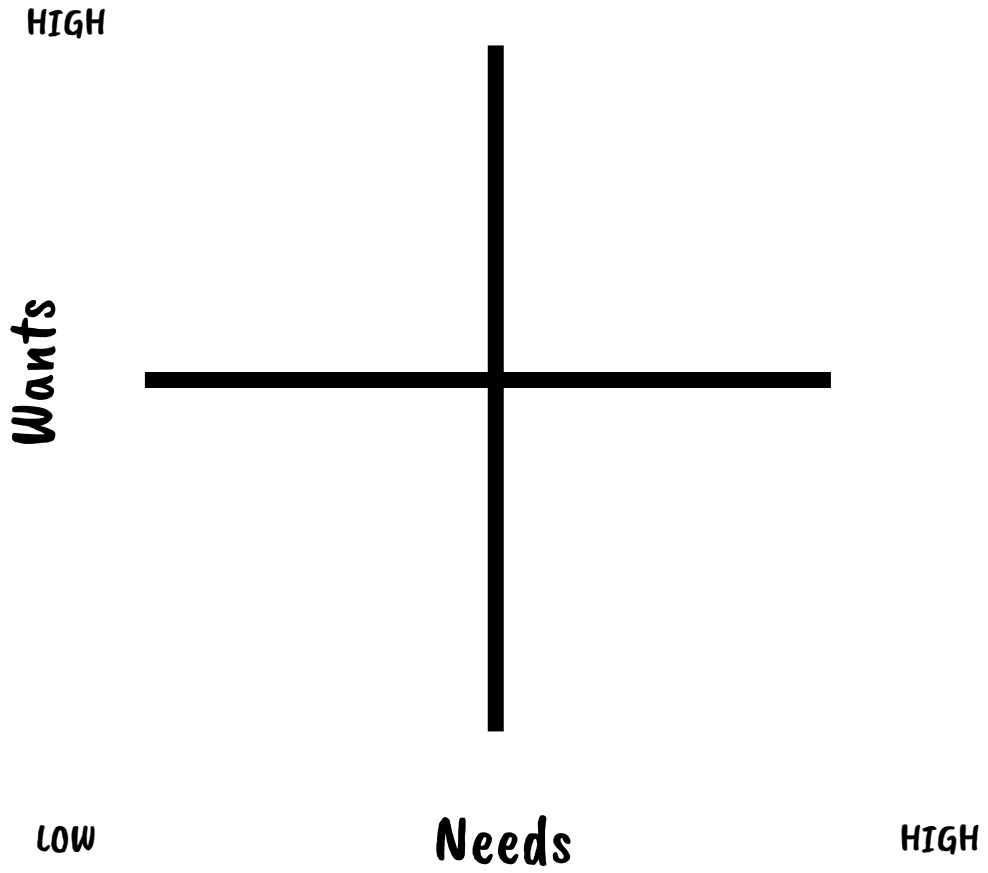


Green Circle
Simplest

Distinguishing Needs vs. Wants: Identifying What's Important to You

What makes you happy? What matters to you? What is not important to you? These are questions we all need to ask ourselves to help guide our lives and consumption habits—that includes not just how we spend our money, but also how we spend our time and energy. Checking in on our wants and needs periodically can help us figure out essentials that bring us joy versus the stuff that junks up our lives and possibly the environment!

1. Create a graphic organizer similar to the one included in this action project description.



2. Consider the following four sections as you fill out this grid with the activities and things in your life:
    a. Lower, left-hand quadrant (Low Want, Low Need): What do you use or spend time, energy or money on that you really don't want or need?
    b. Bottom, right-hand quadrant (Low Want, High Need): This section is the hardest to be honest on! We often tell ourselves certain things are not important if we don't feel like doing them (e.g. brushing teeth, studying for a test, telling your little brother you love him :0) Think about what you truly need to nurture a healthy way of being. These are the things that might be hard to get ourselves to do initially, but ultimately produce a sense of "yeah, that was the right thing to do."
    c. Top, left-hand quadrant (High Want, Low Need): These are the things or activities we often feel a little "bleh" after. They are very attractive or easy at the moment, but can leave us with a kind of emptiness or dissatisfaction, like junk food.
3. Top, right-hand quadrant (High Want, High Need): These are the things that you believe are essential to you and that you want to do, probably because they give you great satisfaction and pleasure.
4. Turn and talk with a partner. What did you have in common? What was different? Did anything surprise you? Any insights? What was challenging about this activity?
5. Look at the left-half quadrant (low needs). Are there any things in there that require polluting fuels that you could let go of? What else comes to mind?
6. Discuss as a class. Where do you see opportunities to refuse? See if you can try out a common goal together to reduce polluting fuels and shift your time, energy, and resources toward activities and things that might bring you more joy. Experiment. For example, maybe try to go a week during lunch with your phones off. How does this change the atmosphere of the lunchroom? What's different? Was it hard? How did it feel? Or try to go one night a week reading, playing a game with friends or family, instead of streaming videos, being on social media, or playing video games. See what you can come up with as a class to test out different ways of being that don't require polluting fuels and have the potential to be fun.

