Chapter 1
Why Teach about Climate Change in English Language Arts?

> We don't have a problem with economies, technology, and public policy; we have a problem with perception because not enough people really get it yet. I believe we have an opportunity right now. We are nearing the edge of a crisis but we still have an opportunity to face the greatest challenge of our generation, indeed of our century.
>
> James Balog (Orlowski, 2012)

> The debate about climate change is not about greenhouse gases and climate models alone. It is about the competing worldviews and cultural beliefs of people who must accept the science, even when it challenges those beliefs.
>
> Andrew Hoffman (2015, p. 88–89)

With every sunrise and rotation of the Earth, humans are more interdependent on reading and writing. We are using more tools for communicating than ever before, creating increasing opportunities for people across the globe to share, organize, and solve all kinds of problems from attacks on democracy to a warming planet. These changes have moved the role of the English teacher to center stage. Humans have always been storytellers, and it has long been known that those who tell the stories control the future. It is by critically understanding the messages and stories engulfing them, and learning the skills to take action, that our students can create alternative discourses to change the present and shape the future. As English teachers, we have the potential to excite, inspire, and empower students to recognize this potential and become involved in the issue of our age, climate change and environmental justice.

Our planet has already irrevocably changed as a result of human-made emissions of carbon dioxide, methane, and other gases. Today, in line with predictions made for decades, we are seeing increasing temperatures, dramatic weather swings, devastating droughts, wildfires, huge storms, flooding, sea-level rise, warming and acidic oceans, enormous animal and plant extinctions, and more (Mann & Kump, 2015; Romm, 2015). Our planet has warmed one degree Celsius more rapidly than any time in Earth's history, with 2016, the year we wrote this book, the hottest year in recorded history.

Recent research indicates that global temperatures may increase by 4 degrees Celsius as early as the 2070s and perhaps even sooner (Intergovernmental Panel on Climate Change, 2016). A rise of 4 degrees Celsius would permanently devastate US food production, not to mention food production in other countries. The Antarctic and Greenland ice sheets have already begun to melt and break apart. No matter what humans do now, sea levels are going to rise, and rise substantially. Much of Florida and the East Coast of the United States will first be subjected to

storm surges, and then inundated, as will many of the largest cities in the world (http://tinyurl.com/zbhldg5).

There is no going back. Each gallon of gasoline burned represents 100 tons of ancient plants (Dukes, 2003) and the carbon they captured being returned to the atmosphere. When carbon dioxide is released into the air it continues to affect climate for hundreds, even thousands of years. We are currently on the trajectory to 4 degrees and more. It is imperative to change what we are doing and limit temperature rise to 2 degrees. It is not certain that even with focused world attention on greenhouse gas reduction, that 2 degrees is still possible. For the sake of the human race and life on Earth, we must, nonetheless, do all within our power to limit global warming as much as possible and as soon as possible. As one of the world's most influential climate scientists puts it, "the difference between two and four degrees is human civilization" (Marshall, 2015, p. 241).

Whatever happens, climate change will be the defining feature of the world our students inhabit. Addressing climate change is everyone's responsibility, and that includes English teachers. As this book will show, there is much we can be doing.

We and our students can and must make a difference. We have the opportunity and obligation to educate our students about climate change; fire their imaginations, their talents, and their energies; inform our local and larger communities; and, join with others across the globe to demand and participate in one of the largest and most urgent transitions in human history.

THE CRISIS AND THE URGENCY OF CHANGE

In a simple model, humans impact the climate by releasing gases which accumulate in the atmosphere and bounce solar energy back to the Earth, as in a greenhouse, making the Earth grow continually warmer. Indeed, our planet is absorbing a lot of heat, warming all ecological systems. Scientists have calculated that in recent years Earth has been gaining as much heat every day as would be released by 400,000 Hiroshima atom bombs (Romm, 2013). Human emissions cause the increased warming, and natural feedback loops speed it up even faster. Ice and snow reflect 70 percent of solar energy while the open ocean absorbs 95 percent. So as polar ice caps melt and expose more ocean, a great deal more heat is absorbed and global warming is accelerated "naturally." Warming by human emissions releases methane, a greenhouse gas, from tundra and ocean beds, again accelerating warming (see Figure 1.1). As McCaffrey (2014) notes

