The School Guide to Climate Education

An Interdisciplinary Framework for School-Wide Implementation

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PREFACE

In an era defined by environmental challenges and the urgent need for sustainability, the role of education is crucial. Teachers stand at the forefront of shaping the perspectives and actions of future generations. It is imperative to equip them with the necessary tools and knowledge to effectively teach about climate change and environmental stewardship.

This teacher training guide delves into the importance of providing teachers with robust professional development opportunities focused on climate education. By investing in teacher training, we not only empower educators to navigate complex scientific concepts but also enable them to foster critical thinking, empathy, and action among their students. Supporting teachers in this capacity enhances their confidence and efficacy in addressing environmental issues within the classroom. Over 4 sessions, teachers will learn about the 3 Pillars of Climate Education and embed the framework into their lessons.

WHAT IS CLIMATE EDUCATION?

CLIMATE EDUCATION: A COMPREHENSIVE OVERVIEW

Climate education is an essential, cross-disciplinary approach that integrates subjects such as math, civics, economics, history, arts, and STEM to address the multifaceted nature of climate change. It emphasizes the interconnectedness of climate systems with everyday life, aiming to help students understand and connect personally to climate issues. By focusing on how climate change disproportionately affects historically marginalized communities, this approach empowers students to advocate for and take action in the global climate crisis.

HISTORICAL CONTEXT

The roots of environmental education can be traced back to the Enlightenment, with thinkers like Jean Jacques Rousseau advocating for the study of nature. The movement evolved significantly during the 1930s with the Conservation Education Movement in the United States, which responded to the environmental crisis of the Dust Bowl. By 1970, environmental activism had gained momentum, marked by the first Earth Day, which saw millions advocating to protect our planet.

Key legislative milestones in the U.S. include the National Environmental Policy Act of 1969 and the National Environmental Education Act of 1970, which led to the creation of the Office of Environmental Education. The subsequent decades saw the establishment of the National Environmental Education Act of 1990, emphasizing the need for national leadership in environmental literacy.

International efforts also played a crucial role. Conferences organized by UNESCO and UNEP in the late 20th and early 21st centuries, such as the 1977 Tbilisi conference and the 1997 Thessaloniki conference, highlighted the global recognition of the importance of environmental education. These events laid the groundwork for incorporating sustainability and climate change into educational curricula.

MODERN DEVELOPMENTS IN CLIMATE EDUCATION

In the U.S., the Next Generation Science Standards (NGSS) introduced in 2013 marked a significant step towards integrating climate change education into the science curriculum. These standards advocate for teaching man-made climate change starting in fifth grade, although their adoption varies across states and districts and is typically limited to the science classroom.

Globally, the need for comprehensive climate education is acknowledged. The National Oceanic and Atmospheric Association (NOAA) produced the "Climate Literacy: The Essential Principles of Climate Sciences" guide, which serves as a valuable resource for science educators. However, there is a recognized gap in supporting materials for non-STEM subjects.

OF EDUCATORS **DO NOT TEACH CLIMATE EDUCATION** IN THEIR CLASSES BECAUSE THEY DO NOT BELIEVE IT ALIGNS WITH THEIR SUBJECT

OF TEACHERS SURVEYED SAID THEY HAD RECEIVED **FORMAL PROFESSIONAL DEVELOPMENT** RELATED TO CLIMATE CHANGE AND SUSTAINABILITY

INTERDISCIPLINARY APPROACH

Effective climate education requires integration across all subjects. Science classes typically cover greenhouse gas emissions and global temperature rises, but subjects such as English, civics, economics, and history also play crucial roles. For instance, students might explore climate refugee stories in English classes, consider advocacy methods in civics, examine inequalities exacerbated by climate change in economics, and understand the impact of plastics on greenhouse gas emissions in earth science.

This interdisciplinary approach ensures that climate education is not confined to science classes alone, but is embedded throughout the K-12 curriculum. This strategy equips students with a comprehensive understanding of the climate crisis and its societal impacts, fostering the development of well-rounded solutions.

TEACHER TRAINING AND RESOURCES

Despite the recognized importance of climate education, many educators report a lack of formal training and resources. Surveys reveal that a significant portion of teachers across various subjects are self-training to include climate change topics in their classes. There is a strong demand for professional development and curriculum guidelines that support climate education across all subjects.

