INTRODUCTION TO ENVIRONMENTAL ETHICS AND ITS APPLICATIONS TO CLIMATE CHANGE

OVERVIEW

The concept of global warming has attracted substantial attention in recent decades as climate change manifests itself in hotter summers and colder winters, disrupted growing seasons, rising sea levels, and devastating natural disasters. Scientific research continues to provide evidence not only that our climate is changing at an alarming rate, but also that human activity is the culprit. Due largely to influence by the media, America's population is split on the subject with many convinced that global warming is a matter of belief. Unfortunately, the near-consensus of the scientific community does not suffice in convincing politicians, science-denialist groups, and the general public of human contributions to climate change and its dramatic implications.

With climate change threatening the health, safety, economies, and societies of future generations, it will soon be too late to mitigate our irreversible damage to the atmosphere and climate. Because of the numerous perspectives on climate change and the varying degrees of responsibility of the entities involved, the subject remains unresolved. The international community grapples with innumerable questions. Do we prioritize the well-being of humanity over that of the environment? Who's to be held responsible for climate change, and to what extent? Going forward, how are we to handle the wide spectrum of implications of climate change? Is climate change even worthy of our concern?

CONTENTS

1. Introduction
2. What is Climate Change?
3. What is Environmental Ethics?
4. Biocentrism, Ecocentrism, and Anthropocentrism
5. Climate and Controversy
6. Human-Centered Dimensions of Environmental Ethics on a Global Scale
7. Case Studies
8. Looking Towards the Future
9. Concluding Activities
10. Additional Resources and References

LEARNING OUTCOMES

1. Understand what climate change is, how it affects the global population, and why it is a source of controversy.
2. Understand the purpose, breadth, and relevance of environmental ethics.
3. Be able to argue from one of the many perspectives in environmental ethics.
4. Understand the options for our environmental future and how each course of action carries ethical weight.

PROCEDURES AND ACTIVITIES

This unit uses a student-centered and interactive approach to teaching. Activities are designed to allow for student participation and are marked as an individual, partner or group activity.

1. INTRODUCTION

The concept of global warming has attracted substantial attention in recent decades as climate change manifests itself in hotter summers and colder winters, disrupted growing seasons, rising sea levels, and devastating natural disasters. Scientific research continues to provide evidence not only that our climate is changing at an alarming rate, but also that human activity is the culprit. Due largely to influence by the media, America's population is split on the subject with many convinced that global warming

is a matter of belief. Unfortunately, the near-consensus of the scientific community does not suffice in convincing politicians, science-denialist groups, and the general public of human contributions to climate change and its dramatic implications.

With climate change threatening the health, safety, economies, and societies of future generations, it will soon be too late to mitigate our irreversible damage to the atmosphere and climate. Because of the numerous perspectives on climate change and the varying degrees of responsibility of the entities involved, the subject remains unresolved. The international community grapples with innumerable questions. Do we prioritize the well-being of humanity over that of the environment? Who's to be held responsible for climate change, and to what extent? Going forward, how are we to handle the wide spectrum of the implications of climate change? Is climate change even worthy of our concern?

Teacher-Directed Class Discussion

Gauge the class' knowledge and initiate a preliminary discussion with the following questions:

1. What is climate change? How does it occur?
2. What is global warming?
3. What is the difference between climate change and global warming?

