The Climate Initiative

# Our Beautiful Planet

## Community Activity and Discussion Guide

## In Search of NITROGEN

KIKIM MEDIA

# WELCOME

We hope this discussion guide sparks conversation surrounding climate change, including the problems we face and the solutions we might find.

The collection of Our Beautiful Planet videos are a beacon of hope in the face of a real and catastrophic issue. We hope that this discussion guide for In Search of Nitrogen will educate you on solutions and inspire curiosity and grassroots action. But to do this, we need to encourage more conversations regarding climate change, which is why we've created this guide.

This is a global problem, but by working together to save the places we love... WE can be the solution.


## We Hope These Films Inspire You to:

- Learn More
- Find Creative Solutions
- Take Action

# A letter from TCI

We face more severe weather, wildfires, warming oceans, and changing habitats as we launch into this new decade. The science behind climate change is indisputable and is no longer a down-the-line consequence or only affecting others in a place far away. We know from scientists that this decade is paramount in addressing climate change before it is too late. We are facing a crisis, not only in our country but globally. Yet, we struggle to talk about what is happening. We feel powerless to make the changes necessary to alter our trajectory.

***How do we as communities figure out how to save what we love and what we value before it is too late?***

At The Climate Initiative (TCI), we know that we can start a movement by engaging communities locally and connecting them with what they love and value. We believe that all voices are necessary and powerful for an effective climate movement, especially youth. TCI encourages youth to lead their communities to act locally and think globally.

We want to empower individuals to use their circles of influence to create collective action to solve climate change. By engaging all voices, grassroots movements can grow, influencing others and shifting policy. Throughout our history, our nation has overcome insurmountable obstacles through grassroots movements. Our history tells us that when a few are passionate and live by their beliefs, they can start a movement that creates real change.

Intended to engage people in climate change science without leaving them hopeless, Our Beautiful Planet is a collection of short films featuring scientists. These scientists discuss their research and possible solutions while communicating the impact of climate change in our communities. Our discussion guide provides the structure and the opportunity for discussions and activities around these film topics.

Our hope is for community members, students, and business and conservation leaders to discover their community places at risk and transition that small-scale understanding to a larger, global perspective. Communities will find solutions by listening, engaging, and collaborating to combat climate change in their town while at the same time seeing how to make an impact globally.

The more effectively we communicate both the science and social aspects of mitigating climate change, the faster we can create powerful policies to combat the ticking clock.

We hope that these discussions and films will inspire the next generation of climate scientists, climate solutions, and community adaptations that create a better future for everyone.

By bonding together, we can collectively decide that future!

**Leia Lowery**
**TCI Director of Programs & Outreach**

# A letter from Kikim Media

From roaming dust storms to underwater kelp farms...from mosquito habitats to the diets of cows…Our Beautiful Planet is a series of films that takes viewers on a journey with a diverse group of scientists researching unique windows into how we can understand and combat climate change.

Today, all of us on this planet are confronting the sobering consequences of climate change. Bigger hurricanes and forest fires. Radical shifts in weather and temperature that can and will disrupt our ability to grow food. Rising sea levels that threaten—within just a few decades—to make the world's coastal cities uninhabitable.

But we're far from helpless. We have a powerful tool at our disposal that can help us to understand climate change, find ways to adapt to it, and perhaps even slow it down.

That tool is science.

Our Beautiful Planet is our new series of short climate films that are constructed in a style designed to appeal to a broad general audience. At a time when we so badly need it, the public's relationship with science is seriously flawed. Many people flat-out distrust science or get confused and bogged down in misinformation. Part of the problem is the difficulty that scientists have in communicating with the public. Our Beautiful Planet helps to cut through this confusion by presenting research and scientific solutions to climate change in an accessible way. This is done by using less jargon and presenting interesting stories about scientists who are ordinary people, their passions for science, and the research they are doing which creates opportunities for striking back against climate change.

Kikim Media is partnering on Our Beautiful Planet with The Climate Initiative (TCI) and the National Science Teaching Association (NSTA), which has produced supporting materials that will help teachers use these films in classrooms across the country. Not only is Our Beautiful Planet intended to help improve American science education by exposing students to what it's like to actually do science, we also hope it will inspire a future generation to consider their own scientific careers.

Our Beautiful Planet doesn't simply present the challenges of climate change as all doom and gloom. Our goal is to excite viewers through the various solutions that scientists are investigating across a myriad of fields of study. No one person, no one answer will stop climate change in its tracks. The solution will be a combined effort, and we hope that our film series will galvanize others to do their part to keep our planet beautiful.