Grassroots efforts by teachers in Oregon and New York to incorporate climate education into their teaching shows that climate education is not something that is only coming from legislators; those in the classroom see the need. These initiatives highlight the creativity and dedication of educators in addressing climate issues, even in the absence of formal support.

CONCLUSION

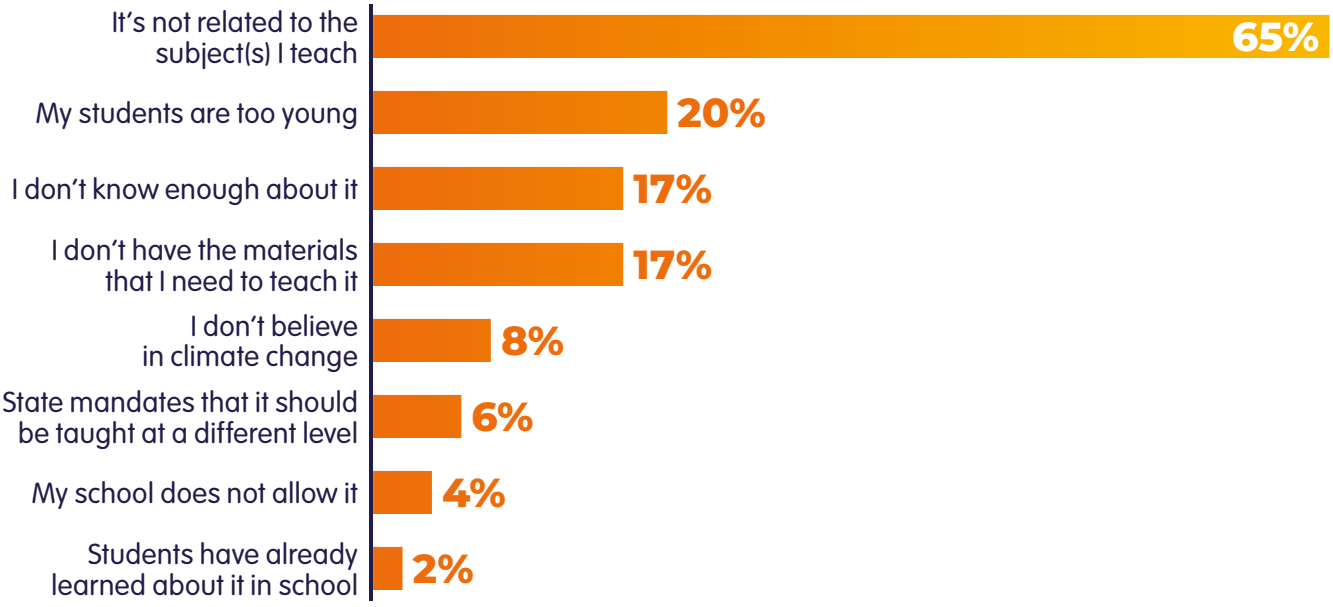
Climate education is a critical component of preparing students to address the pressing issue of climate change. By integrating climate topics across all subjects and grade levels, educators can provide students with the knowledge and skills needed to understand and combat the climate crisis. This comprehensive approach ensures that climate education is not limited to science classes but is recognized as a vital part of a well-rounded education.

WHY DO WE NEED TO TEACH CLIMATE EDUCATION?

The Why of Climate Education: Enhancing Mental Well-Being, Green Muscle Memory, and Climate Solutions: Green Skills and Technology:

Climate education is not just about imparting knowledge; it's about equipping students with the tools and understanding to navigate and mitigate the challenges posed by climate change. The rationale for incorporating an interdisciplinary climate education approach is rooted in three core pillars: Climate Mental Well-Being, Green Muscle Memory, and Climate Solutions: Green Skills and Technology. These pillars provide a comprehensive framework for why climate education matters and how it benefits individuals and society overall.

SURVEY: REASONS TEACHERS DON'T TEACH CLIMATE CHANGE



Source: Poll of 505 teachers. This question was asked of the 55% of teachers who said that they do not teach climate change. Respondents could select up to three answers. "Other" and "Don't know" responses not shown.

