



Facilitator Packet

TED Explores: A New Climate Vision

TED Explores: A New Climate Vision film



“TED Explores: A New Climate Vision,” is a 60-minute film created by our climate-focused initiative, TED Countdown, and highlights ideas from the [2023 TED Countdown Summit in Detroit, Michigan](#). We teamed up with TED-Ed — the team that provides free, high-quality resources to empower teachers and students globally — to develop activities that enhance the film viewing experience.

The activities in the Facilitator Guide and TED-Ed Lesson videos are designed to help educators guide students through learning about climate challenges and the vital roles they can play in addressing them. As students engage with the stories, challenges and solutions shared by TED speakers, they’ll gain a deeper understanding of the climate crisis they will inherit. The activities encourage students to apply lessons from experts to their own local contexts, as well as to the global community. Additionally, we offer a supplemental section with ideas for local action, such as hosting screenings, giving TED-style talks, holding industries accountable or exploring further resources.

Through seven video clips, each with relevant quizzes, discussion questions, and additional resources, students are guided toward further learning and actionable steps. This journey can foster a more engaged and hopeful generation. We’re excited for you and your students to begin!

Facilitator packet + film structure

There are seven video clips, each between 5-11 minutes long. Accompanying each video clip are the TED-Ed Lesson video links with pre-designed questions.

[TED Explores: A New Climate Vision](#) (YouTube)

[TED Explores: A New Climate Vision](#) (ted.com)

Prologue

Chapter One

Chapter Two

Chapter Three

Chapter Four

Chapter Five

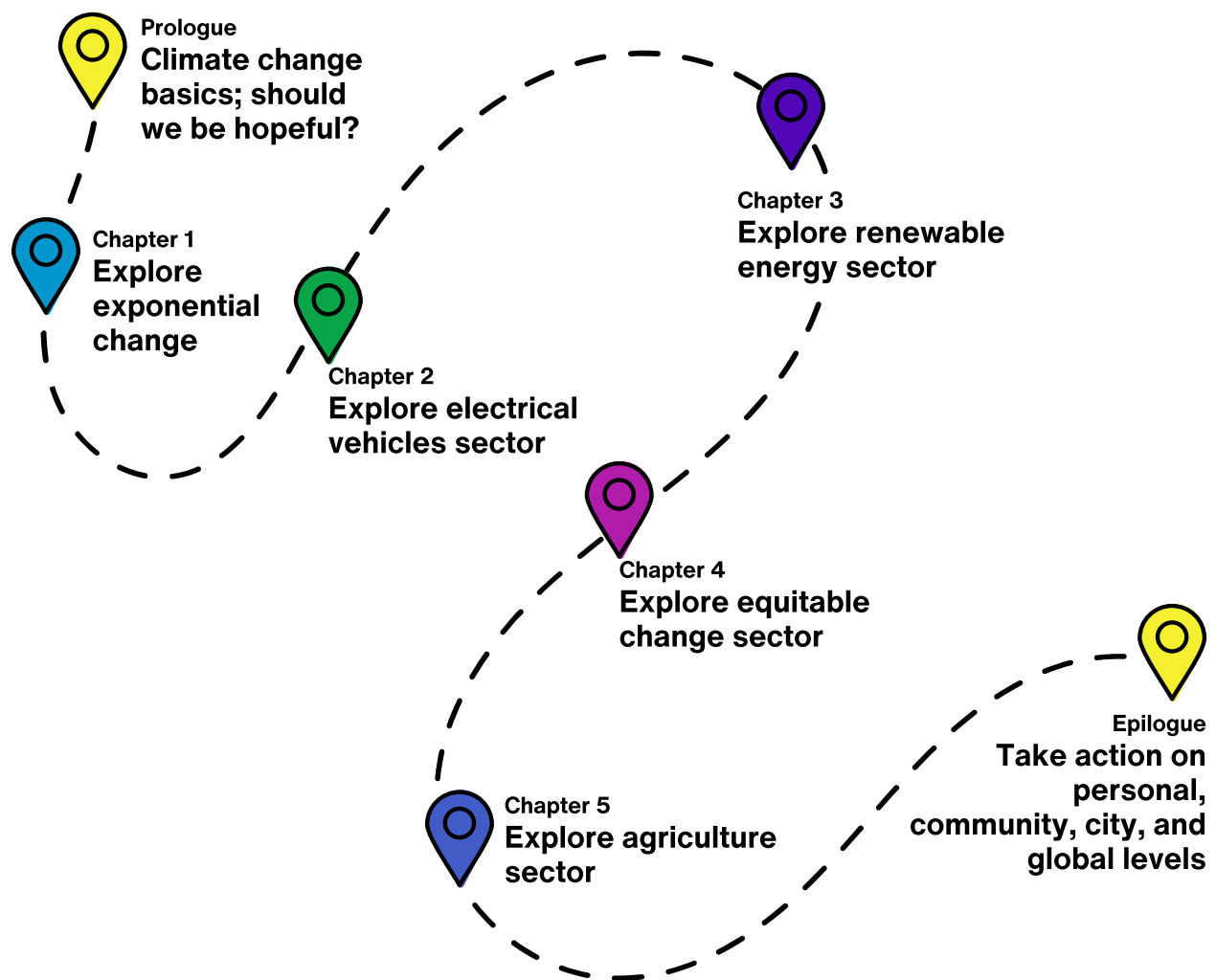
Epilogue

Gigaton Clip

- YouTube link to create your own TED-Ed Lesson questions. Here's [more about how to create your own TED-Ed Lesson link](#).
- Chapter overview: activity timing, student learning objectives, links to TED Talks or animations featured and key concepts
- Three multiple choice questions and 1-2 open-ended questions
- Three discussion questions
- Three to five deeper resource links
- Word bank and definitions