No Harm, No Foul-ing up of Our Atmosphere: Easy Fixes for Saving Electricity

Imagine how much fuel we would save in our county, state, or country if we just turned off electricity where it is not being used. See if you can find areas in your school that are wasting electricity unnecessarily. Contact the Vermont/New Hampshire Energy Education Program (VEEP/NHEEP) for helpful free posters about energy designed for students, as well a variety of other tools, such as energy audit sheets.

1. Divide the class into pairs or groups of three. Divide the school up so that each team has a section of the school to cover.
2. Each team documents electricity in their section of the school by creating a chart (or online spreadsheet) and answering the following questions:
    a. Where are the electrical devices/equipment in your section of the school?
    b. What are the individual electrical devices/equipment?
    c. Do these devices need to be powered on at this time?
    d. Why or why not?
3. Aggregate the data and analyze. What are the main culprits for electricity waste? Did the team notice any efforts to conserve electricity? Why might someone want to do that?
4. Brainstorm ways in which the school can reduce energy consumption. Here are a few ideas:
    a. Turn off lights and electronics when not in use.
    b. Use natural light instead of artificial light whenever possible.
    c. Use LED light bulbs.
    d. Unplug chargers and other devices when they're not being used.
    e. Use a power strip to easily turn off multiple devices at once.
    f. Use a laptop or tablet instead of a desktop computer.
    g. Use a whiteboard or chalkboard instead of a projector or interactive display.
5. For each brainstormed (or presented) idea for electricity conservation, create a team to learn more about that idea and present the pros and cons to the full group.
6. Based on this information, select three priorities for the school (or your classroom) to work on.
7. Develop a feasible plan using the SMARTIE goals. Look at the school's electricity bill before and compare it to after the plan is implemented. Was there a difference? Why or why not?
8. If possible, celebrate any cost savings!

Waste Not, Want Not...in Our Landfills: Disposing of Electronic Waste

Did you ever wonder what happens to old phones, computers, or similar devices when they are no longer being used? The adage "out of sight, out of mind" is true for many of us, but it doesn't serve us well when disposing of electronics. Read on to see some simple solutions to avoiding this toxic waste.

1. Check out the video The Story of Electronics, from the StoryofStuff.org. During the video, note what surprises you, what you disagree with, what you agree with, and what you wonder about. Discuss.
2. This video is several years old and some things have changed (e.g. laws, statistics, policies, manufacturing processes, business practices, etc.). Pick one thing you noticed and research if it is still true. Present your findings.
3. Find out what your school does with its old electronics. Are the safests disposal methods being used? If not, what is possible in your area? (Potential local resources include Staples, recycling centers, such as Hartford Transfer/Recycling Center, and BestBuy.)
4. Present your findings to the maintenance staff and work with them to more safely dispose of electronics.
5. Extension: Batteries. Find out what your school does with batteries, and then learn about what other resources there are in your area to support the proper disposal of batteries. One helpful resource to learn about the environmental hazards that batteries pose, as well as proper disposal protocols, is the UV Sunapee Regional Planning Commission's fact sheet: What Should I Do with Batteries?
6. If you really need to upgrade your phone, check out EcoATM, a company that buys your phone so they can re-use the materials.

Making Cents: Taking the Bus to Save Money and Reduce Polluting Fuel Consumption

What happens when you run in front of a bus? You get tired. What happens when you run behind a bus? You get exhausted. What happens when you ride on your school bus or carpool? You get to socialize, save money, serve as a role model for your peers, reduce health risks, and reduce your carbon footprint.

1. Check out some of the research from the Future of Rural Transit–Network Action Team, which explored combining public and school bus services so that students could ride the public bus and fewer school buses would need to be on the roads. It's not right for every community, but has been really promising in some places. A toolkit for how to set this up in your district should be available soon! Contact VEEP/NHEEP for more information and for other amazing ideas and resources about transportation.

2. Work with your students to develop a set of equations that lead to an estimate of how many gallons of fuel per student are spent on commuting to school. For example:
    a. Use Google maps (or use a physical map) to estimate your mileage for commuting to school each day.
    b. Multiply this by the miles per gallon (MPG) for the car you ride in.
    c. Divide by the number of students in your car or other commuters (such as parents going to work).
    d. For your bus, find out what the MPG is and divide by the average number of students who usually take it. (If your school district has clean fuel buses, big kudos!)
    e. Once the equation is ready, each student should calculate their own fuel consumption and anonymously submit the calculations on paper or an excel spreadsheet.
3. What trends can you see from this data?
4. Can you extrapolate over the course of the year? Across all students in your school? Your school district?
5. Multiply costs, either individually or collectively, using the average cost of gasoline or diesel in your area.
6. Estimate the amount of fuel and money that could be saved over the course of a day, month, or year if one person started taking the bus—or if 5 more people took the bus once/week.
7. Have students consider ways to make bus rides more appealing and track the number of students each day to see how ridership responds.
8. If busing is not possible for everyone because of routes or timing, see if these can be changed. If that is not possible, see suggestions for carpooling in Cut the Fuel, Carpool, a blue square activity below. VEEP/NHEEP also have a "travel training" program in which students practice the skills needed to successfully ride the bus. Field trips to local bus garages included! It's also a good opportunity for older students to show younger students how to do this.
9. Celebrate if the number of students riding the bus increases!