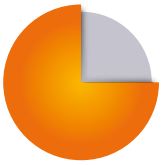
3 PILLARS OF EFFECTIVE CLIMATE EDUCATION

1. CLIMATE MENTAL WELL-BEING

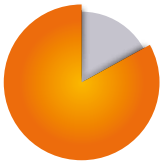
ADDRESSING CLIMATE ANXIETY

Students today are increasingly experiencing climate anxiety — a profound distress about the impacts of climate change — which can become overwhelming and debilitating. A landmark survey by Bath University across 10 countries found that two-thirds of young people aged 16–25 feel sad, afraid, and anxious about climate change, with 56% believing humanity is doomed. This sense of fear and helplessness is exacerbated by inconsistent, age-inappropriate, and often alarmist information.

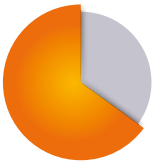
SURVEY: 10,000 YOUNG PEOPLE (16–25 YEARS), FROM 10 COUNTRIES RESPONDED



75% SAY THE FUTURE IS **FRIGHTENING**

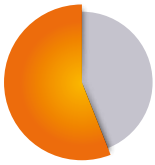


83% SAY PEOPLE HAVE **FAILED TO CARE** FOR THE PLANET



65% SAY **GOVERNMENTS ARE FAILING** YOUNG PEOPLE

40% SAY THEY ARE **HESITANT** TO HAVE **CHILDREN**



56% SAY HUMANITY IS **DOOMED**

ROLE OF CLIMATE EDUCATION IN MENTAL HEALTH

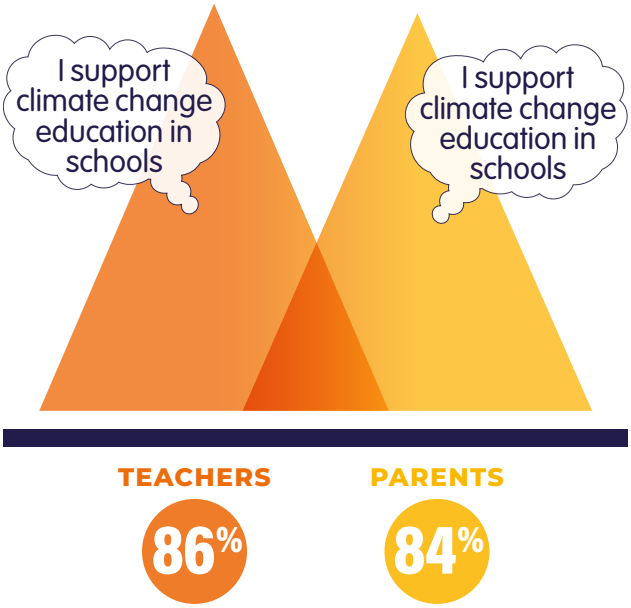
Climate education can alleviate this anxiety by providing structured, accurate, and hopeful information. When students understand the complexities of climate change and learn about actionable solutions, it helps mitigate feelings of helplessness. Embedding social-emotional learning (SEL) within climate education equips students with the emotional skills to manage their anxieties, fostering resilience and agency.

BENEFITS OF SOCIAL-EMOTIONAL LEARNING (SEL)

SEL helps students develop emotional intelligence, manage their emotions, and build supportive relationships. Integrating SEL into climate education can:

- Develop coping skills to alleviate climate anxiety.
- Strengthen problem-solving abilities related to environmental issues.
- Foster resilience and a sense of agency to take action against climate change.

Teaching climate justice and equity through SEL promotes empathy and understanding, enhancing both mental well-being and environmental stewardship. This dual focus benefits students' mental health by providing avenues for activism and a sense of belonging, particularly for marginalized youth. Research shows that adolescents using meaning-focused coping strategies in the context of climate change experience greater life satisfaction, optimism, and pro-environmental behavior.



2. GREEN MUSCLE MEMORY

DEVELOPING INSTINCTIVE GREEN BEHAVIORS

Green muscle memory refers to the development of environmentally friendly behaviors that become second nature through education and repetition. Just as students learn to wear seatbelts or sunscreen through repeated education, climate education can instill sustainable habits that reduce carbon emissions.