> The interconnectedness of Earth's systems means that a significant change in any one component of the climate system can influence the equilibrium of the entire Earth system. Positive feedback loops can amplify these effects and trigger abrupt changes in the climate system. These complex interactions may result in climate change that is more rapid and on a larger scale than projected by current climate models.
>
> McCaffrey (2014, p. 136)

Global warming will have devastating impact in every country. Current understanding indicates that a catastrophic world of mass starvation, mass flooding, mass migration, and mass death of hundreds of millions, perhaps billions, of people may happen much sooner than most expect, particularly in developing countries. An entire lake in Bolivia, the size of Los Angeles, is now bone dry, resulting in residents having to flee. The largest city in the western hemisphere with 20 million residents, São Paulo, Brazil, is close to running out of water. Due to rising sea levels, many of the Marshall Islands and coastal regions of Bangladesh are under water or soon will be.

FIGURE 1.1 Fa

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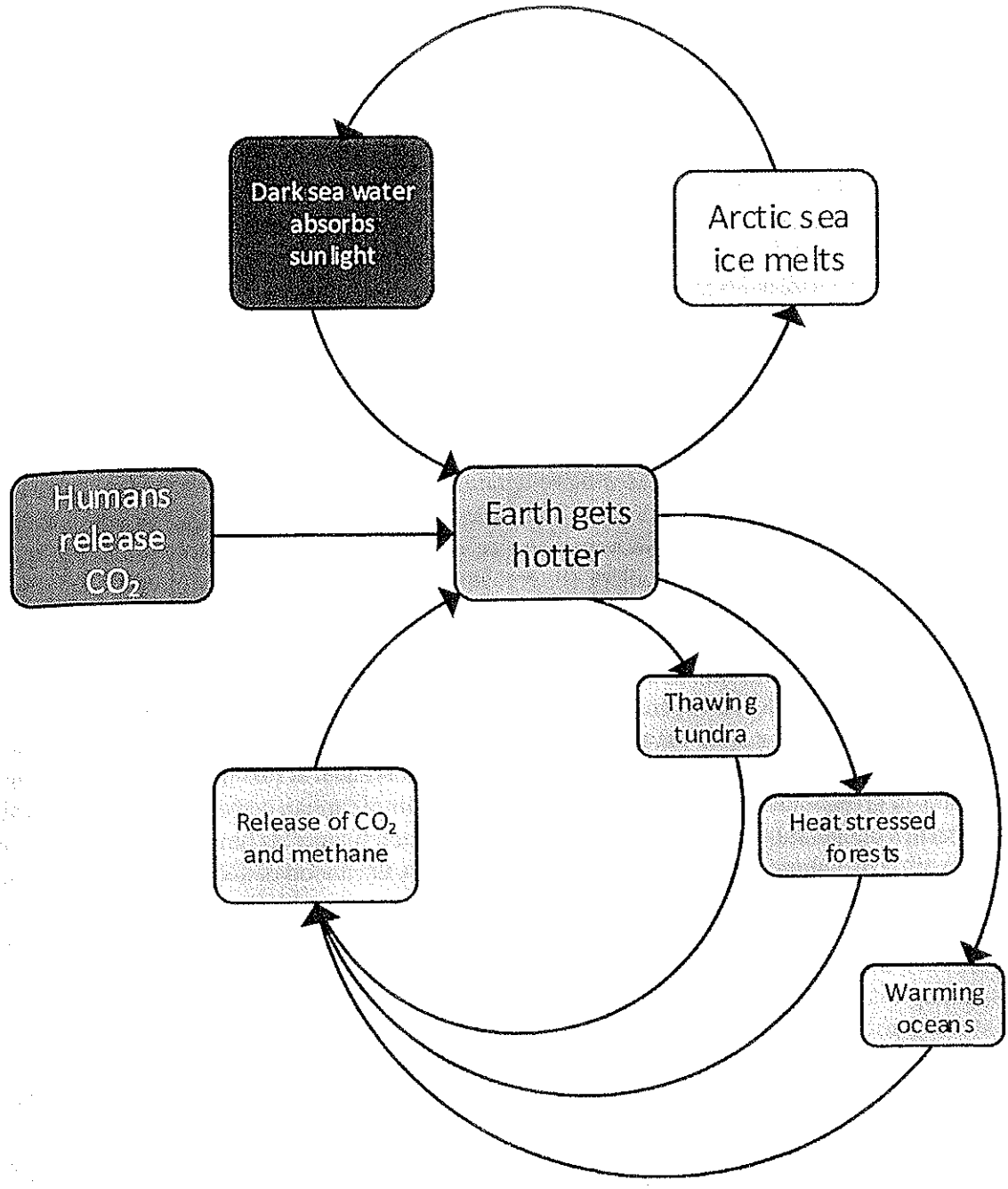