The facilitator road map

This is a sample roadmap of how you might explore the concepts in the film. We divided the film up into shorter videos so that you can explore the different topic areas in each in whichever order fits your goals best. You also do not have to watch all the videos, and since the videos + quiz and discussion questions also live within their TED-Ed Lesson link, you could do some synchronously and some asynchronously.



Student learning objectives

The activities in this guide align with the following Next Generation Science Standards. After viewing the film and participating in this set of activities, students will gain a deeper understanding of human impacts on Earth's ecosystems, methods for mitigating those impacts, and the foundational knowledge needed to evaluate and communicate the effects of climate change.

MS-ESS3-5

Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century

MS-LS2-5

Evaluate competing design solutions for maintaining biodiversity and ecosystem services

HS-ESS3-1

Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity

HS-ESS2-4

Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate

HS-ESS2-7

Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth

HS-LS2-7

Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity

HS-ESS3-1

Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity

HS-ESS3-4

Evaluate or refine a technological solution that reduces impacts of human activities on natural systems

HS-ESS3-5

Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems

HS-ESS3-6

Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity

TED Explores: A New Climate Vision syllabus

Prologue

Intro: Should we be hopeful?

- 0.1 Quiz questions
- 0.2 Discussion questions
- 0.3 Dive Deeper
- 0.4 Word Bank

Chapter 1

Exponential change

- 1.1 Quiz questions
- 1.2 Discussion questions
- 1.3 Dive Deeper
- 1.4 Word Bank

Chapter 2

The electric vehicle

- 2.1 Quiz questions
- 2.2 Discussion questions
- 2.3 Dive Deeper
- 2.4 Word Bank

Chapter 3

Renewable Energy

- 3.1 Quiz questions
- 3.2 Discussion questions
- 3.3 Dive Deeper
- 3.4 Word Bank

Chapter 4

Equitable change

- 4.1 Quiz questions
- 4.2 Discussion questions
- 4.3 Dive Deeper
- 4.4 Word Bank

Chapter 5

Agriculture

- 5.1 Quiz questions
- 5.2 Discussion questions
- 5.3 Dive Deeper
- 5.4 Word Bank

Epilogue

Take action

Ideas for how students can focus on change they can contribute to and take action

Facilitation Planner Template

Chapter	Objective	Date/Time	Video link
Introduction			
Exponential Change			
Renewable Energy			
Agriculture			
Electrical vehicles			
Equitable Change			
Take Action			

Prologue

Climate change basics

This chapter explores the concept of exponential change and how examining sectors that have experienced exponential growth can offer insights, guide our actions, and help us build a better future.



Estimated time:

Video	5:55 min
Activity	40 min



[YouTube Video](#)

[Chapter transcript](#)



Learning objectives

- Students understand the project's purpose and the context of TED-Ed Student Talks.
- Students have their TED-Ed Student Talks Idea Journals or have another dedicated space for their TED-Ed Student Talks work.
- Students create group norms together.



Key concepts:

Feedback is a key part of developing a talk. To create a supported way for students to consciously provide helpful feedback, they can use “diamond feedback” and “spade feedback.” We hope this feedback model will create a shared language and a safe space for students to give and receive feedback in the following Explorations lesson chapters.



Quiz questions

1. The industry with the highest percentage contribution to greenhouse gasses is:
 - A. Industrial processes
 - B. Energy
 - C. Agriculture
 - D. Shipping

2. The three major greenhouse gasses include:
 - A. Methane
 - B. Carbon Dioxide
 - C. Nitrogen
 - D. Nitrous Oxide
 - E. A,B, and D
 - F. All of the above

3. Kingsmill Bond says “a tide of change is coming”. How does he claim that can happen?
 - A. Prices increase and political pressure increases
 - B. Prices decrease and political pressure decreases
 - C. Prices decrease and political pressure increases.

4. A blanket surrounding our planet provides a great visual for climate change. Reflect and explain why this is a good representation.



Discussion questions

- ☐ What places in your neighborhood can be reimagined to make them greener and more resilient? What steps would need to be taken to make that a reality?
- ☐ Why is it important to understand the history of your community when reimagining its future?
- ☐ Explain why there is often a link between low-income areas, climate change issues, and pollution problems.