With hope,

**Kiki Kapany** **Producer**
**Edward Gray** **Writer and Director**
**Alyn Divine** **Co Producer**
**David Evans** **Former Executive Director of NSTA**

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# How to Use the Guide

**This discussion guide starts needed conversations and opens the door for brainstorming necessary actions to move forward. Learning about new challenges and possible solutions helps move people toward climate action. By encouraging community conversations, we inspire future scientists and create the opportunity for actionable change.**

**We hope to build a groundswell of knowledge and ideas critical to creating a grassroots movement that can influence the larger region, nation, and world with every discussion.**

## This guide is set up to help facilitate community conversations about Our Beautiful Planet.

**In this guide you will find:**

- Suggestions on how to use the videos
- Suggestions on identifying and engaging stakeholders
- Strategies to have meaningful conversations
- A variety of questions to inspire conversations from multiple perspectives
- Activities and exercises to inspire deeper conversations
- Information about how to run a fishbowl (for a larger audience)
- Follow-up activities to spark action

## About The Series

Our Beautiful Planet is a fascinating new series highlighting work that climate scientists around the country are doing to solve some of the world's most pressing issues. These dedicated scientists seek to better understand and plan for the realities of our changing climate. Their answers are sometimes found in somewhat surprising and unexpected places using cutting-edge technology and innovative problem-solving.

Our series lets viewers see essential fieldwork conducted today, taking the science out of the classroom and into the real world. These compelling stories will not only teach our viewers crucial scientific principles, but we hope to inspire them to use science to examine the issues affecting their communities.

# About the Films

## In Search of Nitrogen

**When scientists in the early 20th century discovered how to manufacture this nitrogen-based compound—ammonia, it was hailed as one of history's greatest achievements. That's because it is such a powerful fertilizer. It delivers nitrogen, an element that's vital to plants, in a form they can use. Without manufactured ammonia, farmers could not grow anywhere near enough food to feed the world's 8 billion people. Unfortunately, ammonia fertilizer has become so widely used that it's now causing grave damage to the environment. The problem is nitrogen pollution—and Stanford University chemical engineer Will Tarpeh is determined to take it on.**

## Liquid Gold

Each year, farmers must produce a staggering amount of food to meet the demand of a rising global population. Ammonia is a critical ingredient in the fertilizers that enable farmers to grow the enormous amount of food that's needed to feed the world's 8 billion people. But the factories that manufacture the ammonia used in fertilizers are a major source of planet-warming carbon dioxide. Will Tarpeh, a chemical engineer at Stanford University, is developing a groundbreaking technology to tap into an unlikely new source of nitrogen for fertilizer: ammonia contained in human waste.

## Mosquito Menace

Considered to be the deadliest animals on earth, mosquitos kill hundreds of thousands of people and make millions more sick every year. The diseases they transmit have long been most common in the warmest parts of the world. But with average temperatures rising everywhere due to climate change, does that mean that all of us may soon be facing a greater risk for these diseases? Stanford University biologist Erin Mordecai is attempting to answer this question in order to help people anticipate which mosquito-borne disease risks are likely to increase in a particular region and which are more likely to decrease.

## After the Flames

As higher average temperatures dry out plants and trees and make them more combustible, wildfires are becoming bigger and more frequent in many countries. That means that their consequences—such as floods and mudslides—also promise to become a more frequent threat. Amir AghaKouchak, a professor of engineering at UC Irvine, is determined to find ways for scientists to anticipate these kinds of events so that people will know what's about to happen and be able to avoid as much damage as possible.

## Dust Rising

With their howling winds and thick yellow clouds, dust storms can be terrifying. Here in the U.S. we don't hear that much about them. But in parts of the world that experience them frequently, people dread their arrival. They can clog the air with so many particles that it becomes hard to see and even harder to breathe. People who are regularly exposed to airborne dust become more susceptible to respiratory diseases. But as the world becomes hotter, will dust storms become a more frequent threat in many more parts of the world? That's the question that brings atmospheric scientist Amato Evan and his research team from UC San Diego out to this research station in the Southern California desert.

# About the Films

## The Search Beneath the Sea

The Maine seacoast is an iconic hotspot, full of beautiful landscapes, crisp ocean views, and coastal fishing communities. However, off the shores, those beautiful landscapes and coastal communities are facing challenging changes. The Gulf of Maine is warming three times faster than the global average and 99% faster than any other body of water its size. Find out why Oceanographer Charles Tilburg and his students from the University of New England are embarking on a data collecting journey. They collect data about "heat content" and how greenhouse gases affect the oceans on a large scale. They hope that this data will answer questions and provide answers to what is happening to the Gulf of Maine, and the future changes it faces. Will they inspire solutions and future scientists to help mitigate and adapt to a changing Ocean?

## Climate Secret of Cows

It may come as a surprise to you that one of the world's most loved agricultural animals, the cow, comes with a hefty environmental price tag. Cows and other ruminants release large amounts of methane into our atmosphere and at a greater rate than the world has ever seen before. Methane is 84 times more potent than CO2! Ermias Kebreab, a Professor of Animal Science at the Davis Campus of the University of California, is trying to figure out how to reduce methane emissions from cows by changing their diet. Could an unlikely food from the sea change how they digest?