2. WHAT IS CLIMATE CHANGE?
See "Additional Resources" for an accompanying slideshow.

Global warming and climate change are often used interchangeably, but there is an important distinction to be made between the two. *Global warming* describes the recent rapid increase in the average temperature of the planet due to our reliance on fossil fuels as an energy source. Our emissions contribute to global warming through a phenomenon known as the greenhouse effect.
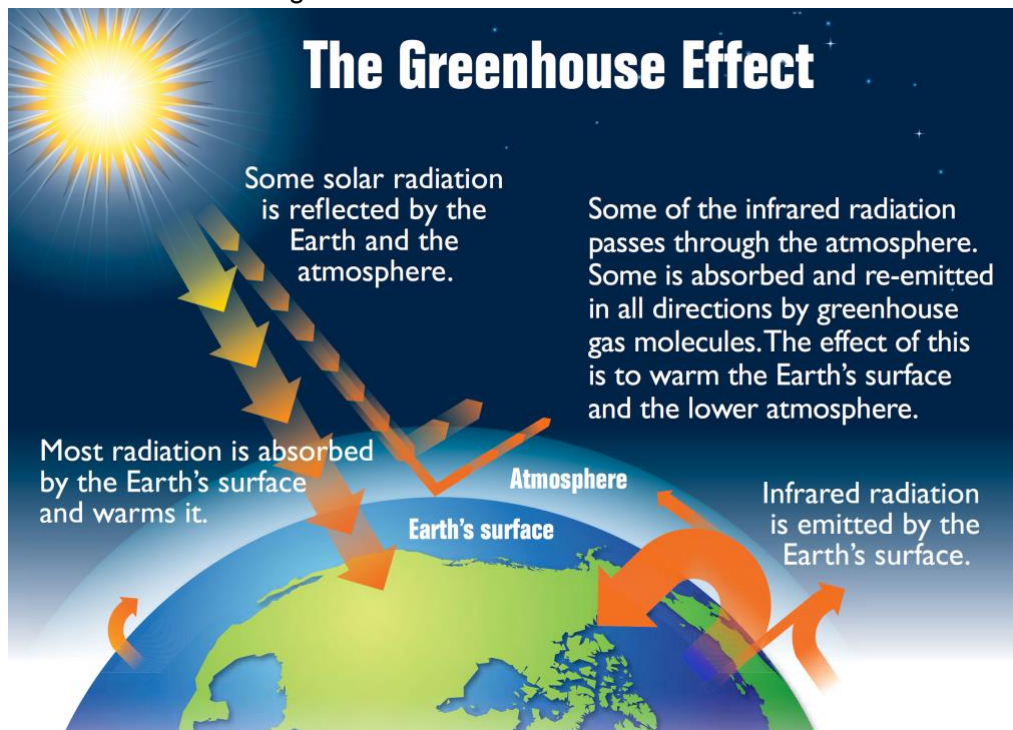

The Greenhouse Effect

Some solar radiation is reflected by the Earth and the atmosphere.

Some of the infrared radiation passes through the atmosphere. Some is absorbed and re-emitted in all directions by greenhouse gas molecules. The effect of this is to warm the Earth's surface and the lower atmosphere.

Most radiation is absorbed by the Earth's surface and warms it.

Atmosphere

Earth's surface

Infrared radiation is emitted by the Earth's surface.

Photo Credit: U.S. Environmental Protection Agency

When solar radiation reaches Earth's atmosphere, some is reflected, and some strikes Earth's surface. The radiation that reaches the Earth's surface is either absorbed, warming the planet, or reflected back into the atmosphere as infrared radiation, or heat. Some of this heat may pass through the atmosphere whereas the rest is absorbed by greenhouse gases in the atmosphere and reflected back to Earth, essentially trapping heat and further warming the planet. The greater the concentration of greenhouse gases in the atmosphere, such as carbon dioxide and methane, the more heat will be trapped.