Blue Square
More In Depth

Saying No to Wasteful Production Saves More than Meets the Eye

Products we really don't need but often use because they are convenient, not only fill up our landfills and often emit toxins, but they are often produced with polluting fuels, are transported using polluting fuels, and are disposed of using polluting fuels. Whooo. Just refusing these products (e.g. plastic water bottles, plastic utensils, paper, plastic bags, etc.) can stop this waste at its source, making for a healthier environment all around.

1. Watch Chris Jordan's TED Talk Turning Powerful Stats Into Art to get a sense of how one artist helps us wrap our heads around the amount of cup waste created each day.
2. Check out EarthDay.org's "Single Use Plastics" factsheet to get an idea of how much disposable plastic we use. It would be pretty challenging to create an art piece using numbers that are in the billions, but what if you scaled it to a more local issue?
3. Research items your classroom or the broader community uses that you think could be reduced or replaced with more sustainable alternatives.
4. Leave a box in your classroom, school or in each student's home and ask everyone to put a selected product in there. It could be used paper, empty water bottles, etc.—whatever appears to be an item that we don't really need to be using.
5. See what more sustainable options are available. Check out this Stuff vs. Stuff article from MIT that compares disposable to reusable water bottles.
6. After a given amount of time—1 day, 1 week, or 1 month—count up the number of products that have accumulated. Have fun multiplying this number in different ways. For example, multiply it by the number of students in your whole school district, or in the country, or by the number of households in your county.
7. Research the amount of energy it takes to produce and transport a particular item, and multiply it by your school's use, your student's home use, or whatever measurement seems most appropriate.
8. Represent that number in an art piece and exhibit it (and other artistic responses) in your school next to your findings.
9. Put that box out again and see if the accumulation is reduced.
10. Celebrate any successes with your community using sustainable sources of products.

Don't Let That Heat Escape: Reducing Heat Loss in Your School Building

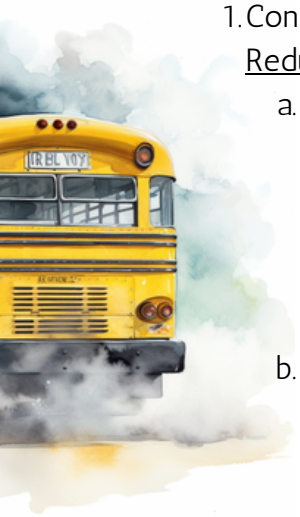
You don't need a full blown energy audit to see where your biggest heat leaks are in the classroom or school. As they say, "teamwork is dream work" and that's what you'll need to find the areas where heat flows quickly out of the building. Gather the following materials for each team: thermometer, stopwatch, notebook, pen, and tape measure.

1. As a class, make a list of guesses where heat loss is most prevalent in your classroom or school. Have each team choose a site to monitor.
2. Work with the administration and maintenance crew to turn off the heat at an appointed time. Let the school know you will be conducting an experiment to see where your class or building leaks the most heat. Invite them to join!
3. Use a stopwatch to measure how long it takes for the temperature inside the building to drop by 1, 2 and then 3 degrees after the heat is turned off.
4. Note these changes in the notebook, along with the temperature outside, and come back together to compare results.
5. What do you notice? Where are the biggest heat losses? Why? Any surprises?
6. Research ways to address this energy loss. Below are a few ideas to jumpstart your discussion. Ask students to determine which solution(s) are possible and preferable.
    a. *Keep school doors closed except when people are exiting or entering.* (Don't hold them open for long periods of time—create a sign on the door to remind everyone.) Like a refrigerator door in reverse, the more you leave it open, the more heat escapes, and the more energy and money are wasted.
    b. *Seal air leaks:* Make stuffed door "snakes" or draft stoppers or window dressers to reduce heat loss from leaky door and window seams.
    c. *Weatherstripping:* Add weatherstripping to doors and windows to prevent drafts and reduce heat loss.
    d. *Install insulated window covers:* Work with the PTO or class parents to install insulated curtains or shades to reduce heat loss through windows. These come in transparent and semi-transparent materials to let light in during the day. Or you can use less transparent materials and close them when the classroom is not in use.
    e. *Plant trees and bushes:* Planting trees and bushes around the school can provide shade and reduce the need for air conditioning in the summer and serve as a windbreak in the winter.
    f. *Use energy-efficient appliances:* Students can encourage the school to use energy-efficient appliances, such as Energy Star-rated boilers, heaters, and air conditioners, which can help to reduce heat loss.

g. *Adjust the thermostat:* Students can encourage the school to adjust the thermostat to a lower temperature in the winter and a higher temperature in the summer to reduce heat loss. Reduce the temperature at night if possible.

Idling Buses: Don't Start Your Engines (Until You Actually Need To)

If you notice your buses idling a lot by your school, there might not be an easier and quicker improvement to human and planetary health than just getting the buses to stop idling. Idling buses means wasted fuel and money. Getting them to turn off the engines when they aren't needed can solve several problems.