## Sea Change

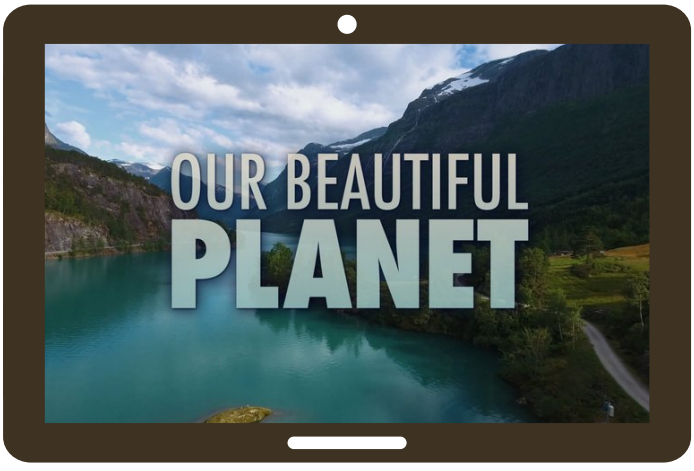
Oceans levels are rising, and we can see the effects now! Around the world, scientists are watching the Gulf of Maine. The Gulf of Maine is warming 3 times faster than the global average and 99% faster than any other body of water its size. As the water warms, its particles expand, amplifying the effects of sea-level rise. Scientists are trying to figure out why the Gulf of Maine is warming so fast. They want to spread the message that this is not just a problem for those on the Gulf of Maine, but a sign of a changed future for all of us! What can we learn from this scientist, and what can we do?

## The Superpowers of Seaweed

Our oceans are going through a historic change. As humans continue to burn fossil fuels, the oceans absorb one-third of the CO2 we put in our atmosphere resulting in acidification. The more acidic ocean water puts many of our beloved marine animals, especially shellfish, at risk. Follow the journey of two scientists: Susie Arnold of The Island Institute and her colleague, Nichole Price of Bigelow Laboratory for Ocean Sciences, as they try to help coastal communities cope with the results of ocean acidification. Many coastal communities rely on the fishing industry for their livelihoods; these changes could greatly affect their way of life. Through science and research, can these two scientists work with each other and local communities to protect Maine's marine life with the help of an unlikely plant friend?

## The Future of Shellfish

Markus Frederich, Professor of Marine Sciences at the University of New England, explores animal species "winners" and "losers" with climate change. Markus works and studies in the Gulf of Maine, where the temperatures are warming at an astonishingly fast pace. He also looks at the effects that it has on different shellfish. Sea creatures like the Green Crab, an invasive species on the Maine coast, are thriving in the warmer water. The American Lobster, a Maine native and driver of Maine's economy, thrive in colder waters. What does this mean for the aquatic inhabitants of the Gulf of Maine? Who wins and who loses, as climate change continues to change the waters and the landscapes of our coastal communities?



# How to Facilitate

## Ways to use the videos:

Our Beautiful Planet films educate about climate change issues and possible solutions. We hope that these films will start conversations about the changes facing communities right now and educate others on how, as a community, people can prepare for, mitigate, and adapt to the future. While these films look at specific issues in unique locations, we hope the discussions will encourage people to connect them with the broader issue of climate change. We also hope it encourages viewers to think globally, act locally, and possibly inspire future pioneers in science and climate solutions. After all, climate change is a global problem, but we can all be a part of the solution.

### Tips to Facilitate Productive Conversation

Climate change can be controversial. Just mentioning the words brings about different emotions for each individual. Explore the following resources to get a sense of how the nation and your community think and feel about climate change.

- Watch the film first and familiarize yourself with the information. With a better understanding, you will be able to facilitate better dialogue.
- At the beginning of the film, alert people to the end goal and subsequent conversation to ensure that discussions lead to the desired outcome.
- Communication about climate change is best when it uses local data, tells a story, and is rooted in place.
- Create an open atmosphere where all views are valued and heard.
- Identify different perspectives. It isn't about convincing people of your viewpoint but understanding multiple perspectives and finding sustainable solutions.
- Be a confident communicator and use an authentic voice, not abstract ideas.
- Encourage people to find common ground with whom they are talking.
- LISTEN, LISTEN, LISTEN. Most people want to feel heard. Feeling heard makes people less defensive and more open to conversation (you can use the listening exercise on pg. 13 before any discussion as a warm-up).
- Connection with each other is the key. Climate change ultimately is a human story; people identify with the world around them through the human experience, not only statistics.
- Speak only for yourself, and do not try to speak for others or in generalities.
- Climate change is a heavy topic. Try to end with hope, try having people imagine what their community or the world might look like if we solve the climate crisis. What about their lives might be better? What part in the solution might they play?

### Finding the Stakeholders

Stakeholders are people and organizations with a vested interest in the topic you are discussing. Stakeholders may be actively involved in the topic/project or will be positively/negatively affected due to the issue.

Determine who might know about changes in the community over time. Also, consider who can affect, or will be affected by, climate change.

