

Regreening



*HUMANS HAVE TRIGGERED  
EARTH'S OWN CYCLES OF WARMING—  
IS IT TOO LATE TO STOP THEM?*

# CLIMATE EMERGENCY: FEEDBACK LOOPS



MOVING STILL PRODUCTIONS, INC. PRESENTS "CLIMATE EMERGENCY: FEEDBACK LOOPS"

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JOURNEYS IN FILM™  
educating for global understanding



# About *Journeys in Film*

Journeys in Film is a 501(c)(3) nonprofit organization that amplifies the storytelling power of film to educate the most visually literate generation in history. We believe that teaching with film has the power to help educate our next generation with a richer understanding of the diverse and complex world in which we live.

We transform entertainment media into educational media by designing and publishing cost-free, educational resources for teachers to accompany carefully chosen feature films and documentaries while meeting mandated standards in all core subjects. Selected films are used as springboards for lesson plans in subjects like math, science, language arts, social studies and more. Our resources support various learning styles, promote literacy, transport students around the globe, and foster learning that meets core academic objectives.

In addition to general subject areas, Journeys in Film's programs engage students in meaningful examinations of human rights, poverty and hunger, stereotyping and racism, environmental issues, global health, immigration, and gender roles. Our teaching methods are successful in broadening perspectives, teaching for global competency, encouraging empathy, and building new paradigms for best practices in education. We seek to inspire educators, school administrators, community members and home-schooling parents to use our innovative curriculum to capture the imagination and curiosity of their students.

We also develop discussion guides for films that don't necessarily lend themselves to academic standards but cover topics and themes that are valuable for classroom discussions and in other settings, such as after school clubs, community screenings, and college classes.

*Journeys in Film* is a 501(c)(3) nonprofit organization.

## Why use this program?

In an age when literacy means familiarity with images as much as text and a screen has become a new kind of page, 21st-century students are more connected to media than any previous generation.

This offers educators unprecedented opportunities to engage students in learning about a variety of subjects and issues of global significance. Films, television, documentaries, and other media platforms can provide an immediate, immersive window to a better understanding of the world and matters affecting all of us.

We teach our students literature that originated from all around the world, but we tend to forget that what often spurs the imagination is both visual and auditory. Films evoke emotion and can liven up the classroom, bringing energy to a course. We believe in the power of films to open our minds, inspire us to learn more, provide a bridge to better understanding the major issues of 21st-century concern, and compel us to make a difference.

When properly used, films can be a powerful educational tool in developing critical thinking skills and exposure to different perspectives. Students travel through these characters and their stories: They drink tea with an Iranian family in *Children of Heaven*, play soccer in a Tibetan monastery in *The Cup*, find themselves in the conflict between urban grandson and rural grandmother in South Korea in *The Way Home*, and watch the ways modernity challenges Maori traditions in New Zealand in *Whale Rider*. Journeys in Film brings outstanding and socially relevant documentaries to the classroom that teach about a broad range of social issues in real-life settings, such as famine-stricken and war-torn Somalia, a maximum-security prison in Alabama, and a World War II concentration camp near Prague. They explore complex and important topics like race and gender. Students tour an African school with a Nobel Prize-winning teenager in *He Named Me Malala* and experience the transformative power of music in *The Music of Strangers: Yo-Yo Ma & the Silk Road Ensemble* and *Landfill Harmonic*.

Our hope is that this generation of youth will contribute to the betterment of humankind through kindness and understanding, together with scientific knowledge to help solve some of the world's most pressing issues.

Our goal is to create relevant and engaging curricula and programming around media that encourage cross-cultural understanding, empathy, and knowledge of the people and environments around the world. We aim to prepare today's youth to live and work as globally informed, media-literate, and competent citizens.

# Why We Must Act Now



“We’re reaching the stage in the heating of the earth when fundamental systems are disrupted: the jet stream, the Gulf Stream, even the way the planet reflects and absorbs sunlight. As these five films will make clear to all who view them, we are kicking off feedback loops beyond our ability to control—once we’ve melted the Arctic no one has a plan for refreezing it; the great forest fires pour ever more carbon into an already overloaded atmosphere. We’ve run out of margin—we must act now to stop the burning of fossil fuel that lies at the bottom of this cascading crisis.”