With the emergence of industrial societies in recent decades, there has been a substantial rise in greenhouse gas emissions on a global scale. Scientists are concerned about the consequences of our emissions, as global warming has far more implications than hotter summers. The term *climate change* describes all the changes in climate patterns that result from the upward trend in Earth's annual temperature, such as extreme weather events, rising sea levels, the loss of ice mass in worldwide mountain glaciers and Greenland, Antarctica, and the Arctic, and altered growing seasons.
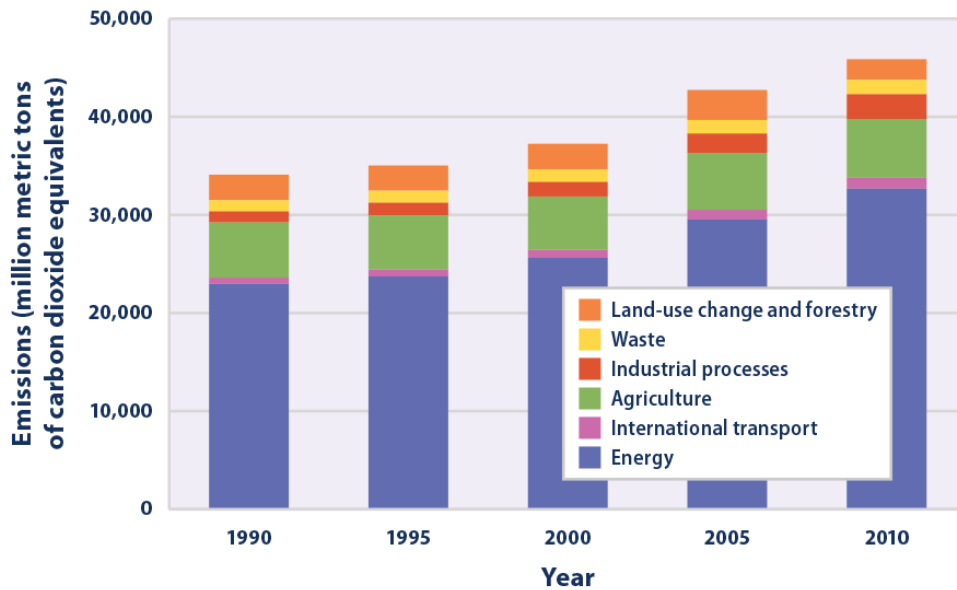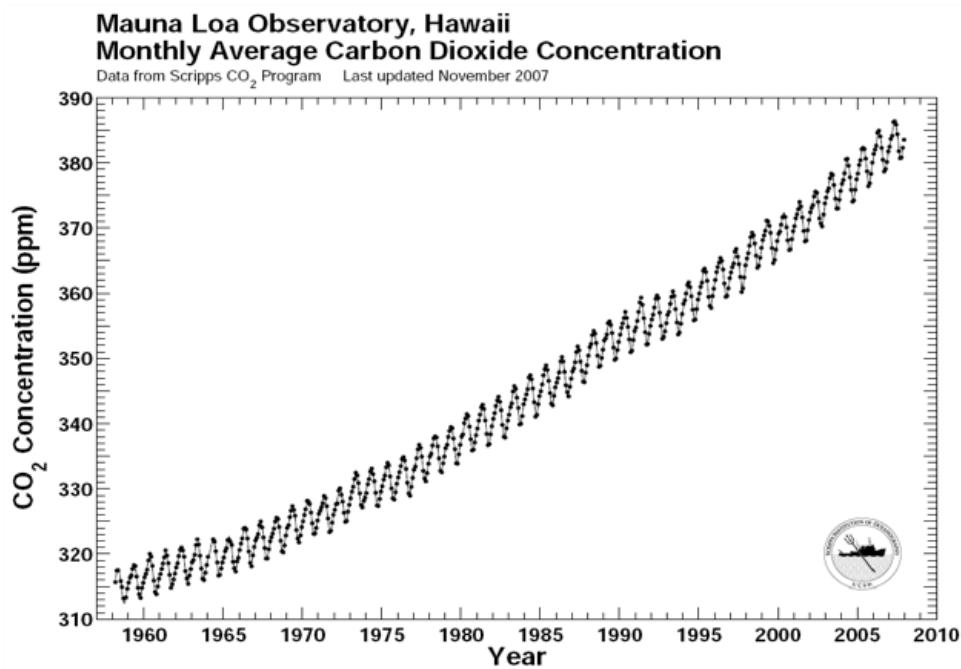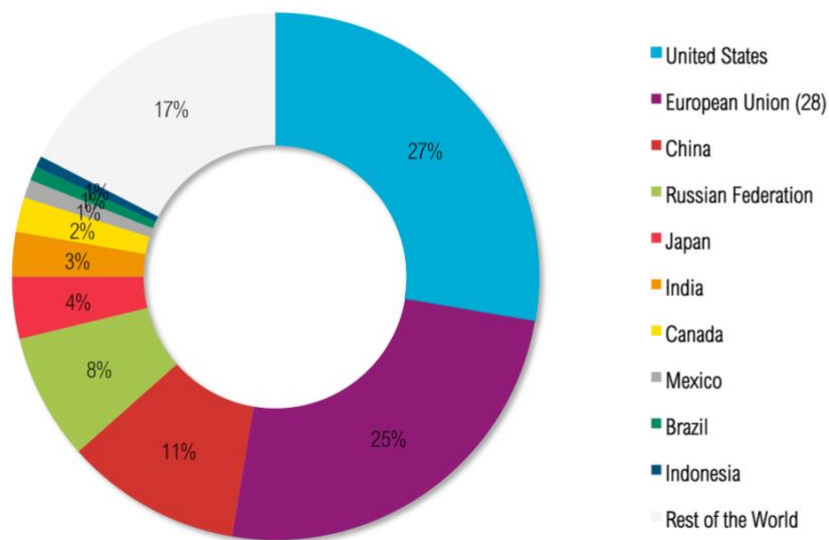

Photo credit: Environmental Protection Agency

Cumulative CO$_2$ Emissions 1850–2011 (% of World Total)

Legend:
- United States — 27%
- European Union (28) — 25%
- China — 11%
- Russian Federation — 8%
- Japan — 4%
- India — 3%
- Canada — 2%
- Mexico — 1%
- Brazil — 1%
- Indonesia — 1%
- Rest of the World — 17%

WORLD RESOURCES INSTITUTE

Photo credit: World Resources Institute

3. WHAT IS ENVIRONMENTAL ETHICS?

Environmental ethics seeks to respond to the many environmental consequences of human development in marrying science with philosophy. It considers the many factors and perspectives to be balanced in the design of environmental policy and practice, giving voice to those who believe environmental health should be prioritized over all else as well as those whose rights are threatened by devastating effects of climate change. Environmental ethics promotes the most challenging moral questions that arise with such issues as resource management, industrialization and development, and climate change. The intention of such discussion is not to reach a clear consensus on how to approach our relationship with our environment; rather, the field seeks to promote an awareness of the many dimensions of environmental ethics in order to achieve a just and sustainable future.