Some examples might be:

- Town managers
- Town planners
- Business owners
- People living in an affected area
- School administration or facilities managers
- People who have lived in the town for many years with a historical perspective
- Land trusts or other environmental groups
- Youth environmental clubs or action groups
- Rotary
- Fire, police, EMS, and other safety workers
- Electricity companies
- Sustainable businesses
- People in the industry affected by the film

# Creative Ideas to Prompt Discussion

**These are some suggestions about ways to structure conversations about the movie. Choose prompts that best fit your audience, but encourage people to look at the topic from multiple perspectives.**

**Pre and Post-Film Questions to Spark Conversation**

This activity allows people to test what they have learned compared to what they previously believed. For some, the film will resonate with their predetermined thoughts, but there may have been a lack of awareness or different information that could spark conversation for others.

1. (Before) How do you think chemicals help food production, and why is this important?

(After) What did you learn? What surprised you that you didn't know before?

2. (Before) Do you think nitrogen is beneficial or detrimental to our environment? Why?

(After) After viewing the film, how is nitrogen beneficial and detrimental to our environment, and how can we address the downside?

3. (Before) Is nitrogen pollution a problem in your community?

(After) After seeing the film, can you think of places that might be at risk or are currently showing evidence of nitrogen pollution?

**Facts from the Film with Starter Questions:**

- By 1900, traditional sources of fertilizers through compost and manure were no longer enough to support the demand for food production due to our exploding population.
- Only 50% of the nitrogen in fertilizers ends up in the plants; the excess nitrogen ends up in our atmosphere as a greenhouse gas and runs off into rivers, lakes, and the ocean. When excess nitrogen goes into waterways, it can trigger algal blooms, sucking out all the oxygen from the water leading to eutrophication and fishkills.
- Electrochemical stripping is a new technique that zeroes in on nitrogen in the water and then extracts it to help remove nitrogen pollution.

What is your reaction to these facts that were in the film?

Do you feel most people know this information? What do you think would change if people understood this information?

What is the "dark side" of fertilizers mentioned in the film? How does nitrogen remain in the environment, and is that contributing further to global warming?

Who do you think benefits from producing excess amounts of nitrogen? What are potential solutions for nitrogen pollution?

Do you think Dr. Tarpeh's methods are an effective way to help fight nitrogen pollution? Why or why not? How might this process be accessible globally?

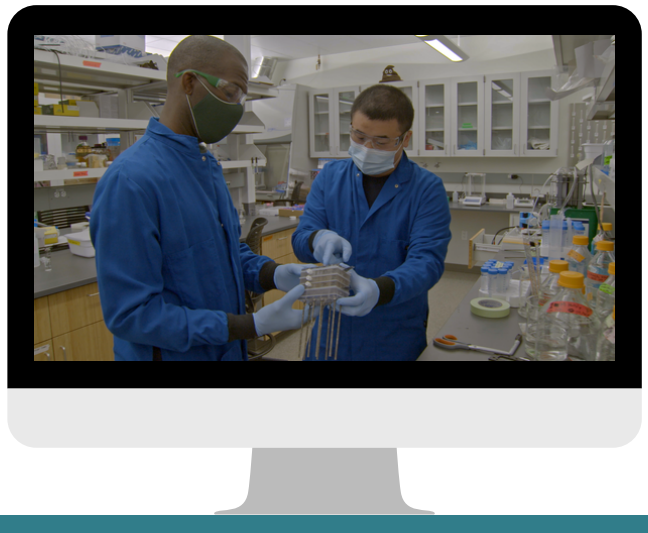
# Creative Ideas to Prompt Discussion

### Gauge Understanding by Linking to the Big Picture

- How is nitrogen both helpful for plants and yet harmful to the environment?
- Why was the discovery of manufactured ammonia significant?
- Can you think of any other current environmental solutions that utilize waste to create sustainable solutions?
- What products do you use in your house or does your town use in community spaces that have ammonia or nitrogen in them? Are there any visible consequences of these products?
- This film explained nitrogen pollution causing algal blooms in water. Is nitrogen pollution only affecting those who live on the coast or near a body of water? What effects might people who live away from a body of water see as a result of nitrogen pollution?
- How do algal blooms impact our food systems? What effect might that have on the most vulnerable populations?
- How does electrochemical stripping help with nitrogen pollution? What other climate change issues could electrochemical stripping help solve?