1. Consider the following myths that keep buses idling on, from EPA's School Bus Idle Reduction:
    a. *Myth*: It's better to leave the engine idling because restarting it produces more pollution.
        i. *Fact*: Continuous idling for more than three minutes emits more PM (particulate matter) than a restart. Emissions after a restart contain less carbon monoxide, nitrogen oxides, and other pollutants than if the school bus idled continuously over a 10-minute period.
    b. *Myth*: It's better for an engine to run at low speed (idling) than to run at regular speed.
        i. *Fact*: Running an engine at low speed causes twice the wear on internal parts as driving at regular speeds.
    c. *Myth*: It's important to warm up the engine with a long idle period, especially in cold weather.
        i. *Fact*: School bus engines do not need to idle more than a few minutes to warm up. Engine manufacturers generally recommend no more than three to five minutes of idling.
    d. *Myth*: Idling is necessary to keep the cabin comfortable.
        i. *Fact*: Many buses maintain a comfortable interior temperature for a while without idling. Fuel-Operated Heaters, also known as Direct Fired Heaters, can be purchased and installed to keep the cabin comfortable.
2. Research the number of buses, types of buses, amount of time they tend to idle, and state or district policies for reducing bus idling, such as the Vermont Department of Education's policy.
3. Invite your bus driver and/or bus company representatives to a meeting with your class to better understand their reasons for idling. Share with them your research. See if you can come up with a way to reduce idling.

4. One week later, measure the amount of idling and see if your efforts have made a difference.
5. If so, write a thank you to your bus drivers! If not, brainstorm what did and didn't work and see what next steps are needed.

Cut the Fuel, Carpool

We wish we had made up that slogan, since it says it all. Fuel costs to your wallet, your health, and the planet can be significantly reduced via a carpool.

1. Look at Making Cents: Taking the Bus to Save Money and Reduce Polluting Fuel Consumption, a green circle activity in this chapter. Use this process to determine how much money and fuel can be saved when teachers and students switch to carpooling.
2. Develop a survey for drivers at your school (with parents or students) that includes your findings as well as your reasons for encouraging carpooling. Ask if drivers would consider carpooling and if so, have them submit their addresses, contact information, and times of departures from home and from school and other logistical information.
3. Develop a map of the community with interested parties and see if you can identify possible carpooling opportunities.
4. Contact drivers and let them know who might be interested.
5. Keep track of those who begin to carpool and estimate savings of fuel and money. You can also do a survey to ask carpool participants about some of the advantages of carpooling.
6. Share these findings with the community through an article in the paper and publicly thank local participants!

Black Diamond
Multifaceted

Become An EcoSchool

If you are in the black diamond section, you are ready for a challenge—and ready to make some big changes! This activity asks you and your school to think holistically about how your school uses energy. Be one of the first school's in your district to become an EcoSchool, a program designed by The National Wildlife Federation (NWF), and lead the way to a more sustainable future!

1. Do an Energy Assessment with Efficiency Vermont or contact NH Saves to find out more about a school energy audit and see where the biggest opportunities for savings and energy conservation are.
2. Prep your students to ask the energy audit professionals questions they might have about saving energy and trends they see around the state or in your community.
3. Students discuss and select the areas they would like to work in that need improvement and develop a plan using the SMARTIE goals.
4. Check out the National Wildlife Federation's EcoSchool's Action Library such as Energy Vampires for specific ways to involve the school in energy and climate conservation.

Partner with the Experts: NHEEP and VEEP at Your Service

Did you know you have an energy conservation coach eager to help you develop curriculum, provide resources, and conserve fuel? The Vermont Energy Education Program and the New Hampshire Energy Education Program are both dedicated to serving teachers like you interested in this work. VEEP/NHEEP educators can help you determine where you'd like to make a difference; provide hands-on tools for learning about electricity, thermal and transportation sectors; and connect you with resources to help you complete an action project that is tailored to your local community/school.

1. Read some of VEEP/NHEEP's success stories to spark ideas about what is possible in your school or watch Braden Hoefer's TEDx Talk "The Simplicity of Saving Energy" to see how one recent high school graduate saves energy *and* money.
2. Contact VEEP or NHEEP to see what resources they have to share and how you can get involved in their programs. For example, you can:
    a. Participate in one of the many action project initiatives VEEP/NHEEP have designed to support teachers and their students.

b. Work with your students to apply for a small grant to support your work.
c. Borrow hands-on equipment to learn about energy in your classroom, and work with VEEP/NHEEP staff to identify and complete an action project in your school/community.

Idling Cars Outside the School: Turn off Your Engines!

Buses are not the only idlers. Idling vehicles offer an excellent opportunity for students to make a significant reduction in harmful health effects and GHG emissions.

a. Consider the following information from the EPA's Idle-Free Schools Toolkit for a Healthy School Environment: "Idling vehicles contribute to air pollution and emit air toxins, which are pollutants known or suspected to cause cancer or other serious health effects. Monitoring at schools has shown elevated levels of benzene, formaldehyde, acetaldehyde and other air toxics during the afternoon hour coinciding with parents picking up their children. Children's lungs are still developing, and when they are exposed to elevated levels of these pollutants, children have an increased risk of developing asthma, respiratory problems and other adverse health effects. Limiting a vehicle's idling time can dramatically reduce these pollutants and children's exposure to them."
b. Borrow an emissions bag from VEEP/NHEEP to measure just how much is being emitted from a car's tailpipe. Watch VEEP's emissions test video showing an electric car on the left, gas car in the middle, and hybrid on the right.
c. See the EPA's Idle-Free Schools video for specific instruction on conducting research and designing a campaign to reduce idling that can make a big difference in air quality in the schoolyard. And if you break some bad habits that have broader implications beyond the school, all the better!