FIGURE 1.1 Factors Impacting Climate Change

Some of the first to suffer and endure the worst effects are the poorest countries, nations that have the least responsibility for the pollution that causes climate change. Poorer countries and poorer people have fewer resources to defend themselves, so the impacts of climate change will be unfair and unbalanced. The US Military considers climate change a threat multiplier that will cause hunger and disease, increase instability, undermine governments, and intensify conflicts and terrorism. It is already doing so in the Middle East and Africa. While climate change will

be disastrous for the poorest regions of the world, it will also have horrific consequences for wealthy countries, the United States included.

We know about Hurricane Andrew in Florida, Hurricane Katrina in New Orleans, flooding in Baton Rouge, Superstorm Sandy in New York, the Texas drought of 2010–2014, the California drought of 2012–2016, and so on. In 2012, drought in the Great Plains and Prairies (the American "breadbasket") led to loss of half of American food crops. The northern jet stream that meandered south during winters in 2013–2015, caused by relatively warm Arctic temperatures that weakened the polar vortex and created frigid winters in the Midwest and Northeast punctured by surprising heat, resulted in 75 degrees on Christmas Eve in New York in 2015. And we are only at one degree Celsius above average so far.

Across the world, all social systems will be stressed and adversely affected by climate change. Just one example: health. People will experience adverse health effects from high temperatures, water and food shortages, toxic algae in drinking water, increases in stress and mental health issues, particularly for populations who will need to leave their regions due to high temperatures, drought, or sea-level rises. Thousands, especially older people and children in cities, will succumb to heat waves. Mosquitoes and ticks will proliferate and likely cause disease migration including increasing outbreaks of dengue fever and malaria, some of the world's most deadly diseases. Extreme weather events result in water source contamination and increased instances of waterborne diseases including cholera (Intergovernmental Panel on Climate Change, 2016). These adverse health effects will lead to increased health care costs for governments and individuals, expenses that need to be considered when weighing the costs of investing in clean energy options to limit emissions. As Professor Richard Gammon once said, "If you think mitigated climate change is expensive, try unmitigated climate change."

These terrifying scenarios have already begun. They will become far more common unless major changes to address global warming are rapidly undertaken across the globe. The current amount of greenhouse gases in the atmosphere as a result of human activity has already raised the Earth's temperature by one degree Celsius. The "carbon budget" is how much more carbon (from oil, coal, natural gas) can be emitted and still have a likelihood of keeping global warming at 2 degrees Celsius. Some of the carbon humans emit is removed by carbon "sinks"—oceans (becoming more acidic) and forests (disappearing due to clear cutting, fires, and pests)—the rest goes into the atmosphere. The most recent research indicates that if we are to hold global warming to 2 degrees, *80 percent of known carbon reserves must not come out of the ground* (McKibben, 2012; Clark, 2015).

The next two decades are absolutely critical to the future of the Earth hence the immediate need to reduce greenhouse gas emissions. Unfortunately, the general public, particularly in the United States, which leads the world in per capita emissions, still does not perceive climate change as a crisis. While public concern is growing about the need to address global warming, a Pew Research Center survey conducted in January, 2016 indicated that only 38 percent of the American people perceive climate change to be a priority issue needing to be addressed by Congress, ranking sixteenth in importance against all other issues (Pew Research Center, 2016). While 55 percent of Democrats ranked it as a priority, only 14 percent of Republicans listed climate change as a priority. Younger people are more concerned about climate change than the older people, with 52 percent of young adults indicating that climate change is a very serious problem compared to 38 percent of people 50 years and older.

Even though 97 percent of scientists confirm that climate change is caused by humans and predict with certainty that catastrophic consequences will occur if carbon emissions are not reduced immediately, a small number of powerful people, organizations, and corporations, who

have much to lose from a change to alternative energy, have managed to dominate the public discourse and frame climate change as "debatable" and "controversial" (Oreskes & Conway, 2011). These few vested interests have been highly successful at influencing mainstream US media to spin the facts about climate change and create a false narrative. In a culture of immediate media spectacle, when the primary news providers are owned by transnational corporations, journalism becomes entertainment and profit, trumping social responsibility and full reporting of the facts (Sperry, Flerlage, & Papouchis, 2010).