# General Questions and Conversation Starters

- This film is important because _____
- What is one thing in the film that piqued your interest? Or what did you find surprising?
- What were some of the unintended consequences of fertilizer production and use?
- This film talks about how by the early 1900s, compost and manure were no longer enough to support the food demand by the population. What other ways can food be produced sustainably to feed our growing population?
- What effect does the excess nitrogen have on our communities, and how might that affect people not directly related to agriculture?
- How can we get people who do not live near a body of water to see how nitrogen pollution impacts them? How can we get people to care about solutions for excess nitrogen?
- Dr. Tarpeh said to identify the context where a compound is causing harm and put that compound in a context where it can be good. What other compounds or waste do we produce that can be repurposed to provide a solution to another problem?
- Can you think of other solutions, besides electrochemical stripping, for nitrogen pollution? What might be strategies your community could use to avoid nitrogen pollution or restore areas that are polluted already?
- What role do our news and media outlets play in communicating about the climate crisis? Does this communication have a positive or negative effect, and how can it help us move towards solutions?
- Who else should you include in this conversation? Who may be affected by this through their business or livelihood? What about their experiences might bring value to the discussion?
- What are your thoughts on engaging farmers in research on nitrogen pollution? Do you feel that this is a common practice? Why or why not? What difference might this make in their community?
- Dr. Tarpeh asks himself, "What are the biggest problems I want to see solved by the time I retire?" What are the biggest (and smallest) problems you see in the climate space that you would like to see solved 50 years from now?
- We know about the science of climate change and have known about it for quite some time. Why have we not seen more movement towards sustainable solutions? What can we do differently to inspire change?



# Activities

## Activity 1: The 1:1 - Communication, Engagement, and Sense of Place

This activity is great for modeling good listening skills, creating a connection between people, and creating a personal connection to climate change through identifying personal special places.

**Part 1 (pre-movie)**

a.) Hand out a small piece of paper to each person and explain what they will be doing. Have a watch or a phone ready to be a timer.

b.) Task: Each person should think of a place they love. It can be anywhere: inside, outside, local, away. It doesn't matter; think of a place that they love. Give people a couple of minutes to describe it or draw it on their paper (It can be a drawing, bullet points, written description).

c.) Have participants pair up with a person they do not know and designate Person A and Person B.

1. 1 minute: Person A has 1 minute to describe their place to Person B when the timer starts. They are to talk for the whole 1 minute, but they have to stop when we tell them to stop. Person B may NOT TALK. Person B may nod; they cannot add anything to the conversation.
2. 30 Sec.: Now, Person B has 30 seconds to tell Person A what they heard them say about their place.
3. Repeat but reverse roles. This time Person B is talking for 1 minute. They cannot reference Person A's place in their description.

d.) Debrief with the participants: What did you notice? Was it hard to listen and not add your thoughts while the other person talked? How did it feel to speak the whole time without interruptions?

On listening:
People have a desire to connect with others. Often we interrupt someone speaking with us to agree with them about what they are saying, but in doing so, we often take over the conversation. When discussing issues close to the heart, like the places we love or the environmental changes we see in our communities, it is vital to listen to one another actively. Only add your voice when someone has completed their thought. By remembering how it felt to be heard and truly listened to, we can create meaningful dialogue about tough topics.

On our places:
When everyone thinks about a place they love, it unites them in that commonality. Though everyone has a different special place, they are finding common ground. This mutual understanding allows more empathy to enter the discussion when transitioning to the questions, "How would it feel if this place was at risk?" or "Is this place at risk due to climate change?"

e.) Next Question: How would it feel if this place was at risk? Or is your place at risk due to climate change?

**Part 2 (post-movie)**

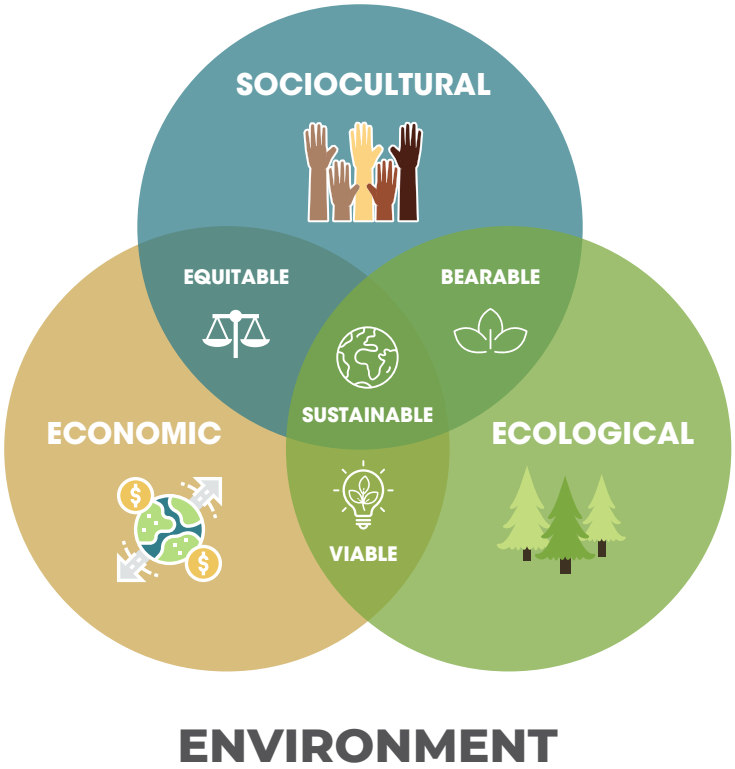
- What was the problem being researched in the movie?
- What was the cause of the problem? Could that problem affect your special place?
- Were there similarities between the location in the film and your special place?
- Are there collective actions that we can take as a group to help our community become more sustainable?