CONSISTENCY ACROSS ALL SUBJECTS

To create green muscle memory, climate education must be integrated across all subjects from Kindergarten through graduation. Consistent exposure to climate-related topics helps students internalize the importance of sustainable behaviors, making these actions instinctive.

IMPACT ON BEHAVIOR AND EMISSIONS

Research supports the idea that climate education leads to measurable behavioral changes. For example, following Greta Thunberg's climate protests, 30% of Swiss residents reported changing their transportation, buying, and recycling habits. A university-level climate change course significantly reduced individual carbon emissions by approximately 2.86 tons of CO_2 per year per student.

A 2020 study from San José State University found that if 16% of secondary school students worldwide studied climate change, it could cut nearly 19 gigatons of CO_2 by 2050, equivalent to removing emissions from nearly 80 million homes. These findings underscore the potential of climate education to drive substantial environmental change.

NETWORK EFFECTS OF GREEN MUSCLE MEMORY

Students' environmentally friendly behaviors can influence their peers, families, and communities, creating a ripple effect that extends beyond individual actions. As future architects, city planners, and business leaders, students with ingrained green muscle memory will make sustainable decisions that collectively have a significant impact on the planet.

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3. CLIMATE SOLUTIONS: GREEN SKILLS AND TECHNOLOGY

ECONOMIC OPPORTUNITIES IN THE GREEN SECTOR

The transition to a green economy presents vast economic opportunities. The global push for renewable energy and sustainable technologies is creating new industries and jobs. For instance, Oxford Economics projects that the shift to a net-zero emissions environment by 2050 will add $10.3 trillion to the global economy.

PUBLIC AND PRIVATE INVESTMENTS

Governments worldwide are investing heavily in the green economy. The U.S. Inflation Reduction Act, the EU Green Deal, and China's investments in renewables and battery technology are driving public and private investments, creating a competitive market for green jobs.

PREPARING STUDENTS FOR THE GREEN WORKFORCE

Climate education prepares students for careers in the burgeoning green economy by teaching them the necessary skills and knowledge to adapt and thrive in such an economy. This education must be universally accessible, ensuring that students across the Global South also have opportunities to participate in and benefit from the green economy.

SKILLS DEVELOPMENT FOR FUTURE JOBS

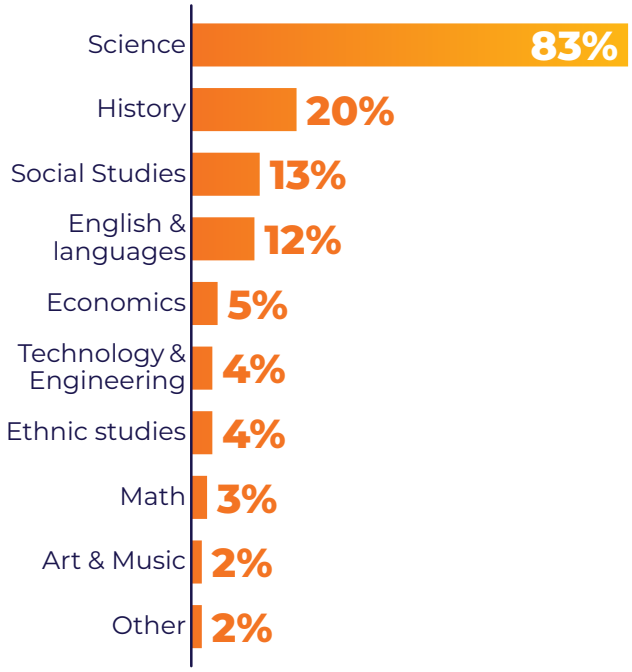
The World Economic Forum's Davos Labs Youth Recovery Plan found that many young people feel unprepared for careers in the green economy. To address this, climate education should introduce students to green job options early, helping them make informed career choices. Research indicates that students with a better understanding of fields such as STEM are more likely to pursue related careers. Given that 91% of teenagers believe they know what career they want, early exposure to green economy jobs is crucial.