Being able to critically question and understand the stories of our time is an important goal for all literacy teachers and the objective of this book. Throughout these pages we unpack the facts and stories about climate change with practical examples of how English teachers have fostered their students' imagination and engaged them in powerful literacy lessons.

RECOGNIZING THE NEW REALITIES

There was a sense of urgency for the 196 nations attending the 2015 United Nations Climate Change Conference in Paris as scientists confirmed only 25–30 years are left to dramatically lower emissions to keep global warming to no more than 2 degrees Celsius. With the cooperation of President Obama and Chinese President Xi Jinping an important and historic agreement to limit greenhouse gases and address global warming was reached.

Unfortunately, in many ways the Paris agreement is not enough. The agreement does not call for leaving carbon in the ground, which is essential. It did not establish a global carbon tax, though individual nations can impose one. All the pledges made in Paris were strictly "voluntary." The richest countries, which have benefited the most from industrialization and put the most carbon in the air, provided only a pittance to address climate change in the poor countries. India, with 25 percent of its 1.3 billion people living in extreme poverty, is understandably reluctant to lessen energy production associated with economic growth. China, with its 1.4 billion people is in a similar situation, though both countries did make commitments. Even under the most optimistic assumptions, the pledges at best still set the world on a path to increasing global temperatures beyond 2 degrees.

So in the aftermath of the Paris agreement, and before the next climate summit in 2020, there remains a tremendous need for people the world over to understand the new realities and participate in the radical transitions necessary to avert the impending danger of climate change. Change is required in more than consumption habits. In our roles as workers and citizens we will need to transform energy, economics, transportation, agriculture, housing, media, health care, and community life. These are huge tasks that require creative actions by countless numbers committed to the cause. Who better to people this movement than students who see their future on the line. And who better to prepare these students than English teachers who understand the power of imagination to grasp big ideas and use literacy to change the world.

Indeed, climate change can be overwhelming. It involves thinking beyond what we already know and it goes against our natural tendency toward safety and normality. Global warming is incorrectly viewed as a topic for the distant future, not an urgent issue in the here and now. Being presented with the science of climate change does not mean everyone will accept its reality or start to do something about it. As students learn about climate change they may experience concern, doubt, anxiety, or ambivalence. Yet, their emotional responses can be starting points for developing hopeful and active engagement.

Our experience and that of the other English teachers we have been working with is that while students may come to the subject of climate change with doubts and questions, when

they are able to inquire into the topic they become engaged, eager to educate others and address the problem.

Global warming is a topic that should and does matter to young people. A survey by the Yale Climate Change Communication Project found that the vast majority of parents (77 percent) support teaching climate change in schools (Adler, 2016). Yet, the education students do receive is limited. While 57 percent of teens understand that climate change is caused by human activities, only 27 percent say they have learned "a lot" about global warming in school (Leiserowitz, Smith, & Marlon, 2011). If, in the public sphere, informed and reasoned discussion about climate change does not always take place, in our classrooms we and our students can openly inquire into new realities, engage in civilized discussion, imagine and begin to enact change. Students can script and rehearse conversations with family or friends who may be less knowledgeable. As young people work to inform others, new understandings and behavior can come about quickly through social and new media, and through our students' modeling of behavior and enthusiasm.

ADDRESSING CLIMATE CHANGE IN ENGLISH LANGUAGE ARTS

English language arts students are transported across the globe, back in time or into the future as they engage with the imaginations of poets, playwrights, novelists, journalists, advertisers, filmmakers, lyricists, and the best storytellers the world has encountered. English classrooms are spaces of discovery, possibility, and participation where students learn to empathize with experiences of people like and unlike themselves. They are places of moral and ethical reflection about new ideas and complicated human realities. In English language arts classes, students can read about the devastating effects of global warming, comprehend its human-made causes, and understand the creative ways people in all corners of the globe are responding to this challenge. And it is also in this space of possibility, where students can learn to write with many tools to express their ideas, voice their concerns, and contribute to the environmental justice movement.

Learning to critically read their world, English language arts students can draw on informational texts and documentaries to understand climate change and examine portrayals of the effects of climate change in literary, nonfiction, and media texts. They can critically examine the influence of human economic, political, agriculture, transportation, and housing systems impacting ecological systems. ELA students can explore creative utopias and dystopias, climate fiction and film to imagine different futures and a safe, healthy, just, and environmentally sustainable world. Students need to be critical of the claims that deny the science, skeptical of the people who assert nothing can be done, and empowered to act with the kind of courage we have seen in the past when humans have risen together against overwhelming odds (Klein, 2015).