# Activities

## Activity 2: Bring it Home

We know our climate is warming fast. As temperatures get warmer, it causes a multitude of problems. Global warming leads to more threats such as sea-level rise, changing habitats, and changing weather patterns. We saw from this film that nitrogen is an essential part of our food systems. Manufacturing ammonia fertilizer allows us to produce the food needed to feed billions of people inhabiting the earth. However, 50% of nitrogen remains in the environment, causing an excess of nitrogen in waterways. Excess nitrogen can trigger algal blooms, sucking out all the oxygen from the water leading to eutrophication and dying fish. Understanding the impact of fertilizer production on the environment, scientist Dr. Will Tarpeh is finding sustainable solutions. Optimistically, the process of electrochemical stripping can extract nitrogen from water to help redistribute nitrogen in places where it is not harmful.

Lead a discussion about excess nitrogen and its effect on our communities. Where does it touch our lives even if we are not near bodies of water to see algal bloom? How can sustainable practices, research, and adaptation help the collective whole as we see the devastating effect of doing nothing? How can we all be a part of the solution and bring hope? How does this topic affect your community directly or indirectly?




## Activity 3: The 3 Lenses

**Part 1: Set Up and View Film**

Set up 3 tables with large sheets of paper at each table and pens.

Then as a whole, watch the film. Have people list at least two stakeholder groups that are affected by this situation, and how. They don't have to agree with their statement or have a solution. Just have them start thinking about who is affected by the situation and who they believe can affect change.

Divide into three groups, and assign them to a table. Each group will visit each of the three tables during part 2.

**Part 2: Travel through the points of view**

Each group will start at their designated table (5 minutes). Here they will discuss the issue through the lens associated with the table at which they are sitting. What are the positive effects on this lens and the negative? Each group must add at least one new item to the list at each table. It must be something new and can not be a repeat of what other groups have said.

Rotate until everyone has visited all 3 three tables (lenses).

### As a Group Debrief

Ask each group to share out the written items at their table. Discuss the topic from each of the three lenses. You can also discuss the connection of the local issue to the global problems we are seeing and address the biases that sometimes exist between groups (inland communities and coastal communities, developed vs developing nations, etc.). What topics come up as possible disagreements or conflicts, and how might we overcome those to come to sustainable solutions? How can the actions of your community be a greater influence?

# Activities

## Question Suggestions for the 3 Lenses Perspective

- How does the issue of excess nitrogen tie into each of the three lenses? (Economic, Ecological, and Socio-Cultural)
- How might solutions for excess nitrogen lead to potential economic benefits? Ecological benefits? Socio-cultural benefits?
- What are the connections between the ecological and economic impacts of excess nitrogen,  and how do they play a role in climate justice and equity?
- How do we communicate the importance of keeping nitrogen in balance like any other nutrient?
- How might we communicate an effective message to groups represented by each of the three lenses?

# Conversation

Climate change is a global issue that can sometimes feel so insurmountable it cripples people from taking action... It often leads to this question: "How can what I do on a personal level make a real difference on a global issue?" While this is valid, it is the wrong way to think about it!

Individual actions can lead to social mobilization, which is very effective. Think about a time when someone you respect and in your circle of friends influenced you by something they were doing. That observation and acknowledgment can inspire action in you.

We all have that ability within our own spheres of influence. What we choose to do can mobilize others around us. When this happens, and the action spreads from your sphere of influence to others and their friendship and influence groups, it becomes a grassroots social movement that can and does affect drawing down greenhouse gasses on a larger scale.

These discussions and collaborations are the beginning of finding your way to be an influencer, normalizing climate-friendly behaviors and conversations, and making a difference in your community.

# in Action

## Individual Actions that influence:

***** We encourage engaging youth in your community through schools, clubs, or other organizations to join in these community actions. They are powerful change agents, enthusiastic participants, and the future of all our communities.**

Community Audit: Do people understand the impacts of fertilizers? Are there places where commercial fertilizers are used in your community? Are there places in your community that are showing signs of algal blooms, or eutrophication? Is there a way to cut down on unnecessary fertilization? Have a public forum or information session once data is collected; this can be done online or in person. Invite feedback and discussion about the findings, try to tap into how people feel, collect stories, and find out what more they might want to learn.

Webinar: Invite three stakeholders to participate in a panel to discuss sustainable practices in food production, or horticulture. How can our communities start taking action after understanding the impacts of excess nitrogen? How can taking action and understanding this concept further climate justice and equity and help other regions in the future? Have an information session with questions for the panelists in the fishbowl format, then open to community questions; this is a great way to get information across but through multiple perspectives, allowing each attendee to feel they see themselves in the problem and the solution!