KEY TERMS:

Anthropogenic: Caused by humans or their activities
Precautionary Principle: The practice of avoiding activity that may pose a threat to environmental health as opposed to waiting for concrete scientific evidence that requires us to stop such activity
Intrinsic Value: Inherent value derived from a resource's mere existence, regardless of whether or not it is of value to humans
Extrinsic Value: Value based on a resource's ability to provide services for humans

4. BIOCENTRISM, ECOCENTRISM, AND ANTHROPOCENTRISM

Biocentrism:

The biocentric perspective in environmental ethics is concerned with more than just clean water and air for humans; it defends the value of biodiversity, endangered species, the preservation of old growth forests, and other components of healthy ecosystems which biocentrism dictates should be protected from human development. According to biocentrism, the only criterion for a body to have value is the condition of being alive, not sentience (the capacity to feel pleasure and pain). Biocentrism regards the human-centered approach to environmentalism as an irrational bias in our favor, as we are the evolutionarily superior organisms of Earth in every capacity. Other organisms are well-equipped for their own survival, even if they aren't capable of as much as we are.

Ecocentrism:

Ecocentrism takes the concept of biocentrism beyond living organisms and assigns value to those principles and structures which characterize our world as a beautiful, thriving system. For example, according to ecocentrism, ecological systems, biodiversity, and species have value in their own right. Many things beyond individual organisms deserve respect and have intrinsic value, even abstract concepts such as beauty and freedom. Ecological systems and our climate and atmosphere have value above and beyond the significance of their individual parts. Their value is also not characterized by their instrumental value, or how they are important for human use. As articulated by Marion Hourdequin in *Environmental Ethics*, "the beauty of the biotic community cannot be determined by adding together the beauty of each of its elements. It is instead a property of the whole, which is determined not only by the individual parts but by the relationships among them."[1]

Anthropocentrism:

Anthropocentrism, meaning "human-centered," dictates that nature and animals have value, but only instrumentally, as a means to our ends. For example, if we do not rely on polar bears for food, warmth, shelter, or maintaining our standard of living, we have no moral obligation to regard them in our environmental policy decision making. Anthropocentrism regards the needs and rights of humans before any other organism or system. According to most variations of anthropocentrism, the fruits of nature, such as forests and species, are available for our use in order to nourish our development as a species.

Teacher-Directed Class Discussion

Apply Environmental Philosophies:

Consider the "Last Man" scenario (excerpted from Hoffman's "Business and Environmental Ethics"):

Suppose you were the last surviving human being and were soon to die from nuclear poisoning, as all other human and sentient animals have died before you. Suppose also that it is within your power to destroy all remaining life, or to make it simpler, the last tree which could continue to flourish and propagate if left alone. Furthermore you will not suffer if you do not destroy it. Would you do anything wrong by cutting it down?

---

[1] Hourdequin, Marion. *Environmental Ethics: From Theory to Practice*. Bloomsbury, 2015, pp. 75.

For the teacher to conclude a class-led discussion: By the anthropocentric reasoning, the tree is clearly of no instrumental value to you. You are free to use nature as you wish, for your own benefit, and thus would not be doing anything wrong by cutting it down. A deeper ecological view, biocentric or ecocentric, would claim that cutting down that tree is wrong because of its intrinsic value, its worth in and of itself.

5. CLIMATE AND CONTROVERSY

Climate change is a source of global debate on all levels of society. Though scientists have determined that global warming and climate change are threatening modern realities, many individuals adhere to the practice of science denialism. Science denialism has challenged public health efforts on other occasions, such as with the belief that vaccinations are ineffective or that they could be linked to autism in children. Science denialists may claim that climate change is a conspiracy among scientists or that the evidence supporting climate change is illegitimate. They may "cherry pick," or select and manipulate scientific data to contradict an overwhelming consensus of the scientific community. Science denialism seeks to transform science, a matter of evidence, into a matter of opinion.

Less extreme perspectives may still question the validity of scientific claims. Some believe climate change is occurring but debate the extent to which humans are responsible. Such individuals may believe that natural causes contribute to climate change and that the warming we observe would have occurred regardless of our emissions.