David Kangas, who teaches at Memorial High School, in Wayne, Michigan, believes that English language arts students need to better understand the world they live in, and that means critically thinking about how climate change is presented to us and how we respond. He wants his students to examine how the carbon-based social systems both hinder understandings and create openings for critical thinking. He invites his students to use their literacy skills to express their concerns and create alternative media messages. Kangas explains,

> Climate change is in my view primarily a human problem and therefore worth exploring in the ELA classroom. Many catastrophic images of weather are the ways people frame climate change. What is harder to detail are the systems people inhabit that contribute to making climate change a difficult problem to understand. I am thinking here about post-carbon humanities. I think it is important to understand the ecological principles

> behind climate change but also to understand the media ecologies we inhabit as well and how these two systems might actually be interdependent. We need to help our students critically consume texts so that they can create texts of what they are observing in their own schools' neighborhoods or cities when it comes to how the climate—both physical and textual—influence[s] their understanding of the social worlds they inhabit.

David gets that students are surrounded by media and that the media are not doing an adequate job educating us about climate change. He sees an important place for the humanities in the transition to a post-carbon world.

Our relationship to the land and to the animals and plants that live on it was called by Aldo Leopold, the "Land Ethic." This ethic rejects a strictly human-centered view of the environment and focuses on the preservation of healthy, self-renewing ecosystems. The Land Ethic raises questions about our relationship to the natural world, to other animals, and to plants. These ethical and environmental questions are appropriate to English language arts. lisa eddy, an English teacher from Adrian, Michigan explains:

> The Land Ethic teaches us that we should consider our actions in light of their impact on the living, breathing community that is the land, and that we should select the alternative available that does the least violence, or impact, to that community. We are at a crisis point in human existence. Because of our ignorance of and/or resistance to the idea of Land Ethic, we have brought our planet to a place where things are out of balance: our energy, food, and transportation systems must be drastically changed to slow carbon output and slow Earth's temperature rise. When it comes down to it, we are one people who live on one planet, and we can teach in such a way as to focus on our local landscape in a global context.

We believe that a purely science-oriented approach to climate change can miss the social, historical, ethical, and human realities that are critical to the problem. Climate change is an accelerator that exacerbates economic, racial, and social inequality. English language arts involves understanding and creating relationships with and between people and characters mediated through language, texts, and media. This knowledge is necessary to understand and address climate change. Pieter Maeseele (2015) explains that framing climate change primarily in the discourse of science limits consideration of the politics of how humans understand and relate to the environment and to each other, and how and whose voices are heard.

Fostering civic engagement can also shift the overall focus of English from positioning students as autonomous individuals or consumers set apart from the world to students as social participants whose ways of being and acting directly affect the local and global ecology (Yagelski, 2011). This shift involves redefining academic success based less on individual achievement and test scores and more on one's social and collaborative relationships with others and how our actions can contribute to sustainability and environmental justice.

As teachers of English, in this book we set forward a perspective and a set of values for teaching about climate change. Our approach emerges from an understanding of the Anthropocene era in which we now live, when environmental, geological, and ecological systems are profoundly altered by human activity. Our beliefs are based in world citizenship, the rights and well-being of all, and the recognition of connections between the diverse members of the world family. Adopting this climate change perspective involves:

1. Foregrounding climate change as the most important issue facing life on Earth.
2. Understanding the causes and effects of climate change locally and globally, as well as the efforts to deny them.

3. Overcoming individualism and nationalism, and adopting a systems-based, global perspective.
4. Creating solidarity with the oppressed and exploited, addressing the unequal impacts of climate change, and striving for social justice.
5. Envisioning and enacting transformational changes through individual and collective action, in which everyone is accountable for their actions and inactions.

The rest of this chapter examines key issues about climate change necessary to consider and frame the teaching of climate change in English language arts.

STANDARDS, TEXTBOOKS, "CONTROVERSY," AND OTHER COMPLEXITIES OF TEACHING ENGLISH

There are plenty of pressures on secondary English teachers that make it challenging to develop and implement new ideas and new curriculum. This book includes examples of English teachers describing their efforts to meaningfully address climate change in their classrooms—it is important to ask: how were they able to do it?