HISTORICAL CONTEXT AND EDUCATIONAL CHANGE

LESSONS FROM THE PAST

Historical changes in education, such as the Industrial Revolution and the Space Race, demonstrate how external demands can drive educational reform. The need for climate education parallels past initiatives, like computer literacy, which evolved from a narrow focus to an integrated part of all subjects. This historical context illustrates the potential for climate education to become a fundamental component of modern curricula.

SURVEY: CLASSES IN WHICH STUDENTS LEARN ABOUT CLIMATE CHANGE



THE ROLE OF STAKEHOLDERS

Successful implementation of climate education requires collaboration among key stakeholders, including students, educators, educational leaders, policymakers, and businesses. Emphasizing the economic advantages and the necessity of an interdisciplinary approach in climate education can help garner the support needed to integrate ita standard part of K-12 education.

Incorporating climate education into the curriculum is essential for addressing climate anxiety, developing green muscle memory, and preparing students for the green economy. By understanding the “why” behind climate education, educators can more effectively implement comprehensive, interdisciplinary climate education lessons into their curriculum that benefits all students.

DEVELOP A CLIMATE LITERATE LESSON

GUIDE TO FACILITATION

The guide will provide background information on climate change and include instructional strategies for integrating climate change topics across various subjects and grade levels, emphasizing interdisciplinary approaches and critical thinking skills. Through this guide, educators will be better prepared to inspire and guide the next generation toward a sustainable and resilient future.

- Pre-Survey or Questionnaire
- Session 1: Social Emotional Well-Being
  - Climate Education Session Slides
  - Teacher Handouts
- Session 2: Green Muscle Memory
  - Teacher Handouts
- Session 3: Climate Solutions: Green Skills and Technology
  - Teacher Handouts
- Session 4: Reflection

PRE-SURVEY OR QUESTIONNAIRE

0=none/never | 5=excellent/always | Make an "X" in the box

1. How would you rate your current understanding of climate education?

0	1	2	3	4	5

2. How often do you include climate change in your lessons?

0	1	2	3	4	5

3. Do you feel like you could teach a lesson on climate change in your classroom right now?

0	1	2	3	4	5

4. In your opinion, what are the biggest challenges in integrating climate change education into your curriculum?

5. What additional supports are needed to integrate climate education into your classroom successfully?

CLIMATE MENTAL WELLNESS

PART 1. PREPARE

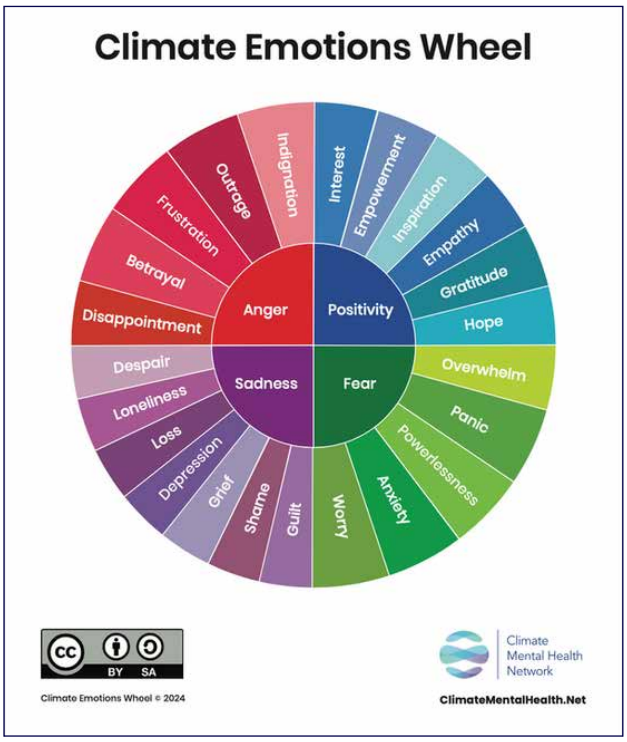
Take a look at the climate emotions wheel. There are many emotions within the four basic emotion categories. Self-awareness gives students a deeper understanding by naming the specific emotions that climate change can elicit. Identify your feelings about climate change to relate to your students.

Name 3 emotions you have about climate change.