Even for those who do not actively question science, climate change represents an inconvenience. To respond to climate change, most populations (especially those in developed nations) would be required to adapt to more environmentally-conscious approaches to human life and development. For a business relying on raw materials from the Amazon rainforest, a policy limiting its use of carbon-sequestering trees would threaten its ability to produce. An average individual receiving electricity from a coal-fired power plant would not find the $30,000 price tag on solar panels attractive. A factory faced with emission limits on sulfur must consider decreasing its hours of operation or seek a costly solution to reducing its production of pollutants.

With the diversity of perspectives represented in the climate change debate, effective action in environmental protection and policy has been slow. The implications of our lack of progress manifest themselves not only in the suffering health of the environment but also global injustice and conflict.

6. HUMAN-CENTERED DIMENSIONS OF ENVIRONMENTAL ETHICS ON A GLOBAL SCALE

Environmental Justice

Poverty and Lack of Representation

There is often a correlation between race and socio-economic status and those populations most frequently victims of environmental injustice. For example, many reserves of conventional energy sources are located in remote areas of the world populated by societies with minimal or no political representation. Such populations often fall victim to human rights abuses and exploitation by energy companies, holding no control in decisions regarding where operations are to take place and waste disposal. These companies may even provide money and equipment for the suppression of protests and resistance by locals. Environmental justice also considers how those populations who contributed least to climate change suffer its most devastating effects, such as exacerbated droughts in Africa and the inundation of Bangladesh.

Culture

Globally, studies show that climate impacts can trigger migration between rural and urban settlements and contribute to rising tensions between socio-economic classes due to inequitable access to resources, cultural dilution because of increased migration, loss of cultural heritage, and drastic changes in lifestyles. Many indigenous groups and their cultures have developed a deep, symbiotic relationship with their natural environments, relying on their health not only for sustenance but also for spiritual and cultural enrichment. Appalachian citizens serve as a prime example of a population whose culture suffers with numerous acts of environmental injustice. Mountaintop removal, a destructive and rapidly expanding mining tactic, violates the spiritual attachment to the mountains that Appalachians have called home for centuries. Unrepresented citizens fight coal companies to maintain their ownership of family plots of land in which generations of ancestors are buried. They are helpless to the destruction of their medicinal plants, animals, clear streams, swimming holes, and hiking trails and lack the government or resources with which to defend themselves against big government and intrusive coal companies.

American Society

American society remains largely divided on the issue of climate change with the population representing a wide variety of perspectives. A large portion of the population believes that we must respond immediately to the warming of the planet, which is primarily caused by anthropogenic (human-caused) contributions. Numerous scientific organizations defend this position, including the National Wildlife Federation, the Sierra Club, the Environmental Defense Fund, and Greenpeace. Many religious and spiritual groups also identify with this stance of serious environmental concern. Opponents of environmentalism may take many forms, such as those who deny that climate change is occurring and refute or ignore the scientific evidence defending it, those who believe it is a "hoax," and those who deny that humans are responsible for our current climate change and that the warming earth is due to natural phenomena. Many of these denialists have economic interests jeopardized by efforts to address climate change. For example, the fossil fuel industry, specifically coal, occupies a prominent role in the American economy, having employed many and contributed to the economy substantially throughout history. With these vocal opposing groups, the climate change debate has become highly politicized and most social efforts to address climate change are soon thwarted and rarely advance to the federal level.

Contemporary Politics of Climate Change
United States of America

The United States occupies second place in the list of the world's top greenhouse gas-producing nations. Despite the efforts of past politicians and many environmentally concerned activist groups, the federal government has been largely ineffective in addressing the issue of climate change. Legislative action has been slow in part because many economically entrenched industries have used their resources to protect their interests by delaying federal regulation. Inefficiencies among branches of government also hinder positive action, such as when the U.S. Senate failed to ratify the Kyoto Protocol (an international agreement of nations committed to reducing their greenhouse gas emissions) upon President Bill Clinton's signing of it.

Barack Obama

During his term as president, Barack Obama served as a defender of the environment and a proponent of immediate action against climate change, calling it "the greatest threat to future generations." Although Congress thwarted several attempts of Obama's Environmental Protection Agency (EPA) to pass climate

change legislation, Obama persisted in America's efforts to combat climate change, designing the Clean Power Plan, launching the American Business Act on Climate Pledge, setting standards for fuel economy vehicles and energy-efficient appliances, and working agricultural industries in the sequestration of carbon and reduction of emissions.

Donald Trump

President Donald Trump denies the science of climate change and does not consider it a threat worthy of immediate concern. Trump's energy reform plan is designed to lead the nation to complete energy independence while accounting for "rational environmental concerns," such as clean air and water. His proposal calls for increased domestic production of coal, oil, and gas, as well as redirecting billions of dollars committed to United Nations climate change programs by Obama towards the repair of American infrastructure. Trump withdrew the United States from the Paris Agreement, a combined effort among the United Nations to slow global warming and strengthen the financial, technological, and logistical ability of the global community to mitigate climate change. He has voided the Obama Administration's Clean Power Plan, as he believes in pursuing all forms of energy, not prioritizing one over the other.