Dive deeper

- [Yale Program on Climate Change Communications](#)
- [The Climate Reality Project](#)
- [How activists uncover pollution in their communities](#)
- [UN: Climate Promise: Climate Change is a matter of justice, here's why](#)
- [TED Ed: What happens if you cut down all of a city's trees](#)
- [Heidi Sørensen's TED Talk on 5 lessons on building an emissions-free city](#)



Word bank

Carbon dioxide	colorless, odorless gas produced by burning of carbon or organic compounds and respiration. It is naturally present in the atmosphere in small amounts, but it is the major greenhouse gas
Climate challenge	going from adding billions of metric tons of greenhouse gasses to the air each year to adding zero
Climate resilience	anticipating, preparing and responding to issues caused by climate change
Eon	an indefinite or long period of time
Exponential change	a process that starts slowly, reaches a tipping point, and then accelerates rapidly over time, causing a quantity to increase or decrease at an ever-growing rate. Exponential growth specifically describes this rapid acceleration when the change results in an increasing quantity or progress.
Greenhouse gasses	a gas that contributes to the greenhouse effect typically by absorbing infrared radiation. These include carbon dioxide, methane, water vapor and nitrous oxide
Methane	second most abundant greenhouse gas produced both naturally and anthropogenically
Nitrous oxide	the third most important greenhouse gas due to its potent ability to trap heat
Tipping point	the moment when an idea, trend or process gains momentum and begins to accelerate rapidly, leading to faster and more widespread adoption or change

Chapter 1

Exponential change

“What we're really going to explore is two apparently opposing realities, and they're often two opposing narratives. One, is that in terms of the Paris goals, we're way off track. We're deep into the emergency. But what we're going to explore is the other reality, that we know what to do. Exponential change is happening, but it doesn't happen by magic.”

Nigel Topping, TED Speaker

Chapter 1

Exponential change

This chapter explores the concept of exponential change and how examining sectors that have experienced exponential growth can offer insights, guide our actions, and help us build a better future.



Estimated time:

Video	7:07 min
Activity	40 min



[YouTube Video](#)

[Chapter transcript](#)

[Simon Stiell's TED Talk](#)



Learning objectives

- Students can define and give an example of exponential growth.
- Students can accurately depict or describe what is meant by a tipping point.



Key concepts

- Exponential change example:
 - In 1993, people primarily communicated by phone calls, with texting being rare. Over time, texting saw a massive surge in usage. In 2023, 23 billion messages were sent every day.
- “When you think about an exponential curve next to a line, at first, the exponential curve is below the line. And so it's moving more slowly than you would think. And then it crosses the line and it's moving faster than you would think.” – Nili Gilbert

- Change is happening faster than experts have predicted. Here's a few examples:
 - EVs: Sales are currently 11.3% of the total market, and are expected to increase to 70% by 2030.
 - Solar: "Prices today are a century ahead of where the world's leading energy experts thought they'd be in 2010. Between 2010 and 2020, we moved from 20 gigawatts of solar energy installed to 150 gigawatts. And by 2030 that number is expected to increase again to a thousand gigawatts per year." – Simon Stiell. For reference, the United States's average annual electricity consumption is around 438 gigawatts.
 - Offshore wind: "In 2019, the price for offshore wind permits was two thirds less than just four years before. And really critically, it was the same price as the mainstream market." – Simon Stiell. Cheaper prices allow for offshore wind to be deployed in more places and more effectively.
- Examples of sectors that need more change, faster:
 - Cement
 - Shipping
 - Heavy industry
- We need to scale key technologies



Quiz questions

1. Which two industries are currently struggling to reduce their carbon output?
Choose two answers.
 - A. Renewables
 - B. Cement
 - C. EVs
 - D. Shipping
2. Many industries are contributing to a clean energy transition except for:
 - A. Electric vehicle production
 - B. Solar panel production
 - C. Cement production
 - D. Wind power production

3. Solar energy prices are changing, how?
 - A. Solar energy is exponentially increasing in price
 - B. Solar energy is decreasing in price, but not as fast as once predicted
 - C. We have seen little or no change in the price of solar energy
4. How would you describe our progression toward changing the human carbon footprint?
 - A. It is increasing faster than once predicted and expected
 - B. We are making little or no progress toward change
 - C. We are cautiously optimistic about making a change in the human carbon footprint
 - D. Both a and c are good answers
5. If exponential change is graphed, what will you see?
 - A. A straight line going upward over time
 - B. Little or not change over time
 - C. A curve moving slow at first, but then increasing faster and faster over time
 - D. An S shaped curve over time



Discussion questions

- ☐ There are many examples of exponential change. Can you think of another example of exponential growth and tipping point?
- ☐ What do you think Kingsmill Bond means when he says, “we have agency?”
- ☐ Habiba Daggash said that “we can have cautious optimism” about where we are headed in reducing our climate change impact. Why do you think this is? Support your view.