Follow the Money: Tap into Resources to Support Your Great Ideas for Climate Stewardship

Some big grant opportunities are now available to help your school go green and there are likely to be more on the way through The Inflation Reduction Act. EPA's new Clean Bus Funding grants is one initiative transporting us to a healthier future. If you want to start at a smaller level, there are lots of opportunities to begin learning how to fundraise for projects you believe in—a lifelong skill!

1. Brainstorm a list of ideas for your school or community to emit less GHG. (Browse through this guide to prompt your thinking.)
2. Vote on your top idea—or break into teams to support more than one idea.
3. Identify the purpose of your request, the funds needed, and how you will accomplish your work.
4. Research grants and other fundraising opportunities to obtain the financial support that you need to carry out your project. Before you begin researching opportunities, check in with your principal to determine if they can provide any guidance about grant writing in your district or expectations for carrying out other fundraising projects. Often districts have grant writers who should be consulted with prior to submitting a grant application—and may be able to offer you some assistance to ensure your success. Here are a few possible sources of grants and other funding opportunities:
    a. Vermont's Arts Council
    b. Wellborn Ecology Fund School-Based Project Grants (focused on the Upper Connecticut Valley region)
    c. The Vermont Community Foundation
    d. Grants.gov (a large searchable database of grants available throughout the US)
    e. https://www.gofundme.com/
5. Select a grant or fundraising opportunity that meets your budget, timeline, and goal(s).
6. Divvy up the application form so small teams work on each section (e.g. description, budget, in-kind match, partner letters of support.) Designate one team to review the document and make sure the overall proposal is strong.
7. Let others know about your efforts and ideas through newspaper articles, announcements in the school newsletter, social media, etc. If the grant does not come through, there might be other sources out there willing to help make your ideas come true.

RESOURCES

Upper Valley and Regional Resources

- **Advance Transit** is a free transit system connecting the Upper Valley.
- **Efficiency Vermont** is a program that provides objective advice, technical services, and financial support to Vermonters interested in energy efficiency.
- **Green Mountain Power's Renewable Energy Center** is an outdoor education center in Rutland, VT, with a solar farm, wind testing tower, educational placards, and a hydro station.
- These trails in the Upper Valley can provide an alternative to driving:
  - **Ascutney Trails Alliance**
  - **Upper Valley Trails Alliance**
  - **Woodstock Area Mountain Bike Association**
- **Traveling in the Upper Valley** has lots of ideas to get around the Upper Valley without a personal vehicle.
- **Vermont Energy Education Program** and **New Hampshire Energy Education Program** help Vermont and New Hampshire students, teachers, and school communities build a deep understanding of energy and climate with interactive workshops, equipment, and action programs.
- **Vital Communities' Energy Program** provides local news and resources about energy efficiency in the Upper Valley.
- **Vital Communities' Towns and Schools Program** is a local initiative aiming to reduce traffic and find alternative ways of getting to and from school.

Equity-Focused Resources

- ***Virunga*** (2014, documentary film) follows the efforts of park rangers in the Congo's Virunga National Park to protect gorillas from a number of threats, including an encroaching oil company.
- ***Catching the Sun*** (2015, documentary film) is about the growth of the solar industry and how clean energy can coexist with economic prosperity.
- ***Demain (Tomorrow)*** (2015) is a French documentary film that investigates how to build a sustainable future with a realistic but hopeful attitude.
- **Environmental Justice and Climate Justice** is an explainer from the NAACP about how environmental and climate justice issues are civil rights issues.

- **"How Much Land Does it Take to Power the World?"** (2021) is a TED-Ed video that compares and contrasts the land use of various forms of power generation.
- **People vs. Pipeline** (2022, documentary film) follows the historic lobbying by Canadian and US land defenders to stop the proposed Keystone XL pipeline.
- **WindowDressers** supplies, trains, and supports teams of community volunteers to improve the warmth and comfort of interior spaces, lower heating costs, and reduce carbon dioxide pollution by producing low-cost insulating window inserts that function as custom, interior-mounted storm windows.