In the United States, most states have adopted the English language arts Common Core State Standards (CCSS), and teachers are increasingly told that they need to address those standards. For the most part, the CCSS are not content based, but skills based. That is they do not require specific curriculum, specific literary works, specific topics, or specific themes. As their Introduction states, "A great deal is left to the discretion of teachers" (Common Core State Standards, 2010, p. 6). Part of the very idea of the CCSS is to free teachers and curriculum developers to identify meaningful, engaging content that will raise academic and intellectual expectations. Climate change can provide this kind of content.

Instruction about climate change relates to a number of the CCSS anchor standards. CCSS encourage bringing more "informational texts" into English classes. Quoting the CCSS Introduction, "They [the standards] actively seek the wide, deep, and thoughtful engagement with high-quality literary and informational texts that builds knowledge, enlarges experience, and broadens worldviews" (p. 3). The standards emphasize close and careful reading, persuasive writing, and developing arguments. The standards expect students to "demonstrate the cogent reasoning and the use of evidence that is essential to both private deliberation and responsible citizenship in a democratic republic" (p. 3). In English language arts, the standards explicitly foster an integrated model of literacy, using research, developing technology and media skills, and understanding other cultures and perspectives. The standards encourage an understanding of literacy across disciplines and, when appropriate, it makes sense to build bridges between content areas—climate change offers many opportunities for this type of interdisciplinary teaching.

Another challenge that English teachers confront is obtaining the texts they need to do the teaching they believe in. This book provides classroom tested examples of a wide variety of new materials, including climate fiction short stories and novels, "informational texts," young adult fiction, film, documentaries, websites, and so on. We share stories about entire English language arts courses devoted to climate change as well as significant units on the subject. At the same time we remain conscious of the challenges many teachers face in changing the curriculum, finding time for new approaches, and obtaining new materials.

Throughout this book we tell stories about English classes that address climate change in ways that worked in their context. We describe teachers who use shorter works, stories, poetry, essays, novellas, movies, that fit easily into crowded curricula and help develop important climate change

teaching. We draw on new approaches in climate fiction that can be brought to almost any literary work in your curriculum and allow you to address climate change in your class with the works you are currently teaching. We talk about instructional strategies that are effective in working with limited resources including choice reading, literature circles, and jigsaw approaches. We point to a variety of information from essays, images, videos, and websites that are available free, online. The wiki we have created to accompany this book http://climatechangeela.pbworks.com has many more suggestions and links; because it is a wiki, teachers can post and continue sharing ideas on this wiki.

Sometimes teachers or administrators are reluctant to address "controversial" topics. As we have learned there is, in fact, no legitimate controversy in the scientific community that climate change is happening, is caused by humans, and poses a frightening challenge to life on Earth. The "controversy" is in fact bogus, a sham created by climate change deniers often funded by carbon companies that stand to lose money in the short run if necessary actions are taken to protect the planet. English teachers have never let Holocaust deniers stop us from teaching about the Holocaust. Climate change deniers are not denying something in the past; they are denying something in the future that we can now act to prevent or ameliorate, thus saving millions of lives. Not so long ago we were told that tobacco was good for you and doctors were seen on television promoting their favorite brands of cigarettes. However, the general public has since learned what the tobacco companies knew for years: tobacco is devastating to human health. Some of the same public relations firms and pseudo-scientific experts that distorted the truth about smoking are now at work spinning public discourse to doubt the science of climate change (Oreskes & Conway, 2011). In the case of climate change we are talking about human health, and much more. If our society fails to address climate change it will insure the destruction of a liveable world for all of us. The stakes could not be higher.

Our approach is to engage students as co-learners by tapping into their concerns, questions, and interests. We have found that rather than taking away time and energy, teaching about climate change inspires and empowers students to use literacy as a meaningful tool for change. While writing this book in the spring of 2016, Allen was teaching his first literature course for college students at Western Michigan University entirely focused on climate change. He began with the first chapter of Bill McKibben's (2010) book, *Eaarth: Making Life on a Tough New Planet.* His students wrote passionate blog posts you can still read http://OurPlaceInNature3110.blogspot.com. One of his students, Lauren Koch, explained:

> Most of us are okay remaining ignorant and in the happy routine of our lives. We need to wake up. We need to become completely aware of what is going on around us, and the effect that we have on it. Earth has already changed, and it is going to continue to. That is exactly what Bill McKibben is doing through the first chapter of *Eaarth*. Through all of the crazy statistics and future scenarios, he's preparing us for what has already been happening. He's making us aware.