Dive deeper

- [European Space Agency: Understanding Climate Tipping Points](#)



Word bank

Agency	when people have the power, capability and resources to fulfill their goals and full potential
Energy sector	any company or stock that is involved in producing or supplying energy. Companies involved in exploring, drilling or refining consumable fuels
Exponential change	When change happens very slowly at first, and then comes a tipping point and suddenly things accelerate and accelerate and accelerate. In other words, change is no longer linear. When you think about an exponential curve next to a line, at first, the exponential curve is below the line. And so it's moving more slowly than you would think. And then it crosses the line and it's moving faster than you would think.
Cement	A binder material that is used for construction and building
Heavy industry	A business that involves large equipment, large scale undertakings, including construction, shipbuilding, renewable energy, and mining.
Tipping point	critical point in a situation where an unstoppable change or effect can take place, either negatively or positively

Chapter 2

The electrical vehicle revolution

“Many are calling it the electric vehicle revolution. Now, with that comes unprecedented change that will require us to build new capacity and collaborate in ways that we've never seen before to make things happen faster.”

Cynthia Williams, TED Speaker

Chapter 2

The electrical vehicle revolution

This chapter focuses on Detroit, Michigan, the heart of automobile production and the site of the 2023 TED Summit Countdown. It highlights the electric vehicle industry, now at a tipping point, and how companies are building the infrastructure and capacity to drive exponential growth in the future.

Estimated time:



Video	9:57 min
Activity	40 min



[YouTube Video](#)

[Chapter transcript](#)

[Julio Friedmann's TED Talk](#)

[Should you switch to solar?](#)



Learning objectives

- Students can accurately describe the current issues — both positive and negative — of the electric vehicle industry.
- Students can identify other needs that go hand in hand with increasing infrastructure for EVs.
- Students can reflect and identify the key stakeholders in the EV debate and summarize their concerns about the future of EVs.
- Students can identify potential educational and career paths that are available in the EV industry.



Key concepts

- Electric vehicles (EVs) exemplify unprecedented rapid change and are at a tipping point, serving as a test case for the potential of exponential change.
- Vehicle emissions (transit contribution) represents 8% of emissions (compared to 76% from energy emissions and 12% from agriculture)
- EV change can happen even faster with:
 - Infrastructure, like charging stations, lighting, restrooms, security and shelter.
 - Improving capacity by investing in facilities and talent like electrical, mechanical and software engineers.
- Example: Ford produced 600,000 EVs in 2023 and will produce 2 million by 2026. This is an example of technologies at scale.
- Texting was also not popular, but then there was exponential change. Are EVs next?
- By the end of the 1800s, nearly 40% of American cars were electric. What factors disrupted their market advancement, and how can we address these issues to avoid repeating the past?
 - Charging deserts in rural areas
 - Range of batteries
 - Mass manufacturing
- Technology we need:
 - Batteries that can last longer (battery range)
 - Battery recycling
- Electric vehicles rely on energy, so they are connected to the energy issue as well.



Quiz questions

1. By the end of the 19th century, what percentage of cars in the US were electric?
 - A. 2%
 - B. 10%
 - C. 35%
 - D. 40%
 - E. 70%

2. To make EVs more accessible for people to use them, we need:
 - A. More gas stations
 - B. More charging areas
 - C. Less gas stations
 - D. All of the above

3. For the EV industry to succeed and elicit change, it must invest in:
 - A. Education
 - B. Talent
 - C. New facilities
 - D. Training
 - E. All of the above

4. EVs existed more than 100 years ago.
 - A. True
 - B. False



Discussion questions

- ☐ Would you choose to drive an electric vehicle? Explain your reasoning.
- ☐ There are three "C's" when it comes to electric vehicles: Change, collaboration and capacity. Explain each one and how they are connected to the success of electric vehicles.
- ☐ It is often essential to work with people in many different sectors to create change. Why is this true for the EV industry and its future success?
- ☐ Cynthia and Manoush describe significant change over decades in the car industry. How do you envision your community will be impacted by the expansion of EVs in the market? What changes will be required to ensure EVs can be used properly in your community?



Dive deeper

- [TED Ed: The surprisingly long history of electric cars](#)
- [TED Ed: Why electric cars are finally taking over](#)
- [PBS: Electric Cars Pros and Cons Part 1 and Part 2](#)
- [Emma Nehernheim's TED Talk on battery recycling](#)



Word bank

EV	acronym for electric vehicle, which uses one or more electric motors for propulsion. The vehicle can be powered by a collector system, with electricity from extravehicular sources, or can be powered autonomously by a battery or by converting fuel to electricity using a generator or fuel cells. EVs include road and rail vehicles, electric boats and underwater vessels, electric aircraft and electric spacecraft.
Collaboration	working with someone to create something together
Infrastructure	the system of public works in a country or area like roads, bridges, water, energy and telecommunications
Capacity	the maximum amount of something that can be produced
Charging desert	when EV charging stations are great distances apart and not readily available on commonly traveled routes
Green power	electricity produced from wind, solar, biogas, hydropower, geothermal or biomass
Microgrid	a small power system that operates independently of the local electric grid
Range	distance an EV can travel when fully charged
Sustainability	development that meets the current needs of people without sacrificing future generations abilities to meet their needs

Chapter 3

Renewable energy

“Collective action building together is what makes the difficult possible and nourishes the soul through mission and purpose. We know what to do, and we can act not out of anger or fear, but out of generosity and common purpose, bringing aspiration and humility together.”