Other Edcuational Resources

- **5 Ways to Make Cities More Walkable** gives you just what it says: ideas from transportation experts Kittelson and Associates, a firm based in Portland, OR, about how to make cities more walkable.
- ***Breaking Boundaries: The Science of Our Planet*** (2021, documentary film), narrated by David Attenborough, investigates the nine planetary boundaries currently keeping Earth at habitable homeostasis and how we are blowing through those boundaries.
- **Building A Bicycle Friendly Neighborhood: A Guide for Community Leaders** is a resource from a Washington, DC–based organization that provides sound advice on how to build a biking community.
- **Climate Action Tracker** gives countries grades on how well they are or are not achieving climate goals.
- **En-Roads: Interactive Energy Predictor Tool** is a free online simulator that allows anyone to test and explore cross-sector climate solutions.
- **Fossil Fuels for Kids** (2019) is a 12-minute video describing the origins and implications of fossil fuels for a young audience.
- **Greenpoint Eco Schools Sustainability Toolkit** shares the story of a Brooklyn school integrating a strong sustainability program and provides resources for other schools, teachers, and families.
- **GreenPrint** is a sustainability roadmap for schools created by Green Schools National Network.
- **Green Strides** provides "tools to green your school." Created by the Department of Education and The Center for Green Schools at the US Green Building Council.
- **Living Schoolyard Activity Guide** by Green Schoolyards America contains over a hundred activities for using the schoolyard as an intentional educational space.
- **Our World in Data: Fossil Fuels** is an interactive, data-filled dashboard where you can see trends in energy consumption.
- **Our World in Data: What Are the Safest and Cleanest Sources of Energy?** uses data to show renewable and nuclear energy are much safer and cleaner than fossil fuels.

- **The Power Reset** (2021) is a short documentary film that tells the story of the town of Wunsiedel, Germany, and its decision to reinvent itself as a renewable energy hub.
- **People vs. Pipeline** (2022, documentary film) follows the historic lobbying by Canadian and US land defenders to stop the proposed Keystone XL pipeline.
- **WindowDressers** supplies, trains, and supports teams of community volunteers to improve the warmth and comfort of interior spaces, lower heating costs, and reduce carbon dioxide pollution by producing low-cost insulating window inserts that function as custom, interior-mounted storm windows.
- **Project Drawdown** can be used to research climate solutions for issues that you have identified in your community.
- **School Energy Audit** is an activity originally designed by the National Energy Education Development Project in the U.S. Department of Energy. It leads students through calculating energy usage at their school.
- **Sustainable Transportation and Fuels** from the federal Department of Energy provides an overview of the basics of sustainable transportation and fuels.
- **Vermont Safe Routes to School & Bike Smart** offers a program designed to help students safely walk and bike to school, with the purpose of developing student independence, improving academic performance, reducing traffic congestion and air pollution, and creating stronger communities.

Potential Funding Sources

- **Energy Efficiency and Renewable Energy Resources for Rural K–12 School Energy Managers and Educators,** from the US Department of Energy, provides ideas for how rural schools can become more efficient and switch to renewable energy. It also lists a variety of ways to obtain funding for these types of projects.
- **Getting to Green: Paying for Green Infrastructure** is a guide written by the EPA about financing options and resources for local decision makers.
- **A Green New Deal for K-12 Public Schools** is a report that illustrates the need for more holistically sustainable schools and proposes the funding needed to do so.
- **Green Power Partnership** is a program developed by the EPA to encourage companies and organizations to voluntarily switch to green energy sources.
- **Summary of Inflation Reduction Act Provisions Related to Renewable Energy** is a page on the EPA's website that summarizes information in the Inflation Reduction Act related to renewable energy project tax provisions.
- **Wellborn Ecology Fund School-Based Project Grants** awards grants of up to $5,000. Based in the Upper Connecticut River Valley, this organization is focused on increasing place-based ecology education for children and youth.

DON'T SAY GOODBYE

As we reach the end of this guide, we hope it has ignited a spark within you—a spark of inspiration and determination to engage in equitable climate action. The journey we have embarked upon together is just the beginning, a stepping stone towards a more sustainable and just future.

Equitable climate action requires the collective efforts of educators, students, and community members. It calls for a deep commitment to understanding the intersectionality of climate change and social justice, and a willingness to challenge the status quo. It is through our shared dedication that we can shape the Upper Valley. And it starts with small steps that can build and add up to something bigger. That's one of the main points we're trying to reinforce in this publication.

As you take the knowledge and ideas presented here, we encourage you to adapt and tailor them to your unique context. Embrace the local resources and opportunities that surround you. Empower your students to become changemakers, equipped with the tools and insights to transform their communities and contribute to a global movement for positive change.

The path of equitable climate action will be challenging, but it is a path of regenerative possibilities and hope. Each step you take, however small, creates ripples of impact that extend far beyond the boundaries of your classroom. And remember, you are not alone in this endeavor. Reach out to your students, colleagues, or one of the many, many organizations listed in this guide to get the support you need.

Thank you for your commitment to equitable climate action, and may your efforts, in collaboration with others, bring about a future where climate resilience becomes a reality. We are looking forward to getting REAL about climate change with you—and having some fun along the way!

APPENDICES

APPENDIX I: AUTHOR BIOS

Joan Haley, Ed.D. Joan's passion is equity-centered climate change education and creating supportive and meaningful partnerships for sustainability. Joan has a Bachelor of Science in Economics from the University of Michigan; a Master of Science in Environmental Science and a Master in Public Administration from the School for Public and Environmental Affairs at Indiana University; and a Doctorate in Education from Northeastern University, with a focus on individual and collective efficacy for climate resilience. After joining the U.S. Peace Corps in Honduras and falling in love with environmental education, Joan worked nationally and internationally for several years for the North American Association for Environmental Education (NAAEE) and the Smithsonian Institution, developing professional learning programs for formal and non-formal educators and eventually serving as Interim Director for NAAEE. After moving to Vermont with her growing family, she focused more locally on engaging educators through place-based learning programs and currently serves as the Director of Education Partnerships for Shelburne Farms with the National Park Service. She co-founded Park for Every Classroom and the Upper Valley Teaching Place Collaborative, co-created the Wellborn Place Based Ecology Education Institute, the Climate Resiliency Fellowship, Super Junior Rangers, Boots to Boat Educator Journey, and co-facilitates the GLOBE and Forest for Every Classroom programs. She's happiest outside.