—Bill McKibben, author, environmentalist, and co-founder of anti-carbon campaign group [350.org](http://350.org)

“The global average temperature continues to set new records. Extreme heat waves and intense droughts now affect much of the globe, damaging agriculture and facilitating wildfires. Simultaneously some regions are experiencing extreme storms, precipitation, and flooding. These specific changes were anticipated by some scientists 40 years ago, but the changes were not supposed to happen until 2100 or later. Why now? The direct warming has melted reflective ice and snow and released additional heat trapping gases from permafrost and other lands. These feedbacks have amplified the warming and disrupted the climate decades to a century sooner than anticipated. We can unwind this accelerating downward spiral by rapidly reducing heat trapping gases and by allowing more forests and other natural systems that are already removing 31% of our annual emissions each year to accumulate additional carbon out of the atmosphere. This will eventually slow global warming and diminish the feedbacks, facilitating the return to a more benign climate. The feedback loop videos identify four major feedbacks and clearly demonstrate how they interact to accelerate further warming and increase the resulting climate change consequences.”

— William Moomaw, Professor Emeritus, The Fletcher School, Tufts University  
Lead author of the Nobel Prize-winning Intergovernmental Panel on Climate Change

# Introducing *Climate Emergency: Feedback Loops*

The five short films of *Climate Emergency: Feedback Loops* were released in 2021, a year after one of the hottest years on record. In 2020, the Earth experienced a range of extreme weather that may have finally caught the attention of policy-makers:

- A Siberian heat wave set temperature records in excess of 100 degrees Fahrenheit within the Arctic Circle.
- Wildfires ravaged the western United States and Australia.
- The Atlantic hurricane season, with an extraordinary 30 named storms, caused over \$46 billion in damages to property.
- The area of Arctic sea ice was at a record low.
- Super Typhoon Goni hit the Philippines with sustained winds of 195 miles per hour.
- Monsoon flooding in China destroyed or damaged 1.4 million homes and businesses.

Extreme as these events were, scientists are even more worried about the Earth's natural feedback loops that have the potential to create even more disastrous weather events. According to an article in *Scientific American*, "...catastrophic climate change could render a significant portion of the Earth uninhabitable consequent to continued high emissions, self-reinforcing climate feedback loops and looming tipping points."<sup>1</sup>

What is a feedback loop? Feedback loops are a continuous system in which a change in one (or more) parts of the system act to influence the rest of the system, either positively (increasing the effects of the system) or negatively (decreasing the effects of the system). A positive feedback loop is a circular chain of events that can amplify a change within a system. In a negative feedback loop, series of events dampen the change within the system, helping make it more stable.

<sup>1</sup> <https://www.scientificamerican.com/article/the-climate-emergency-2020-in-review/>

The five films of *Climate Emergency: Feedback Loops* use stunning video, interviews with leading climate scientists, and thoughtful narration by Richard Gere to educate the viewer on key feedback loops greatly accelerating climate change. The "Introduction" film drives home the point that human activity is increasing global warming and leading to climate change. It explains the concept of feedback loops and shows briefly how this concept applies to forests, atmosphere, permafrost, and albedo.

"Forests" explains that the world's trees have long served as a "carbon sink," removing carbon dioxide from the air, storing carbon in wood, leaves, branches, and trees' soils, and in turn releasing water vapor and oxygen. The shrinking of forests, due to human activities like logging and clearing areas for agriculture, means that less carbon is captured and global temperatures increase.

In the video "Permafrost," the viewer learns that this area of frozen ground, which covers about a quarter of the Northern Hemisphere, stores massive amounts of carbon underground. As it begins to thaw, microscopic animals are waking and feeding on frozen vegetation and animals and then releasing more gases into the atmosphere, creating additional warming.