Julio Friedmann, TED Speaker

Chapter 3

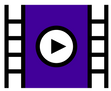
Renewable energy

This chapter explores the impact of the energy sector and envisions a future centered on renewable energy. It focuses on the emergence of the solar energy industry, the challenges it has encountered, and its ongoing exponential growth.



Estimated time:

Video	11:06 min
Activity	40 min



[YouTube Video](#)

[Chapter transcript](#)



Learning objectives

- Students can identify the pros and cons of solar energy.
- Students can compare and contrast the extractive processes for minerals needed in battery production versus the extraction processes necessary for fossil fuel extraction.
- Students can identify renewable energy sources.
- Students can infer how alliances between countries in regard to energy needs and ability to meet them can be an effective tool in the fight against climate change and environmental damage.



Key concepts

- Energy represents 66% of global greenhouse gas emissions, which is why we need to focus on renewable energy
- Solar energy key dates:
 - 1954 was the dawn of solar energy, but it was expensive.
 - A turning point in solar price history occurred on the floor of Germany's parliament, where Hermann Scheer introduced the Renewable Energy Sources Act in 2000.
 - 15 years ago, solar was the most expensive form of electricity. It is now the cheapest. As use and demand went up, costs were cut and technologies became more efficient.
- Incentives to drive countries' solar use created unprecedented demand for solar panels worldwide. Manufacturers were able to scale up production and innovate in ways that cut costs. As a result, solar panel prices dropped while efficiency grew.
- “We currently extract, at the moment, 15,000 million tonnes of fossil fuels every year. The International Energy Agency says that we will need about 43 million tonnes of critical materials in order to build out the clean energy economy. So that's 300 times less required on nature.” - Kingsmill Bond
- We have untapped the full potential of solar energy. “The good news is every day the Earth receives 163,000 terawatts of energy from the sun. About half of that bounces back to space. But about 80,000 terawatts arrive at the Earth in a form we can use. For reference today, the world uses about 26 terawatts of energy.” – Julio Friedmann
- Other renewable examples are nuclear, geothermal, and hydropower.
- What we need: human capital (talent), collective action, and abundance attitude.
- Example of collective action:
 - “My favorite example of this is Chile. Almost eight years ago now, their government said, Wait a second, we can make the cheapest green electricity on earth. We have hydropower, we have solar power, we have wind power and the best resources anywhere in the world. So let's start by making a lot of green electricity. And then they said, because of that, we can also make green hydrogen cheaper than anywhere else. And then Japan was like, Hello, we want your green hydrogen. Can you ship it to us? And Japan's like, we will also give you money to pay for these projects. Will loan your money to pay for these projects. Could you please use Japanese technology? So they're using Japanese turbines, electrolyzers. They're using Japanese ships to haul the ammonia around. So Japan gets rich on this. Chile gets rich on this win-win, totally win, win” - Julio Friedmann



Quiz questions

1. Most solar units pay for themselves within:
 - A. 2–3 years
 - B. 5–7 years
 - C. 7–12 years
 - D. 15–18 years

2. Emissions from the energy system account for how much of the global greenhouse gas production?
 - A. 15%
 - B. 25%
 - C. 33%
 - D. 66%

3. What is not an example of a renewable energy source?
 - A. Hyrdopower
 - B. Solar power
 - C. Natural gas
 - D. Wind energy
 - E. Geothermal energy

4. What is not an example of a renewable energy source?
 - A. People converting and selling extra power produced back to the grid
 - B. Incentives being offered for converting to solar power
 - C. The ability to now collect all of the Sun's daily energy that reaches Earth
 - D. Increased solar panel production drove the prices down for consumers and made them more affordable
 - E. A, B, and D are all good answers
 - F. All of the above



Discussion questions

- ❑ To successfully implement energy projects around the world, we need time, money and human capital. How would you define human capital?
- ❑ The need for new energy sources across the world might just forge new alliances between countries, similar to the one between Chile and Japan. Can you think of other alliances/partnerships/collaborations? What are the potential outcomes of these alliances? Will they potentially be positive, negative, or both? Share your ideas!
- ❑ Discuss this quote from the film from Julio Friedmann: "Some of the best resources are, in fact, in the global South. These places are not simply future climate victims. These places are latent energy superpowers."
- ❑ Over three billion people in the world use less energy in a day than a typical refrigerator uses in a day. What can you do as an individual to decrease your energy use?



Dive deeper

- [Our World In Data: Renewable Energy](#)
- [United Nations: Renewable Energy](#)
- [How much land does it take to power the world?](#)
- [How much electricity does it take to power the world?](#)
- [Ramón Méndez Galain's TED Talk on the energy transition in Uruguay](#)



Word bank

Clean hydrogen	hydrogen produced with less carbon dioxide emissions
Collective action	"Building together is what makes the difficult possible and nourishes the soul through mission and purpose. We know what to do, and we can act not out of anger or fear, but out of generosity and common purpose, bringing aspiration and humility together." Julio Friedmann says examples of this in the US is the reaction to WW2, the Marshall plan, COVID.