Michael Duffin, Ph.D. is a co-founder of PEER Associates. He specialized in program evaluation and environmental sustainability in Antioch University's Ph.D. in Leadership and Organizational Change program. Michael has worked as an educator, administrator, and/or evaluator in the field of environmental education since 1991. His work has focused on using qualitative and quantitative evaluation and research tools and processes to promote organizational learning in public agencies, philanthropic foundations, K-12 schools, and nonprofit advocacy settings. Favorite clients have included big organizations and projects like the National Park Service, US Environmental Protection Agency, National Geographic, and The Climate Initiative, as well as smaller scale efforts with Shelburne Farms, Vermont Energy Education Project, and Antioch University New England's Nature Based Early Childhood Initiative. You may bump into Michael on a long thru hike, the soccer field, or a tennis court.

Andrew Powers is a co-founder of PEER Associates and has dedicated over two decades to supporting clients who work tirelessly to make a positive impact on the world. He finds inspiration and meaning in their stories of the on-the-ground effort of working towards a sustainable future. Together with Michael Duffin, Andrew aims to make evaluation a valuable but fun process for their clients, helping them enhance their efforts driven by useful data and insights. With a passion for new technologies, Andrew explores innovative ways to collect and analyze data, seeking to stay abreast of emerging trends. In his spare time, he likes to build parts of houses and things for houses using rustic and salvaged materials, embracing the beauty and variability of reused and undervalued resources.

Cassandra Mathelier, LMSW is an Equitable Climate Action Consultant with a background in horticulture and nature-based therapeutic interventions for youth. She has a passion for engaging social and environmental issues from a holistic and collaborative perspective. She is a founding member of Columbia University School of Social Work Environmental Justice Caucus and continues to engage in relevant projects with the goal of empowering people to collaborate and innovate novel solutions to social and environmental issues. She is a practicing psychotherapist with a background in environmental studies and earth science. She is a LMSW, who earned her Master of Social Work from Columbia University and a Bachelor of Arts from Vassar College. In her spare time, she enjoys puzzle-making, cooking elaborate meals, and spending time outdoors with loved ones.

Aaron Cinquemani, Ed.D. is an accomplished educator with a Doctorate in Education and over 14 years of experience in public education. Throughout his career, he has made significant contributions as a leader, demonstrating a deep commitment to fostering educational excellence and student success. With a passion for creating positive learning environments, his leadership skills and ability to effectively collaborate with teachers, parents, and community stakeholders have been instrumental in creating a supportive and inclusive school culture. Dr. Cinquemani's expertise in educational administration, curriculum development, and staff professional development has earned him a reputation for excellence and a track record of success. He believes in the power of continuous learning and stays abreast of the latest educational trends and best practices, ensuring that his schools remain at the forefront of educational innovation. Dr. Aaron Cinquemani's unwavering dedication to education, combined with his wealth of experience and expertise, has positively impacted the lives of countless students, educators, and communities. His commitment to fostering educational excellence continues to inspire and empower others in their pursuit of academic and personal growth.

APPENDIX II: EQUITY IN THE CLASSROOM

As you discuss what an equitable future looks like and feels like with students, it is important to model the same values and ambitions in your classroom and help students practice them through their own interactions.

Here are some ideas for developing a more equitable classroom environment:

- Get comfortable with feedback. Ask students what is working and isn't about the structure, the facilitation, the content, the learning experience, and the curriculum. Make it anonymous sometimes. Give them opportunities to make choices and make collective decisions.
- If there is a student in your class who has an identity that is less common within the classroom, whether it be race, class, religion, sexuality, socioeconomic status, ability, nationality, or anything else, be conscious about avoiding tokenizing them with actions such as requesting for them to share their ideas or experience about the topic without their proactive and enthusiastic interest in doing so. Tokenism can also occur when teachers or students defer to the individual to fact check assumptions about their identity, expect the individual to speak on behalf of all the people who share the same identity or culture, or share comments that reinforce expectations of the student to display behaviors, qualities, or ideas which are stereotypically associated with their identity or culture. A simple statement to acknowledge diversity of experience and thought within all identities and cultures can go a long way for setting the tone on classroom culture and expectations.
- Offer opportunities for the shy kids in your class to talk in smaller groups or in pairs, to write in notebooks, or to type up their ideas in written form. Then ask them if they are comfortable sharing out loud. Encourage them by keeping them within a healthy zone of growth with scaffolded and incremental levels of comfort with public speaking.
- Move the desks around. For group discussions, get into a large circle, a few circles for smaller groups, or have desks facing each other. Play around with different structures. Get input on what works and what doesn't.
- Consider different learning styles by offering a mix of visual, auditory, kinesthetic, and writing components in the curriculum.
- Be aware of power dynamics and acknowledge the biases and privileges that affect your point of view, and encourage students to consider their own perspectives and biases, as well.