China

China is at the top of the list of nations that produce the most greenhouse gas emissions. However, China has historically prioritized rapid economic growth while ignoring serious environmental issues. China emphasizes the scientific uncertainty that surrounds the climate change debate, constantly questioning the conclusions of such organizations as the Intergovernmental Panel on Climate Change (IPCC). It defends itself as a developing nation at international conferences addressing climate change, arguing that as a sovereign nation it has the need and right to develop. Thus, it should not be obligated to undertake policy that may hinder its development, including environmental policy such as emissions ceilings (limits on the quantity of emissions that a nation may produce). It also defends that industrial nations are those responsible for the vast majority of greenhouse gas emissions over the past two centuries and are thus primarily responsible for reparations. China also maintains that industrial nations are responsible in funding developing countries in their research of technology with which they may participate in the global effort to address climate change. India, third on the global list of top emissions producers, maintains a similar position to China as a developing nation facing international pressures to address climate change.

👥 **Partner Activity**   👥👤 **Group Activity**

Debate: Assign half the class to China's perspective and the other to that of the United States. Allow the class, as groups or individuals, ample time to research and formulate arguments regarding their respective country's emission rights. Debate may be on a class-wide or partner level.

7. CASE STUDIES

Case Study 1: "Heart-Wrenching Video Shows Starving Polar Bear on Iceless Land"

The polar bear has become the poster victim of climate change. With rising temperatures melting ice and threatening global winter seasons, animals such as polar bears are some of the first affected. The polar bear relies on winter seasons for its nourishment, as white ice serves as a camouflaging backdrop for the predator seeking blubber-rich prey. As arctic winters become less cold and ice melts, polar bear populations are gravely threatened with starvation.

Filmmakers from the conservation group Sea Legacy captured a video of a starving polar bear, staggering with hunger and frothing at the mouth. The video quickly went viral as a concrete image of the effects of human-induced climate change. (Video can be found here: https://news.nationalgeographic.com/2017/12/polar-bear-starving-arctic-sea-ice-melt-climate-change-spd/)

It is unclear if the polar bear suffered any other ailments, and the polar bear went missing soon after the video was recorded, so no physical evaluation of the bear could be performed. The polar bear is an endangered species, meaning that it is at risk of extinction due to habitat destruction and other anthropogenic factors. Sufficient scientific evidence identifies the polar bear as a species severely threatened by the effects of climate change, as in recent years we have seen record-high temperatures and levels of melting ice in the Arctic. However, the polar bear is not quite as endangered as many other global populations with a population of about 25,000 remaining.

Teacher-Directed Class Discussion

1. *Is one video of a single polar bear in the Arctic enough to make a case for the effects of anthropogenic contributions to climate change?*
2. *Some scientists suggest that polar bears are capable of adapting to melting ice and rising temperatures. Does this absolve us of a need to be concerned about Arctic ice?*
3. *What degree of obligation do we have to the polar bears?*

Case Study 2: Bangladesh Faces Rising Sea Levels

Climate change has been linked to a number of environmental disruptions that manifest themselves on a global scale. Melting ice contributes to rising sea levels and disrupted ocean currents. The recent increase in extreme weather events and natural disasters may also be traced back to climate change. Some countries suffer the consequences of global emissions and their impact on climate more than others, and these countries in peril are, more often than not, developing nations.

Consider Bangladesh, a country facing threats of rising sea levels. A sea-level rise of 1 meter would flood one-third of its coastline, creating millions of environmental refugees and destroying water supplies, crops, and livestock. Saltwater intruding inland will foul water supplies and crops and harm livestock. Natural disasters will become more frequent and intense, placing more lives, land, and property at risk.

The cost of building infrastructure to protect against such threats of climate change is around four billion dollars while Bangladesh's total federal budget in 2010 was about 10 billion dollars. However, Bangladesh's per capita carbon dioxide emissions are 1/20th of the global average and about 1/100th of US emissions.[2]

Teacher-Directed Class Discussion

1. *Should Bangladesh have to pay the costs of its own protective infrastructure? If not, who should?*
2. *Should responsibility for the effects of climate change be distributed on the basis of each nation's emissions and how they compare on a global scale?*

---

[2] Jamieson, Dale. "Energy, Ethics and the Transformation of Nature." *The Ethics of Global Climate Change*, edited by Denis G. Arnold, Cambridge University Press, 2014, pp. 32.