Critical minerals	minerals that are essential to the economy that are finite
Decarbonization	reducing or removing carbon emissions
Efficiency	a comparison of the amount of useful work produced versus the amount of energy used
Electrolyzers	something that splits water molecule into hydrogen and oxygen for production of hydrogen fuel
Energy sector	any company or stock that is involved in producing or supplying energy. Companies involved in exploring, drilling, or refining consumable fuels
Equitable	having equity or fairness toward all
Incentive	something that motivates or encourages someone to do something, such as a payment
Geothermal Energy	renewable energy source produced from heat within the earth
Global South	nations with lower economic and industrial development generally located South of more industrialized countries: Africa, Latin America, the Caribbean, parts of Asia, and parts of Oceania
Green Electricity	electricity produced from wind, solar, biogas, hydropower, geothermal or biomass
Renewable energy	energy from a source that is not depleted
Solar cell	a device that converts solar radiation into electricity
Subsidize	to pay part of the cost of producing a commodity
Terawatts	a unit of power equal to one trillion watts
Turbine	machine that produces continual power by spinning, and usually powered by water or steam if renewable electricity is being produced
Watt	a unit of power that can perform one joule of work in one second

Chapter 4

Equitable change

“We need to make sure that we are not exacerbating inequality, but rather we are ensuring that that gap is closed and that the groups that have been historically marginalized are not once again being marginalized in a new way.”

Nigel Topping, TED Speaker

Chapter 4

Equitable change

This chapter emphasizes the importance of designing climate solutions that account for all potential consequences and those impacted. A recurring theme throughout is the focus on collaboration, and bringing diverse stakeholders into the loop. Together, we can drive both exponential and equitable change.



Estimated time:

Video	9:46 min
Activity	40 min



[YouTube Video](#)
[Chapter transcript](#)
[Anika Goss's TED Talk](#)



Learning objectives

- Students can infer the link between economic inequality and climate change.
- Students can list the positive impacts of trees and green space in an urban environment.
- Students can predict why individuals in low-income areas are more susceptible to the effects of climate change.
- Students can define climate resiliency and state ways it can be accessible for all.



Key concepts

- We've seen examples of potential exponential change, but we should also think about the consequences of those changes. Just like we talked about how the first agricultural revolution came at a cost to water, forests and wildlife, we have to make sure there aren't other costs through the new changes happening.
- Change can be equitable by enlisting the people that live there. Design solutions by including those directly impacted by the issue.
 - "We might have a good idea about gardens and tree planting, but this is where people live. And so you ask first." - Anika Goss.
- Economic sustainability and environmental sustainability are connected. E.g. The communities with more pollutants, less green space and more contaminated water are going to be most vulnerable to climate impacts.
 - Examples: "Detroit industrial sites that led to our economic boom, many stand vacant and abandoned. These industrial sites have led to dangerous contamination to our land and our water and our air. Detroit is looking at Green spaces and building resilient communities. Trees have an impact by cooling spaces and helping to clean the air." - Anika Goss.
 - Not enough money is going to where there is major potential and where people are also being more impacted, which is in Africa. "Africa, despite being 90% of those across the entire globe that still do not have access to electricity and being 17% of the global population, we're actually 2% of international finance. Money doesn't actually flow to these spaces naturally, and we need to do a lot of work to get global finance to these spaces." - Rebekah Shirley.



Quiz questions

1. Despite Africa having 17% of the global population, only ____ of international finance goes to the continent.
 - A. 2%
 - B. 10%
 - C. 15%
 - D. .05%

2. Trees in an urban environment can:
 - A. Decrease temperature
 - B. Take up too much space and crowd people out
 - C. Clean the air
 - D. All of the above

3. We need an equitable transition to clean energy. What does this mean?
 - A. A renewable energy future has to include everyone
 - B. The distribution of the benefits of renewables has to be equally distributed
 - C. We need to provide clean energy, tools, and solutions to the people who currently do not have them
 - D. Work has to be done to get global finances to areas that do not normally receive them
 - E. All of the above

4. Although Africa has great potential for renewable energy, what is the main obstacle to implementation?
 - A. There are a lack of natural resources in Africa
 - B. Lack of money to fund the programs
 - C. Africa is 17% of the global population so renewable energy won't work
 - D. All of the above



Discussion questions

- ☐ What places in your neighborhood can be reimagined to make them greener and more resilient? What steps would need to be taken to make that a reality?
- ☐ Why is it important to understand the history of your community when reimagining its future?
- ☐ Explain why there is often a link between low-income areas, climate change issues, and pollution problems.