"Atmosphere" deals with warming that is altering the Earth's weather pattern and making extreme weather events more common. Even the jet stream is being affected, resulting in warmer weather moving north and stalling for longer periods of time, with consequent changes in rainfall patterns and flooding.

"Albedo" refers to the ability of Arctic ice to reflect the sun's rays and temper their warming effect. However, the volume of ice is decreasing; it has shrunk 75% in the past forty years,



and consequently the albedo effect has diminished. The Arctic may soon be ice-free in the summer.

Taken together, these five short films make the case that time is running out to prevent catastrophic climate change, change that could result in the extinction of whole species and drastically affect human societies. Unless we demand and implement dramatic changes, the Earth will reach a “tipping point” from which there is no return.

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## **Climate Emergency: Regreening Lesson**

(Environmental Science, Service Learning)

# Regreening the Earth

### Enduring Understandings

- The climate crisis, magnified by feedback loops, is impacting the Earth and will continue to impact and endanger life in the future unless actions are taken to reverse the causes of the crisis immediately.
- There are multiple ways to alleviate these issues, and many organizations and individuals are currently working around the world to bring about a regreening of the Earth. Creative solutions will be needed to reverse the damage already caused.
- Students can impact the world around them in both large and small ways.

### Essential Questions

- What does it mean to regreen the Earth?
- Who is trying to regreen? What are they doing? What impacts are they having?
- What is one way that students can participate in bringing about environmental change locally and globally?

### Notes to the Teacher

Analysis of feedback loops shows us how the environment replicates both positive and negative phenomena to intensify solutions and failures. While one problem can cause many more, one solution can also trigger many others. What are some possible action steps humans can take? The films from *Climate Emergency: Feedback Loops* stress the need to act now, and students will be challenged to do that in this lesson as they carry out a research project that is designed to help them regreen the Earth.

In 2015, the journal *Science* estimated that there were approximately 3 trillion trees on the planet. A 2019 follow-up found that there was room for approximately 1 trillion more. The generally accepted key to regreening the Earth is maintaining existing forested areas and adding more trees. While any kind of green space is helpful, trees sustainably absorb carbon over time. Action in this lesson will be focused on ways to regreen locally to contribute to regreening globally.

This lesson will introduce students to possible solutions to global warming that have been suggested or implemented by young environmental activists. Students will learn more deeply about one of the solutions, be asked to explore and evaluate its outcomes, brainstorm ways to enhance the solution, and participate in implementing one of these processes.

In Part 1 of this lesson, students consider what is meant by “regreening” the Earth. They brainstorm a list of the reasons for climate change based on the films from *Climate Emergency: Feedback Loops*, and they consider how they could have an impact on one or more of these issues in their own community.



Part 2 introduces students to young activists around the globe. **Handout 1** is a chart designed for students to record information about these young people. Students will need access to the Internet to complete it. Once it is completed, students consider the impact of these teen activists and consider whether any of their efforts could be applied to the community your students live in. Student groups complete **Handout 2** to formulate an action plan and present their plan to the group.

In Part 3, students plan a viable project that they can carry out in their community. They outline their goals and generate a list of steps they will have to take. They consider what resources and permissions they will need and think about possible partnerships that would help them meet their objectives.

Prior to teaching the lesson, teachers should photocopy handouts, reserve library/computer lab space if required for using Internet-connected devices, and talk with their school librarian about any resources that students may use to complete their handouts and prepare for their presentations. The implementation of the solution may require additional resources depending on the project students choose, and therefore the teacher may also wish to talk with school or local officials about resources that can be made available to students. If resources are limited, teachers are encouraged to provide parameters to students up front. Students can then plan creatively within these limitations.

The time required for carrying out the project will vary widely based on the project selected. Teachers may wish to provide specific options that will best fit the time allowed; if more time is available, teachers may wish to allow students more agency in determining the direction and scope of the project.