_____

_____

_____



Now, answer these follow-up questions about the three emotions you identified with the most.

1. Do you have more negative or positive emotions about climate? Why do you think your emotions lean that way?
2. Why do you think it's important for students to understand their own emotions about climate change?
3. How can we use student emotions to create a deeper connection to the content?

PART 2: REVISE

Use the following questions to guide you in rewriting a lesson. To answer these questions, you need a lesson you previously taught and feel comfortable modifying to provide a climate change lens.

1. Using the table below, pick 1–2 areas to focus on within your lesson. Why did you choose to focus on these areas with your students?

SOCIAL EMOTIONAL LEARNING SKILLS	
Self-awareness	Understanding one's own emotions
Social awareness	Understanding others' feelings, using empathy and sympathy to connect
Self-management	Regulating emotions to work through problems and find solutions
Decision making	Using problem-solving skills to think through solutions to find outcomes that work best for all
Relationship building	Making connections through shared interests

Framework based on CASEL Social Emotional Learning

2. How can your lesson objectives, background knowledge, vocabulary, and lesson steps incorporate two or more of the following climate words: Positive, optimistic, hopeful, action, and solution-oriented?
3. Do my students have time to reflect on their learning, individually and with their peers, before, during, and after the lesson?

   Example: "Before the lesson, students will turn and talk with a partner about what they think climate change looks like in their community."

4. How can the learning objectives promote student creativity and solution-focused student outcomes?
5. How can students' unique voices be highlighted and celebrated after the lesson?

PART 3: REFLECT

Looking at your revised lesson from part 2, answer these follow-up questions.

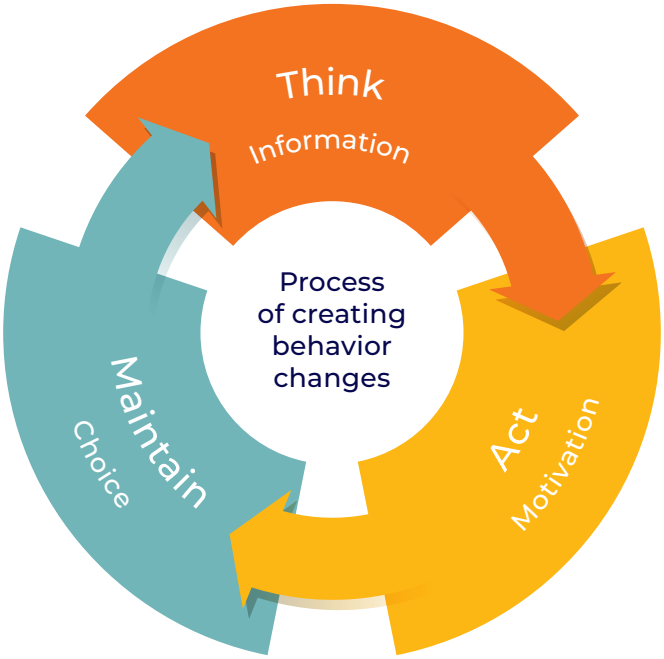
1. How effectively did I integrate opportunities for students to express their emotional responses to climate change within the lesson?
2. What unexpected student inquiries arose during the lesson?
3. What additional resources would be helpful to enrich this lesson going forward?

GREEN MUSCLE MEMORY

PART 1: PREPARE

Think about what makes habits successful. What steps are needed to make those changes, and what does consistency look like?

To frame this session, examine the three components of the **Green Muscle Memory** Infographic.



THINK: Present information about a problem and analyze areas within your daily life that can be improved to alleviate a specific issue.

ACT: Develop students' intrinsic motivation. Students need to be authentically motivated to change their behaviors.

MAINTAIN: Encourage consistent choices that reflect living sustainably.

Answer the following questions to prepare for rewriting a climate-literate lesson emphasizing green behavior changes.

1. What information do you need to present to students for them to start making environmentally conscious choices?
2. How can I make meaningful content connections so students feel intrinsically motivated to act?
3. How can I support my students in maintaining sustainable habits?

PART 2: REVISE

After looking at how we can **THINK**, **ACT**, and **MAINTAIN** to make sustainable behavioral changes, use the following questions to guide you through rewriting a lesson. To answer these questions, you need a lesson you previously taught and feel comfortable modifying to provide a climate change lens.