- Encourage students to adopt a growth mindset when they face challenges and celebrate their strengths, no matter how small. A kind word of genuine admiration goes such a long way to developing self-esteem and a sense of efficacy.
- When an offensive comment is made or when harm occurs in the classroom environment, take some time to repair the harm by calling out the issues, offering students the opportunity to process their thoughts and talk about their experiences. Then have them agree upon a reasonable action to resolve the issue. Depending on how severe the conflict or harm is, the solution may not necessarily fully repair the relationship, and that is okay, too, so long as there is genuine agreement on a resulting path forward.
- Conflict and tension are okay. Create opportunities to move around and relax. Even if it may look or seem unproductive, it can go a long way towards having a class of emotionally relaxed students prepared to engage in deep discussion. Fun is okay too. Yes, it's important to think deeply about these topics, and yes we are discussing pressing matters that have gone unaddressed for too long. Still, hopefully the point of the work towards equity and climate change mitigation and adaptation is to live in a world where people still thrive and laugh. So, in the midst of these projects, it makes sense to model how happiness and joy and silliness can exist in tandem with responsible and good work. Within the allowances of your project's parameters, consider building in a little time for something creative—maybe just some time to chill out, or do something outside under the sun. Don't forget to have an end of project celebration. Do something (even if it is relatively small) to celebrate and appreciate every single person involved and the collective effort of the group.

APPENDIX III: PRODUCTIVE PHRASES TO ENHANCE GROUP CONVERSATION

"Raise your words, not your voice. It is rain that grows flowers, not thunder."
—Rumi

Engaging in deep conversations can be a great way for students to explore and exchange meaningful ideas for equitable climate action. Below are ten productive phrases students can use to foster deep conversations:

- "What are your thoughts on [topic]?" This open-ended question encourages the other person to share their perspectives and promotes dialogue.
- "I'd love to hear more about your viewpoint on this." Expressing genuine interest in someone's opinion can lead to deeper discussions and a better understanding of their perspective.
- "Can you provide an example to illustrate your point?" Asking for specific examples can help clarify ideas and make the conversation more concrete.
- "What do you think the implications of this are?" Encouraging critical thinking about the consequences and broader significance of a topic can lead to deeper analysis and exploration.
- "How does this relate to what we've learned before?" Drawing connections between current discussions and past knowledge can help build a more comprehensive understanding and foster deeper thinking.
- "Do you think there are any alternative perspectives we should consider?" Encouraging consideration of different viewpoints can broaden the conversation and promote critical thinking.
- "What are the underlying assumptions or values behind this argument?" Exploring the underlying assumptions or values can help uncover hidden biases and provide a deeper understanding of the topic.
- "What evidence or research supports your point of view?" Encouraging the use of evidence and research can promote a more evidence-based and informed conversation.
- "How might this topic impact society or individuals in different ways?" Encouraging exploration of the broader societal or individual impacts of a topic can lead to deeper discussions on its significance.
- "What are the potential counterarguments or objections to this perspective?" Encouraging consideration of opposing viewpoints helps to foster critical thinking and a more well-rounded discussion.

Remember, the key to having a deep conversation is active listening, being respectful, and allowing space for others to express their thoughts and ideas.

APPENDIX IV: ALIGNING WITH STANDARDS

The Next Generation Science Standards (NGSS), the C3 guidelines for social studies, and the Common Core for Math and English language arts all offer excellent opportunities to support climate stewardship. Following are some general thoughts about how to effectively use these curricular resources.

Use NGSS or similar science standards to scaffold scientific and engineering practices (e.g., planning and conducting investigations, data analysis and interpretation, designing solutions) that support climate literacy. Follow the Earth and Human Activity scope and sequence to learn specifically about climate change. Emphasize the NGSS practice "Arguing with Evidence" to foster informed student self-expression and efficacy.

Help students practice making connections by incorporating NGSS cross-cutting concepts into the curriculum, focusing on "Systems and System Models." Use inquiry-based instruction to spark connections and curiosity. Work with students to diagram the pieces, patterns, and processes (Kolan and Poleman, 2009) of the climate change topic under study to encourage systems-thinking and identification of leverage points. This will help students see how they can make a difference.

Equitable climate action also aligns with the Common Core State Standards. By addressing climate change through the lens of equity, students can explore a wide range of subjects while developing critical thinking skills and global citizenship. In English Language Arts, students can engage in research, reading, and writing activities to analyze the impacts of climate change on marginalized communities and propose solutions. Math lessons can incorporate data analysis, modeling, and problem-solving related to climate science and policy. Equitable climate action in education not only fosters environmental literacy but also cultivates empathy, collaboration, and a sense of responsibility, nurturing well-rounded individuals ready to tackle the challenges of a changing world.

To take NGSS standards and/or the Common Core State Standards' to the action level, you can cite C3's Dimension of "Taking Informed Action" to demonstrate your alignment with standards. This action step will help students practice working toward substantiated solutions. You can use *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming* (Hawken, 2017) or see Drawdown.org to research ranked and documented climate solutions to help inform your climate action.