8. LOOKING TOWARDS THE FUTURE

As global warming and climate change may be primarily attributed to our use of fossil fuels, the most obvious plan to pursue would involve a decrease in reliance on fossil fuels and seeking sources of renewable, clean energy. As global population steadily increases, so does the quantity of individuals consuming energy and resources and contributing to cumulative anthropogenic impact on the environment. Thus, an additional course of action would involve limiting the amount of children we produce.

In recent decades, several innovative and controversial approaches to climate change have emerged. With modern technology, our capabilities permit us to attempt much more than a switch to clean energy and decreased reproduction.

Geoengineering

Carbon Dioxide Removal: Carbon Dioxide Removal, or CDR, attempts to reduce the quantity of greenhouse gases accumulating in the atmosphere by taking carbon dioxide out of the atmosphere. CDR involves planting trees to take up carbon dioxide or fertilizing oceans to promote phytoplankton blooms of microorganisms that can suck up carbon dioxide. Though strategies such as planting trees are relatively benign and pose few ethical concerns, techniques like ocean fertilization involve externalities that threaten ecosystems. For example, a phytoplankton bloom could create "dead zones," or areas with very low dissolved oxygen concentrations, thus dangerously altering ocean chemistry.

Teacher-Directed Class Discussion

- *Is the cost of negative externalities, such as dead zones, worth the benefit of reversing our damage to the climate?*
- *Is geoengineering, even in a simple, "natural" form like CDR, just a way to sidestep the root of the problem and avoid reform of our current habits?*

Solar Radiation Management: Solar Radiation Management, or SRM, is a strategy of changing the earth's energy balance by intercepting sunlight or reflecting it back into space, thus reducing the amount of solar energy we receive. This can involve mirrors installed in outer space to deflect radiation or painting roofs white to reflect solar radiation. There is even the possibility of injecting sulfate aerosols, chemicals that scatter and block incoming radiation, into the stratosphere. This method appears cheaper, faster, and technologically easier than CDR in alleviating our effects on climate change. However, from this method arise significantly more ethical issues than from CDR.

Teacher-Directed Class Discussion

- *Is it ethical to manipulate the climate intentionally at a global scale? Are we attempting to "play God," and if so, is that unethical?*
- *Who gets to decide whether we employ this method, and who will be considered in making the decision?*

- *How can we predict the full range of impacts that this kind of geoengineering will have on our climate and the world's ecosystems and communities?*
- *If we employ SRM, will we embark on a frenzy of geoengineering techniques far more aggressive and controversial?*

Human Engineering

Human engineering is a strategy of mitigating anthropogenic contributions to climate change beyond encouraging behavioral changes. It involves the "biomedical modifications of humans so that they can mitigate/or and adapt to climate change."[3] With human engineering, an embryo would be selected for traits that would allow for its smaller ecological footprint. For example, a meat-intolerant child would not consume products of the livestock industry, which is responsible for substantial deforestation and methane production. With fewer meat-consuming individuals, the demand for meat would decrease, thus shrinking the livestock industry. Smaller individuals would require less energy and resources per capita, and educated women are more likely to have fewer children. Of course, human engineering is a highly controversial topic. Beyond the risky nature of the proposed hormone therapy for making children smaller, many may find the mere concept of interfering with human nature immoral.

Teacher-Directed Class Discussion

- *How else may we engineer humans to be more environmentally-friendly?*

Challenges in Global Policy

Distribution of Responsibility: In designing policy and strategies for approaching climate change on a global scale, we must consider whether every nation will be held to the same standards, or if some nations are to commit to stricter regulations in their emissions and efforts to reverse climate change than others. As emphasized in issues of environmental justice, developing nations contributed least to climate change and yet suffer its harshest consequences. Moreover, when it comes to the difficult choices about global environmental policy, the rights of developing nations are most vulnerable and they are the bodies least likely to be represented.

Guidelines for policy: In terms of emissions, policy makers will be forced to consider the basis on which to distribute emissions rights. On an international scale, should developing nations be given greater allowances, as industrial development requires an inevitable surge in greenhouse gas emissions? Logistically, should emission rights be considered on an individual level, allowing one to emit only so much as is required to live a minimally decent life? Or should we calculate the level of global emissions that would be sustainable and divide rights among the world's nations from there on a basis of population?

9. CONCLUDING ACTIVITIES

Video Wrap-Up: Dr. Erich Matthes of Boston College

Dr. Erich Matthes of Boston College speaks to the varying perspectives in the contemporary discussion on environmental ethics, with a focus on climate change. The interview is intended to conclude the class

---

[3] Liao, S. Matthew, et al. "Human Engineering and Climate Change." 2 Feb. 2012, pp. 2.

discussions on the various questions addressed in this module and lead into a fun final activity (See additional resources).