Action Project to Lower Greenhouse Gasses:

- Starting community-wide composting efforts to reduce waste and methane gas emissions
- Solarizing government buildings and schools
- Investing in renewable energy
- Sustainable agricultural and horticultural practices
- Creating and protecting natural carbon sinks

Monitoring Project: Get involved with a citizen science monitoring project! Find universities or local organizations already monitoring a problem your community is facing and volunteer to be a part of the team that collects data. Many states have programs that depend on citizen-collected data. By participating in monitoring, you will learn more and have opportunities to engage others in meaningful conversation and action.

Make Videos or Social Media Posts: Social media platforms effectively communicate to the public. Just be sure to offer solutions to go with the information about the problem.

# Local Assessment Activities

How do we bring these crucial issues to our local landscape? It is easy to feel disconnected from a topic when an example is in a faraway place or doesn't seem relevant to our day-to-day lives. In order to be effective, it is important to feel empowered by working together to save the places we love and live in. It is vital that we provide opportunities for all members of our community to thrive and live in environmentally sound places.

## Think Globally - Act Locally

### Activity 1: Fishbowl Conversation

Fishbowl conversations are a great way to elicit multiple points of view about a topic and allow interviews of stakeholders in a controlled and open way that makes them feel safe to share their opinions and thoughts.

- Identify Stakeholders from different points of view, and invite them to a forum or a group zoom call (Ex: town manager, fire chief/police officer, business owner, retiree, land trust director, town planner, parent, someone from public works, etc.).
- Have questions formulated before the forum. Make sure to give them to your speakers prior. TIP: Take the time to formulate well-thought-out questions that elicit the information you want to know or get across.
- If in person, seat interviewees in front of the audience in a semicircle for good visibility for all participants. (If online, pre-determine the order in which they will answer questions.)
- Ask one question at a time, allowing a designated number of minutes per person to answer from their perspective before moving on to the next question. Proceed in the opposite direction for the next question and continue back and forth for all questions.
- Leave time at the end for general discussion or your panel to answer the audience's questions. This forum will often open communications between community members and stakeholders, creating a meaningful dialogue.

***This activity can be done on its own as a conversation starter or a way of disseminating information and can also be used as a way to end a community conversation and summarize what was discussed in the groups.

### Activity 2: Community Mapping

Community Mapping engages community members in conversation about their local landscape. Having community members look at a local map and see how climate change will affect the places they know and visit regularly makes finding solutions more urgent. Jointly looking at a community map allows for open conversation and questions specific to people's needs and fears. Community mapping can empower advocacy on environmental issues, support management of access to land and natural resources, and educate on the economic considerations of any plan.

- Introduce Community Mapping and the role it plays in collaboration and community buy-in.
- Have a map of your town that is large enough for people to gather around at a table or have up on an easel.
- Have people mark the places meaningful to them, places they love and want to protect.
- Next, make sure all the significant assets to the town are marked and identified (main streets, ocean, lake, rivers, forested areas, parks, bridges, public works locations, etc.).
- Place sticky notes or circle places on the map that might be affected by climate change or affected by the issue your conversation is addressing. Make sure everyone has a chance to participate.
- Identify the places most at risk and the areas that are options for solutions.
- Engage stakeholders with knowledge about the town and the current policies to give participants guidance on viable solutions.
- Conclude with a few actions that individuals or the collective can taken to help solve this problem.