Some additional resources for you and your students are:

<https://www.nrdc.org/stories/global-warming-101>

<https://www.rock-your-world.org/environment>

<https://www.un.org/en/climatechange/youth-in-action>

It is vitally important that students not feel discouraged or hopeless as they contemplate the feedback loops that are accelerating climate change. In addition to Lesson 5, you may wish to encourage them to explore Project Drawdown (<https://drawdown.org/>). “Drawdown” is defined on this website as “the future point in time when levels of greenhouse gases in the atmosphere stop climbing and start to steadily decline.” This non-profit organization reviews and evaluates potential climate solutions, advances communication about such solutions, and works with partners to accelerate climate solutions. Your students will find many suggestions here for ways in which climate change can be slowed or stopped.

Laurie David and Heather Reisman’s *Imagine It: A Handbook for a Happier Planet* (New York: Rodale Books, 2020) provides suggestions for individuals and families to change their own habits in order to reduce their use of natural resources.

### Common Core Standards addressed by this lesson

#### **CCSS.ELA-LITERACY.CCRA.SL.1**

Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

#### **CCSS.ELA-LITERACY.CCRA.SL.4**

Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

#### **CCSS.ELA-LITERACY.CCRA.W.8**

Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.

#### **CCSS.ELA-LITERACY.CCRA.R.1**

Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

### Duration of Lesson

This is a three-part lesson. The first two parts make up the research and presentation components and require three to four hours of class time. If only three hours are available, work may need to be assigned as homework. The third part includes planning and implementation of the regreening project and will add additional time to the lesson, depending on the extent and goals of the project. If there are resource or time limitations, explain those at the beginning of Part 2.

### Assessments

- Class discussions
- Handouts
- Group presentations
- Project outcomes
- Reflection

### Materials

- Climate Emergency: Feedback Loops* films
- Access to library or devices with Internet connection for research
- Handout 1: Young Environmental Activists**
- Handout 2: Problem Profile**
- Handout 3: Regreen Your World**



## Procedure

### Part 1: What does it mean to “regreen the Earth”?

1. Prior to watching the films, ask students what they think the term “regreen” means. After they have responded, share that according to the Merriam-Webster Dictionary, to regreen means “to make green again, *especially*: to restore (barren, degraded, or deforested land) to a healthy ecological state by planting vegetation (such as trees, shrubs, grasses, or sustainable crops) often in conjunction with improvements in soil fertility and water retention.” Write this definition on the board and discuss it to be sure students understand it completely.

2. After viewing the *Feedback Loops* films, ask students to identify the causes of global warming noted throughout the films. Brainstorm a list on the board. Are there other issues that were implied but not directly referenced in the film? Add these issues to the list. If you notice there are causes missing, or to expand your list, ask students to use their devices to research causes of global warming. The brainstormed list should include at least the following:

- Deforestation
- Reliance on fossil fuels
- Greenhouse effect
- Industrial practices
- Transportation
- Agricultural practices
- Consumer practices
- Pollution
- Humans’ lack of desire to change

3. As a class, discuss which of these causes students believe they can impact and how much they can impact them. Students should consider the livelihoods that are most important in their local communities, as well as their ability to reach people within and beyond their school. Consider the ways in which regreening the Earth would impact their

community. What changes would have to happen to limit their production of greenhouse gases, for example? After the discussion, make a list of the causes and rank them according to where students believe they have the most impact to those where they believe they could have the least.

### Part 2: Who is trying to regreen? What are they doing? What impacts are they having?

1. Tell students that you are going to introduce them to young people who may have thought they had a limited voice and small impact, but who are now known for their environmental activism. Distribute copies of **Handout 1: Young Environmental Activists** and give students time to research each of the activists. You may wish to divide the students into research teams or give this as an assignment for them to complete for homework.

2. Lead a discussion with the following questions: How did each of these young activists impact their community, region, country, continent, world? What actions have they taken to regreen the world? Discuss the kind of results they have had. How long did it take them to achieve these results?

3. Ask students if any of these activists’ solutions to regreening the world seem possible for students to replicate or learn from to regreen your own community. What would be required to do that? Create groups of 3–5 students. Ask each group to choose one of the youth activists and consider how their work could be adapted to work in your school or community.