Dive deeper

- [Yale Program on Climate Change Communications](#)
- [The Climate Reality Project](#)
- [How activists uncover pollution in their communities](#)
- [UN: Climate Promise: Climate Change is a matter of justice, here's why](#)
- [TED Ed: What happens if you cut down all of a city's trees](#)
- [Heidi Sørensen's TED Talk on 5 lessons on building an emissions-free city](#)



Word bank

Abundant	a large quantity
Asthma	chronic lung disease that constricts the airways due to inflammation and constriction surrounding muscles, making it difficult to breathe
Equitable	having equity or fairness toward all
Heat island	urban areas that typically have higher temperatures than outlying, more rural areas
Marginalized	a group of people or a community that is treated as insignificant or unimportant
Oasis	something serving as a pleasant change, or refuge from the more harsh local environment (e.g. an urban greenspace)

Chapter 5

Agriculture

“There are 400 million acres of rice grown globally, and our methods, if used, can reduce greenhouse gas by 50%, reduce water use by 50%, increase yields to feed a hungry world.”

Jim Whitaker, TED Speaker

Chapter 5

Agriculture

This chapter highlights the agricultural sector, what farmers are doing to build a future where agriculture protects biodiversity, conserves water, reduces greenhouse gasses and feeds a hungry world. This chapter continues exploring the theme of how economic stability is connected to environmental stability.



Estimated time:

Video	8:56 min
Activity	40 min



[YouTube video](#)

[Chapter transcript](#)

[TED Ed: Can we create the "perfect" farm?](#)

[Jim and Jessica Whitaker's TED Talk](#)



Learning objectives

- Students can infer how agriculture historically led to human civilization.
- Students can summarize the effects of the first agricultural revolution on Earth's environment.
- Students can hypothesize what future farms across the world will look like.
- Students can describe current farming methods that are less impactful on Earth's surface and climate.



Key concepts

- Agriculture is responsible for 12% of the problem
- 40% of land on earth is farmland
- About 10,000 years ago, humans began to farm. This agricultural revolution was a turning point in our history that enabled people to settle, build and create. The first agricultural revolution transformed society, but it also meant feeding people at the expense of forest, wildlife and water. This second revolution needs to account for those systems, which means protecting biodiversity, conserving water, reducing pollution and greenhouse gasses.
- Economic stability is connected to environmental stability.
- Example of agriculture improvement: Rice farmers are tracking water, fuel and fertilizer which lead to increased yields in the amount of rice they could supply and profit from.
- Rice production in the US is at a tipping point, it's about to become the most sustainable version.
- Bring farmers and local communities into the loop.
- Jim says, "There are 400 million acres of rice grown globally, and our methods, if used, can reduce greenhouse gas by 50%, reduce water use by 50%, increase yields to feed a hungry world."
- When you read company sustainability goals, they're all saying they're going to be net zero. The only way they can be net zero is they bring the farmers into the loop.



Quiz questions

1. Currently, how much of Earth is being used for agriculture?

- A. 15%
- B. 25%
- C. 40%
- D. 60%
- E. 80%

2. Which crop is the main food source for over 3 billion people?
 - A. Corn
 - B. Soybeans
 - C. Wheat
 - D. Rice

3. Rice is grown in paddies. Which major greenhouse gas does this produce?
 - A. Carbon dioxide
 - B. Nitrous oxide
 - C. Methane
 - D. Water vapor

4. What is the effect of decreased water use on a rice crop?
 - A. Less erosion
 - B. Less fertilizer runoff
 - C. Less crop yield
 - D. A and B



Discussion questions

- ☐ The first agricultural revolution transformed society, but it also meant feeding people at the expense of forests, wildlife and water. How did it impact the landscape?

- ☐ Climate change impacts weather. How has this caused problems for farmers, like those in Arkansas? Have you seen impacts of climate change on the weather and people where you live?

- ☐ The way a company can meet its "net zero" pledge is to bring farmers into the loop. Why – and how – should companies include farmers?

- ☐ Jessica says, “Take a walk through your supermarket. Everything's sustainable, everything's greenwash. You can put whatever you want on a package. There's no rules, there's no standards. So we're trying to make that standard.” What are the standards for food labels where you/your family buys their food?



Dive deeper

- [TED Ed: Can we create the "perfect" farm?](#)
- [Project Drawdown: Farming](#)
- [World Bank: Climate smart agriculture](#)
- [PBS Newshour: Tipping Point: Agriculture on the Brink](#)



Word bank

500 year flood	A flood of a certain magnitude or greater that is likely only to happen once in every 500 years
1000 year flood	A flood of a certain magnitude or greater that is likely only to happen once in every 1,000 years
Agricultural revolution	cultural changes that allowed people to go from hunter-gatherer communities and subsistence living, to crop and animal domestication and growing of large tracts of food
Anaerobic bacteria	bacteria that live and thrive in areas with no oxygen
Biodiversity	the total variety of all living things on Earth and how they interact with one another
Biomass	total weight of all organisms in a given area, or organic material used to produce energy
Crop yield	amount of a specific crop produced in an area
Erosion	wearing away and transport of earth materials by wind, water or humans
Expansion	increasing in amount or extent
Exploitation	making use of and benefitting from or treating unfairly
Greenwashing	making unclear, false or misleading claims about the environmental impact of a commodity
Net zero	maintaining a balance of the amount of greenhouse gasses added to Atmosphere versus the amount removed

Epilogue

**We can do
this; we can
take action**

“We can create a legacy of environmental
quality and climate resilience for all.”