# Local Assessment Activities

## Activity 6: En-ROADS Simulation

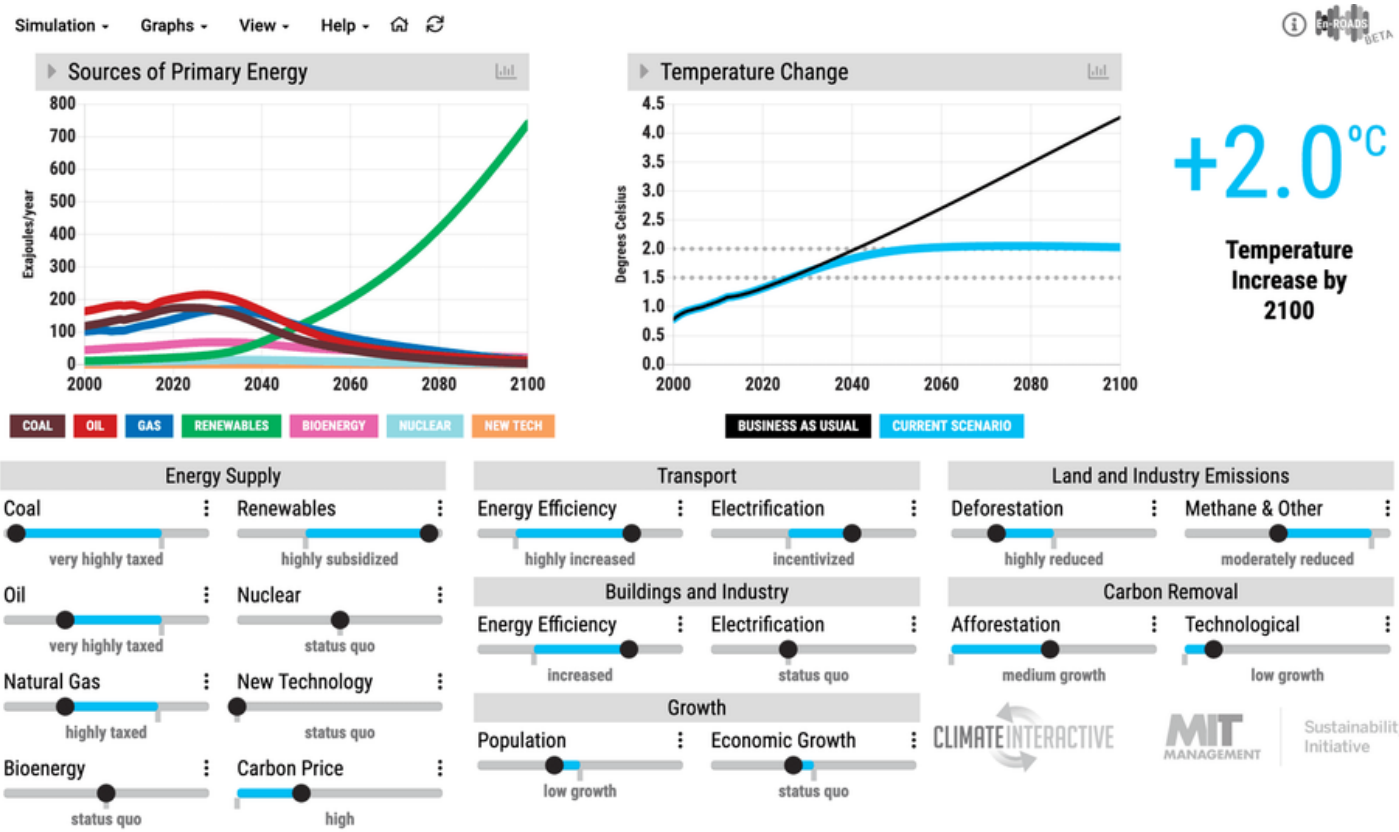
En-ROADS is an online simulation for groups of people to investigate their solutions to climate change. Here is a link to the simulation, and you will also find multiple resources to become more educated on the topic. This link will give you a 20-minute introductory video to En-Roads. Here is a link to a two-page guide from TCI about the various levers. The goal of the simulation is to keep the temperature below 2°C or 3.6°F while maintaining a healthy economy, and society. It is a great way to encourage people to look at climate change on a global scale, but bring it home to see what they can do on a local level.

a.) Separate into groups of 2-4 people and ask them to decide what they think the best solution would be to keep the temperature rise below 2°C or 3.6°F (Just one action).

b.) Come back together as a whole and try each group's scenario. How low did the group get the temperature?

c.) Engage in conversation about other solutions. Encourage people to look at the levers more deeply by clicking the three dots beside each lever which takes you to more information. You will see three icons:  the first allows you to see more graphs, and the i icon gives you more information about the specific lever. The information button will include research on the topic, examples, and equity considerations. Reading this information is a great way to encourage further investigation into specific topic areas.

d.) Once you have gotten the temperature below 2°C, lead a discussion about what you learned. Are there solutions that your community could take on to lower emissions? Could you start community composting? Could you encourage an energy efficiency audit for governmental buildings? Could your town support community members to make their homes more energy-efficient, saving them money and lowering emissions?



# Examples of Actions, Resources, and More Information

## Links to:

**Policy, Mitigation, and Adaption**
The EPA has a list of agriculture nutrient management and fertilizers on this link below:
https://www.epa.gov/agriculture/agriculture-nutrient-management-and-fertilizer

The EPA created a list of sources and solutions to nutrient pollution for agriculture:
https://www.epa.gov/nutrientpollution/sources-and-solutions-agriculture#:~:text=Applying%20fertilizers%20in%20the%20proper,water%20and%20protects%20stream%20banks

This article by the Proceedings of the National Academy of Sciences of the United States of America discusses nitrogen pollution mitigation:
https://www.pnas.org/content/118/22/e2107576118

This article by The Conversation recommends regulating fertilizer producers to reduce nitrogen pollution:
https://theconversation.com/a-new-way-to-curb-nitrogen-pollution-regulate-fertilizer-producers-not-just-farmers-106291

This factsheet is on promoting nutrient recovery and reusing nitrogen pollution and farming:
https://eeb.org/publications/53/farming/27063/factsheet-on-promoting-nutrient-recovery-reuse-nitrogen-pollution-farming.pdf

**Social Movements and Social Change**
This links you to a chapter in a textbook about social change and social movements:
https://opentextbc.ca/introductiontosociology/chapter/chapter21-social-movements-and-social-change/

The Pacific Institute for Climate Solution's article on encouraging social mobilization:
https://pics.uvic.ca/sites/default/files/uploads/publications/FINAL%20Social%20mobilization-Sussman%20Gifford.pdf

**For more facts about this topic, visit:**
EPA
Yale Environment 360
Soil Association
NOAA
Columbia University
UN Environmental Programme