1. How can your lesson objectives, background knowledge, and vocabulary incorporate a positive mindset toward sustainable practices?
2. How can my students and I reflect meaningfully on our current environmental behaviors to encourage change and growth?
3. What extension activities can students be presented with to help them apply their knowledge and make sustainable choices?
4. How will you keep yourself and your students accountable for changing your behaviors?
5. Students applying their understanding outside the classroom will have a more significant impact on creating lasting sustainable behaviors. How can students implement their learning outcomes outside the classroom?

PART 3: REFLECT

Looking at your revised lesson from part 2, answer these follow-up questions.

1. How effectively did I incorporate objectives throughout the lesson to reinforce green muscle memory concepts?
2. What unexpected student inquiries arose during the lesson?
3. How will students reflect on their behavior changes after the lesson?

CLIMATE SOLUTIONS: GREEN SKILLS AND TECHNOLOGY

PART 1: PREPARE

Consider technology's positive impact on your life, inside and outside the classroom, and respond to the following questions.

What technology makes sustainability easier in your daily life?

How effectively did I integrate opportunities for students to use technology throughout the lesson?

What interests do your students have in technology? How can you connect their interests to solving the climate crisis?

PART 2: REVISE

Use the following questions to rewrite your lesson to create a solution-focused lesson incorporating technology. To answer these questions, you need a lesson you previously taught and feel comfortable modifying to provide a climate change lens.

1. How can lesson objectives, background knowledge, and vocabulary emphasize the development and application of skills necessary for students to apply what they've learned?
2. What opportunities exist for students to apply their knowledge before, during, and after the lesson?
3. How can learning outcomes incorporate creativity and innovation?
4. When considering solutions as part of the learning outcomes, during and after the lesson, when do students have the opportunity to apply and analyze what they are learning?
5. Given the importance of peer conversations in understanding a concept, how can I create opportunities for students to engage with their peers?

PART 3: REFLECT

Looking at your revised lesson from part 2, answer the following questions.

1. Was I successful in providing my students with a solution-focused approach to the climate crisis?
2. How effectively did I integrate opportunities for students to use technology throughout the lesson?
3. Was the sharing of student outcomes effective? How did students share their solutions with classmates, the school, and the community? What would you do differently if you could make changes to the end-of-lesson and post-lesson activities?

SESSION 4: REFLECTION

POST-SURVEY OR QUESTIONNAIRE

0=none/never | 5= excellent/always | Make an "X" in the box

1. How would you rate your current understanding of climate education?

0	1	2	3	4	5

2. How often do you include climate change in your lessons?

0	1	2	3	4	5

3. Do you feel like you could teach a lesson on climate change in your classroom right now?

0	1	2	3	4	5

4. In your opinion, what are the biggest challenges in integrating climate change education into your curriculum?

5. What additional supports are needed to integrate climate education into your classroom successfully?

BLANK LESSON TEMPLATE

	Original Lesson	Climate Literate Lesson
Student Learning Objectives:		
Vocabulary:		
Materials:		
Before Lesson:		
During Lesson:		
End of Lesson:		
After Lesson:		

EARTH DAY SHOWCASE

Students will have the opportunity to show what they have learned around a theme chosen by the teacher. The four themes are important for combating climate change.

OVERVIEW

Following the completion of the teacher training, teachers will choose a climate change topic from the topics listed below. Over the course of the semester, teachers will work schoolwide, grade level, or classroom level to:

- Choose a topic with their students
- Follow the resources given by EDO to complete the project-based learning activity
- Students will conduct research on the topic
- Students will create a solution-based project on the chosen topic
- Showcase student solutions, community-wide, on Earth Day
- Students will receive a certificate of completion

TOPIC OVERVIEW AND RESOURCES

Students will conduct research on 1 of the 4 topics provided. Within each topic, students will choose a focus area to guide their solution-based research project.