Peggy Shepard, TED Speaker

Epilogue

We can do this; we can take action

This epilogue comes back to the question we asked in the prologue: should we be hopeful? Speakers from the film share a round-up of the solutions presented, what they are focused on for the future, and how we can take collective action.



Estimated time:

Video	4:36 min
Activity	40 min



YouTube video

Chapter Transcript



Learning objectives

- Students can summarize the changes that are likely to occur if we achieve the climate goals mentioned.
- Students can predict how cheap, clean energy for all would change our environmental and economic futures.
- Students can state what will occur if we are able to reach true net zero carbon emissions and how it will affect everyday life around the world, especially in warm climates.
- Students can describe ways in which individuals can become personally involved in climate change issues.



Key concepts

- Pathways to address the climate challenge:
 - 10 billion batteries by the end of this decade
 - Regenerative farming
 - “We have purchase power. We need to buy less stuff and we need to look after what we buy. Valuing the things that we own is a climate solution.” Josephine Phillips
 - “The ocean is a powerful source of solutions that we've overlooked for far too long.” Susan Ruffo
 - “You have to be engaged. Let your elected officials know that this is important to you. You have to Vote. You have to go out there and support politicians who are going to support our planet.” Al Roker



Quiz questions

1. Offshore wind has the potential to meet the energy demand of the whole world over _____.
 - A. One time
 - B. Two times
 - C. 18 times
 - D. 100 times

2. What can we do to “decarbonize our old economy that we have?”
 - A. We can invest in more renewable energies that produce less carbon dioxide
 - B. We can decrease our dependence on fossil fuels
 - C. We can brainstorm ways to save energy
 - D. We can focus on regenerative farming
 - E. All of the above



Discussion questions

- ☐ What is the overall emotion you feel from these speakers? Has your view of the future changed at all?
- ☐ How do the words, “You are not powerless” make you feel or think about the future? How might you use this as a call to action?
- ☐ Why is it so important for young people to be more involved in climate change issues and solutions?
- ☐ Josephine Phillips states, “We need to buy less stuff and we need to look after what we buy.” Can you think of anything in your life that perhaps you can change or are willing to “buy less of” to make a difference in your carbon footprint?
- ☐ We have an opportunity to not just solve problems but build something better. As Christiana Figueres says, “It's not that we're simply going to avoid the worst impacts of climate change, it's that we're going to improve the quality of life for humans. Both in the urban and in the rural sector and for non-humans.” What do you see in your local community that is being done to help decrease climate change and make the quality of life better for its members?



Word bank

Abundant	available in large quantities
Carbon Capture	the process of trapping carbon dioxide to mitigate climate change effects
Transition	a period of changing
Regenerative Farming	improving soil conditions by modifying agricultural practice
Vulnerable	in need of support, susceptible

Take action checklist

“I'm constantly surrounded by young people just like me who are really, really, really passionate about the world that we live in for obvious reasons. It's the world that we will inherit.”

– Akil Callender, Youth Energy Advocate and Energy Specialist

Checklist of action items to discuss as a group:

Watch

- ☐ Watch how other young people are thinking about the climate challenge
- ☐ Watch these TED talks that provide more action oriented steps
 - ☐ Ayana Elizabeth Johnson's TED Talk on how to find joy in climate action
 - ☐ Xavier Cortada's TED Talk on a creative approach to community climate action
 - ☐ Fehinti Balogun's TED Talk on how to find your voice for climate action
- ☐ Watch short animated TED-Ed Lessons on the TED-Ed Earth School page, explaining concepts with themes like fixing food, decarbonising the grid, electrifying transportation and protecting nature. And then check out the accompanying Action Guide.

Design

- ☐ Students give their own TED-style talks using the free TED-Ed Student Talks resources, created by the TED-Ed team so that educators can take the experience TED speakers go through and help their students discover, develop and share their ideas with each other and the world. Register for the materials here.
- ☐ Host a screening of the film and bring community members together at the event to discuss themes from the film.
- ☐ Use tips from John Marshall's TED talk about how to communicate about the climate challenge.

Act

- ❑ Learn about your local, state, federal, or nationally elected representatives.
- ❑ Sign up for [TED Countdown's newsletter](#) to stay updated on any future opportunities.
- ❑ Participate in a [Climate Reality Project training](#), which occur annually all over the world.
- ❑ Write stories about climate change -- check out [Grist's fictional collection](#) of climate stories for inspiration.
- ❑ Tell your climate story by participating in [Project Drawdown's Global Solutions Diary](#).
- ❑ Find mentorship to accelerate your climate solutions at the [DO School's BeVisioneers Fellowship](#). This global fellowship of young leaders will also connect you with other young people who are passionate about climate action.
- ❑ Create your own climate art or utilize TED Countdown's and Fine Acts' [open licensed Climate Collection art](#).

Word bubble + notes

Creative

Passionate

Power

Meaningfully engaged

Change

Underestimate

Valuing

You are not powerless

Unlimited

Go out there

You are needed

Vote

Buy less stuff

Just keep going

Value what you own

Add your own

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.