Another of Allen's students, Maddie Reeves wrote:

> The chapter made me think long and hard about my individual choices. We may all feel like drops in the ocean, but added up, each of our choices, ranging from what car we drive and how much we drive it to whether we throw that plastic Coke bottle in the trash or the recycling bin, make a huge impact on the planet and its future.

Allen reports that the first class meetings were full of passionate and intense discussion. At the beginning of the second week he asked his students how many of them had talked to someone else outside the class about what they were learning. In a moment, every student in the class had a hand in the air.

CLIMATE CHANGE IS A STORY

In every discourse whether that be of science, the mass media, or literary, or cultural artifacts, climate change is a story, and the plot, the characters, and how that story has different variations (Gaard, 2014). The way a story is told makes a difference in how we understand it and respond to it.

A common version of the climate change story is that transportation and energy production are the main characters and the plot develops around the need to transition to solar, wind power, and batteries. A different version emphasizes animal agriculture, asserting that worldwide production of beef, chicken, and pork emits more greenhouse gases than transportation or industry—and the importance of eating far less meat. Another version features large corporations as the primary actors, the need for regulating carbon consumption and methane leaks, and the challenge of addressing corporate lobbying and misinformation.

The global warming story is also told contrasting first world versus developing countries' consumption and lifestyles, and raises questions about climate justice: who benefits from causing climate change and who suffers? Poor countries ask to have the carbon pollution that they did not create removed from their skies, and the rich countries who developed by burning carbon pay for the consequences in the poor countries and accept the climate change migrants forced to flee their homes (People's Agreement of Cochabamba, 2010). Related retellings of the story emphasize the inequality of the rich and the poor both between and within countries and questions of responsibility and consequences, or the differential impacts of climate change on people of color and women.

Another way to tell the climate change story is to focus on the impact on natural systems, plants and animals, species extinction, and the role of humans. This story has versions about deforestation or agriculture or the oceans. The story can be about changing our approach to nature from extraction to sustainability, from insensitivity to respect, even reverence.

These different and yet interrelated stories of climate change explain natural phenomena, as have stories since ancient times in all societies. The different climate change stories engage alternative values, beliefs, and discourses, from science as truth to religious stewardship of nature, from free-market economics to government regulation and international cooperation, from multicultural understanding to basic ideas about justice and equal rights. Which versions of the story do we hear and which do we not hear? Whose experience is visible and whose is invisible? Whose voices are heard and not heard?

The stories of climate change may not be the stories that English teachers have traditionally wrestled with, but they are the stories that will increasingly dominate the news and shape our existence. As this book shows, they are increasingly the stories of literary works and nonfiction. English teachers are experts at helping students examine relevant, complex, and connected stories, and look for meaning and truths in and behind the words. We foster our students comparing, contrasting, and evaluating stories and making large and small life choices based on what they learn.

CLIMATE CHANGE AS AN ETHICAL AND MORAL ISSUE

Students are motivated to care about climate change because of deeply held ethical concerns for the human race (Weber, 2016). Complex and uncertain comparisons of costs of climate change mitigation versus costs of adaptation to climate change have their place but students are more likely to adopt a climate change perspective because of a moral sense of responsibility

(Schmidtz & Willott, 2011; Broome, 2012). One analysis of college students' propensity toward pro-environmental behaviors found that their attitudes and values had a stronger effect on adopting behaviors than their knowledge, suggesting the need to combine knowledge, attitudes, and values (Arnon, Orion, & Carmi, 2015). It is telling that Pope Francis' 2015 Encyclical Letter "On Care for Our Common Home" "reframes climate change and other ecological challenges from economic and technological issues to one of the moral stewardship of public goods" (Weber, 2016, p. 131).

Contemporary writers who address the moral questions of climate change often talk about the extent to which current generations are willing to invest so as to not devastate future generations. They talk about how humans are morally obligated to not:

> hand over a planet Earth that has less worth or in a more miserable condition than the planet we ourselves have had the good fortune to live on. Fewer fish in the sea. Less drinking water. Less food. Less rainforest. Less coral reef. Fewer species of plants and animals.
>
> Gardner (2015)

These writers miss the point when it comes to teaching the current generation of middle-school or high-school students. As far as our students are concerned, that handing over has already taken place.