Class-wide game: "Extra Credit Catastrophe"

This game is intended to simulate international relations on the subject of climate change. Students will be faced with the difficult decision of preserving their own wealth or sacrificing it in hopes that the collective will contribute equally towards the mitigation of climate change. Though the ultimate prize outlined here is extra credit on the final exam, any incentivizing reward may be substituted (See additional resources).

10. ADDITIONAL RESOURCES AND REFERENCES

Additional Resources:

> Presentation on Global Warming and Climate Change:
> https://docs.google.com/presentation/d/1OEDoElvpNwDQdZOeedEYLupWGhxviL-r4VrA_h45ylA/edit?usp=sharing
> Dr. Erich Matthes on Environmental Ethics and Climate Change:
> https://www.youtube.com/watch?v=0k1gGFXSCfY
> Extra Credit Catastrophe:
> https://static1.squarespace.com/static/5a2614102278e77e59a04f26/t/5a32975bf9619aebe0624cbe/1513264987164/Extra+Credit+Catastrophe.pdf

References:

"A Historic Commitment to Protecting the Environment and Addressing the Impacts of Climate
 Change." *National Archives and Records Administration*, National Archives and Records
 Administration, obamawhitehouse.archives.gov/the-record/climate.

Bittel, Jason. "The Polar Bear, Climate Change's Poster Child, Ignites Controversy." *NRDC*,
 Natural Resources Defense Council, 22 Dec. 2017, www.nrdc.org/onearth/polar-bear-climate-changes-poster-child-ignites-controversy.

"Energy and Human Rights Abuses." *Energy Security, Equality, and Justice*, by Benjamin K.
 Sovacool et al., Routledge, 2014, pp. 125–130.

Hansson, Sven Ove. "Science Denial as a Form of Pseudoscience." *Studies in History and
 Philosophy of Science Part A*, vol. 63, 2017, pp. 39–47., doi:10.1016/j.shpsa.2017.05.002.

Hatch, Michael T. "International Negotiations and Politics of Climate Change in China." *Global
 Warming and East Asia: The Domestic and International Politics of Climate Change*, edited by Paul G.
 Harris, Routledge, 2004, pp. 48–54.

Hoffman, W. Michael. "Business and Environmental Ethics." *Business Ethics Quarterly*, vol. 1,
 no. 2, 1991, pp. 169–184.

Hourdequin, Marion. *Environmental Ethics: From Theory to Practice*. Bloomsbury, 2015.

Jamieson, Dale. "Energy, Ethics, and the Transformation of Nature." *The Ethics of Global*

Climate Change, edited by Denis G. Arnold, Cambridge University Press, 2011, pp. 16–37.

Liao, S. Matthew, et al. "Human Engineering and Climate Change." 2 Feb. 2012.

Morrone, Michele, and Geoffrey L. Buckley, editors. "Poverty and Political Economy in
Appalachia: Theoretical and Historical Context." *Mountains of Injustice: Social and Environmental Justice in Appalachia*, Ohio University Press, 2011, pp. 21–31.

Morrone, Michele, and Geoffrey L. Buckley, editors. "Loss of Heritage and Culture." *Mountains of Injustice: Social and Environmental Justice in Appalachia*, Ohio University Press, 2011, pp. 172–173.

"Pluralism, Contextualism, and Natural Resource Management: Getting Empirical in
Environmental Ethics." *Refounding Environmental Ethics: Pragmatism, Principle, and Practice*, by Ben A. Minteer, Temple University Press, 2012, pp. 114–139.

"The Challenges Ahead." *US Politics and Climate Change: Science Confronts Policy*, by Glen
Sussman and Byron W. Daynes, Lynne Rienner Publishers, 2013, pp. 194–209.

"The Paris Agreement." *UNFCCC*, UNFCCC,
unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

"Trump on the Issues: Energy and Climate Change." Edited by Jonathan Masters, *Council on
Foreign Relations*, Council on Foreign Relations, www.cfr.org/interactives/campaign2016/donald-trump/on-energy-and-climate.

UNESCO, and COMEST. *The Precautionary Principle*. *The Precautionary Principle*, United
Nations Educational, Scientific and Cultural Organization, 2005.

"What's in a Name? Weather, Global Warming and Climate Change." *NASA*, NASA, 20 Jan.
2016, climate.nasa.gov/resources/global-warming/.

Image sources:

"Climate Change Indicators in the United States." U.S. EPA, Dec. 2012.

"Top Diagrams to Explain Climate Change – The World At 1°C." *The World At 1°C*, The World At 1°C, 17 Aug.
2017, worldat1c.org/top-diagrams-to-explain-climate-change-10c5a016b6e9.

ACKNOWLEDGEMENTS