4. Using the Internet, ask students to begin their research on ways to regreen their school or community. Distribute copies of **Handout 2: Problem Profile** to create a basic plan for this work. (If students need additional time, the work in steps 3 and 4 can be completed as homework or in an additional class period.)



5. When students have had sufficient time to work out a plan, direct each team to prepare a two- to four-minute presentation based on the worksheet. Schedule time for each group to present.

Part 3: How do YOU want to change the world? What is one way that students can participate in the regreening of the Earth?

1. Jigsaw students into groups of 6–8 so that there are people from several groups represented. Discuss the presentations and decide on a project to carry out. Give students the choice to accept a project as it was presented, modify a project and use it, take parts from multiple projects and combine them, or create a new solution altogether that was inspired by one or more presentations. The goal is to create a project that regreens AND contributes to a positive feedback loop.

2. Direct each group to complete **Handout 3: Regreen Your World**. Unless your goal is to create a long-term program, require students to consider a project that can be completed by the group in the time you have allotted.

3. As groups consider where their efforts would be best applied, encourage them to consider the following questions: What resources will they need? Do they have the access to those resources? Students should consider if the resources that they have access to are sufficient to carry out their project. If the answer is no, then they need to develop a different idea.

4. Have each group present its idea to the class. Then, as a class, discuss whether the plan can be executed with the time and resources that are available. Develop consensus around one plan where there are available resources, the ability to contribute to a positive feedback loop, and student enthusiasm. Appoint student leaders and develop committees tasked with completing specific tasks. Use **Handout 3** to guide work on the project, paying specific attention to the goals and outcomes in order to ensure that the project stays on target.

5. Once the project is complete, ask each student to write a reflection on their work within the group and on the project outcomes. Do they feel that they made a difference? Are they inspired to do more? How important is continuing this work for them?



**Climate Emergency: Regreening Lesson**
*(Environmental Science, Service Learning)*

## Young Environmental Activists

Directions: Complete the chart for each student activist. If you find resources that are specifically helpful, add them in the Notes section to use in the next part of this lesson.

Name	Organization	Actions	Notes
Yusuf Baluch			
Kehkashan Basu			
Felix Finkbeiner			
Sarah Goody			
Isra Hirsi			
Ann Makosinski			
Xiuhtezcatl Martinez			
Autumn Peltier			
Greta Thunberg			
Melati and Isabel Wijsen			

***Climate Emergency: Regreening Lesson***

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## Problem Profile

Provide answers that are as specific as possible.

Names of research team members:

Using the work of a youth activist as inspiration, describe a project that the class could complete to help regreen the Earth.

What are the most successful methods the activist used? Did they need help from another organization to get the resources they needed to make a difference? What can you learn from this for your project?

Are there parts of their work that you think you could use in your project? Why? What are they? Are there things that you don't think would work? Why? What are they?

What resources will you need to complete your project?

What steps would you need to take to complete this project? Be specific.

How will this project contribute to the greening of the Earth?

How will you measure your success?

Now use this information to prepare a two- to four-minute presentation on your proposal.

## Handout 3

### *Climate Emergency: Regreening Lesson*

*(Environmental Science, Service Learning)*

# Regreen Your World

It's now time to carry out a project of your own that will help to regreen the Earth. As you learned in the *Feedback Loop* films, it is necessary for us to take immediate action to stop the destructive feedback loops that are currently present throughout the world.

Based on the solutions you heard groups propose, what is your plan for regreening your world? (Remember that you may choose to accept any single plan or to modify or create other plans based on what you have learned in this process.)

What resources will you need to complete your project?

How can you secure access to these resources? Be creative as you consider the answer to this question. Remember that you may use resources from within your school or from local governments and environmental groups as well as from organizations created by the youth activists you studied in the research part of this project.



Do you need to seek permission or a local partnership before you begin? If yes, who will do this?

How will you know that you have successfully completed the project? What are your target outcomes?

What steps will need to be taken to complete the project? Include specific tasks. You may need to continue on a separate sheet.

Be ready to discuss your plan with the class.

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