Plastics Students will research:	A Human health B Ocean and Waterways C Single-Use Plastics	**Fast Fashion** Students will research:	A Fast Fashion Waste B Fashion Materials C Regulations
Reforestation Students will research:	A Restorative Techniques B Carbon Sequestration C Biodiversity Loss	**Foodprints** Students will research:	A Production B Distribution C Consumption

TOPIC OVERVIEW	
Plastics	**Background Information:** Students will research one of the topics: Plastic Waste, Human Health, or Plastics in Oceans.
	Resources: Student Guide
	Action: Sign the Global Plastics Treaty with EARTHDAY.ORG
Reforestation	**Background Information:** Students will research how reforestation can combat biodiversity loss, carbon emissions, create resilient communities and have a positive economic benefit. Students will come up with a solution to support one of these important parts of reforestation.
	Resources: Student Guide
	Action: Sign up to be a part of The Canopy Project with EARTHDAY.ORG
Fast Fashion	**Background Information:** Students will research one of the topics in fast fashion, fashion waste, fashion materials, or regulations. Students will then come up with a more sustainable option for reducing fast fashion.
	Resources : Student Guide
	Action: Sign the The Fashion Industry Must Change Petition with EARTHDAY.ORG
Foodprints	**Background Information:** Students will research one of the levels of the food system, either production, distribution, or consumption. Students will then decide on solutions to reduce waste and make more sustainable food choices.
	Resources: Student Guide
	Action: Take the Sustainable Food Pledge with EARTHDAY.ORG

PLASTICS

Directions: Select which topic you will be researching:

☐ Human Health ☐ Oceans and Waterways ☐ Single-Use Plastics

Fact 1:	Fact 4:
Fact 2:	Fact 5:
Fact 3:	Fact 6:
Directions: Come up with 3 ideas for solutions and provide supporting research.	
Solution 1:	Research:
Solution 2:	Research:
Solution 3:	Research:

REFORESTATION

Directions: Select which topic you will be researching:

☐ Restorative Techniques ☐ Carbon Sequestration ☐ Biodiversity Loss

Fact 1:	Fact 4:
Fact 2:	Fact 5:
Fact 3:	Fact 6:
Directions: Come up with 3 ideas for solutions and provide supporting research.	
Solution 1:	Research:
Solution 2:	Research:
Solution 3:	Research:

FAST FASHION

Directions: Select which topic you will be researching:

☐ Fast Fashion Waste ☐ Fashion Materials ☐ Regulations

Fact 1:	Fact 4:
Fact 2:	Fact 5:
Fact 3:	Fact 6:
Directions: Come up with 3 ideas for solutions and provide supporting research.	
Solution 1:	Research:
Solution 2:	Research:
Solution 3:	Research:

FOODPRINTS

Directions: Select which topic you will be researching:

☐ Production ☐ Distribution ☐ Consumption

Fact 1:	Fact 4:
Fact 2:	Fact 5:
Fact 3:	Fact 6:
Directions: Come up with 3 ideas for solutions and provide supporting research.	
Solution 1:	Research:
Solution 2:	Research:
Solution 3:	Research:

NEXT STEPS

TEACHER CERTIFICATE OF COMPLETION

CLIMATE EDUCATION INTO EVERYDAY CURRICULUM CERTIFICATE OF COMPLETION

Download Certificate of Completion: Show your commitment to climate education by downloading the certificate of completion HERE

ADVOCATE FOR CLIMATE EDUCATION

Continue Advocating for Climate Education through:

- **Community Engagement: Partner With Your Community Groups**

  Work with local organizations, environmental groups, or policymakers to advocate for broader climate education initiatives in schools and communities.

- **Global Engagement: Be an Earth Day Representative**

  Be a part of a network of educators who support climate education across 120+ countries.

- **Policy: Advocate Through The Legislative Process**

  Advocate for state or federal policies that support climate education, such as funding for curriculum development, teacher training, or educational resources.

EARTHDAY.ORG REPRESENTATIVES

Be a part of the original Earth Day community by signing up your school to be an Earth Day School today.

RESPONSIBILITIES OF AN EARTH DAY REPRESENTATIVE

- Register HERE or on the Climate Education Page at EARTHDAY.ORG
- Use EARTHDAY.ORG's mission to bring sustainability actions to schools and students
- Host an Earth Day Showcase for Earth Day 2025