Future climate projections used by the international scientific and political communities generally go only as far as the year 2100. The average life expectancy of American and European children today is about 90 years. A child born in 2005 is likely to live into the 2090s. Our students are the first generation whose whole lives will be lived as the enormous impacts of climate change are playing out. Although those climate change projections that do go beyond 2100 are terrifying indeed, as far as our students are concerned, we are not talking about their children or their grandchildren; we are talking about them, their world, the direct moral and ethical questions they face.

While students, given their geographic locale, may not directly experience the worst impacts of climate change right now, they can vicariously begin to imagine and understand the effects of climate change on real people as portrayed through traditional media, social media, testimonials, documentaries, images, art, essays, film, and literature. This kind of textually based human perspective teaching is at the heart of English language arts instruction. Examining multiple perspectives raises important questions:

- Who is suffering from climate change? What is their experience like? How have prior history and current social conditions shaped their options?
- What would it be like to be a climate change victim or refugee? What responsibility do we have to victims and refugees? How can we help them? What is our role in the global community?
- Who is responsible for climate change? How does inequality shape the causes and impacts of climate change? What is our responsibility in the present for events that will occur in the future?
- What responsibilities do humans have to animals, plants, and the natural world?
- What would a just and fair approach to addressing climate change look like? What values are important when addressing climate change?
- Will the market alone address climate change? What is the role of local, national, and world governments? How does climate change impact political choices and thinking?
- What is climate justice and how do we help create it?

In responding to literature or media, or in writing about their daily experiences, students reflect on characters' or people's actions as measured by ethical and moral beliefs (Martusewicz, Edmundson & Lupinacci, 2014; Turner, 2015). A climate change perspective calls for overcoming individualism or nationalism, and adopting a systems-based, global view. As Naomi Klein (2015) notes in her book, *This Changes Everything: Capitalism vs. the Climate* (for study guide lessons for this book: http://tinyw.in/4z4C.

> Fundamentally, the task is to articulate not just an alternative set of policy proposals but an alternative worldview to rival the one at the heart of the ecological crisis—embedded in interdependence rather than hyper-individualism, reciprocity rather than dominance, and cooperation rather than hierarchy.
>
> Klein (2015, p. 462)

Great literature and English language arts have always been places for thinking about the moral and ethical dimensions of human behavior and society. As the Anthropocene era encourages us to rethink the relationship between humans and the natural world, English language arts classrooms are now a crucial space for addressing climate change.

MOVING BEYOND INDIVIDUALISTIC VALUES

English language arts is also a place for considering values. Young people are making important decisions about their values, about what will, for them, define success in life. Is success accumulating material goods? What other dimensions of success are there? How does relationship with the environment factor into what we consider a good and successful life? As they learn about climate change, students can develop and refine their conception of a successful person based on harmonious rather than adversarial relationships with ecosystems. As Richard Kerridge (2013) describes, this entails a shift of emphasis in the way we imagine the self, from the self as an atomized individual with hard boundaries to a self always already in the process of producing the world and being produced by it; a self through which the world flows; a self that is as conceptually inseparable as it is materially inseparable from the larger ecosystem that sustains its physical body. Ecological perception dissolves unifying notions of selfhood and strong dualistic separations between culture and nature, subject and object, or human and non-human (p. 353).

Adopting an "individualist" stance may also reflect students' economic status. The fact that higher income people have assumed rights to personal car use as opposed to employing mass transit, high energy use for heating or cooling their homes, or ready access to food and services often not available for lower income people raises questions about inequality related to all people's rights to inhabit a healthy planet (Newell et al., 2015).

Research on people ages 18–34 and their levels of concern about climate change finds that those with "individualist" or "hierarchical" values are more skeptical about climate change (Corner et al., 2015). In contrast, young people who adopted "self-transcendent" values were more likely to be concerned about climate change and the need to address it (Corner et al., 2015). Clearly, addressing climate change involves going beyond an egocentric, individualistic perspective. As Timothy Clark (2011) notes:

> Deep ecologists urge a drastic change in human self-understanding: one should see oneself not as an atomistic individual engaged in the world as a resource for consumption and self-assertion, but as part of a greater living identity. All human actions should be guided by a sense of what is good for the biosphere as a whole. Such a biocentrism

> would affirm the intrinsic value of all natural life and displace the current preference of even the most trivial human demands over the needs of other species or integrity of place.
>
> Clark (2011, p.4)

Young people are bombarded with advertising selling not only products but values, and a lifestyle of consumption. This book provides examples of classrooms where these values are analyzed in relation to climate change and sustainability.

ENVISIONING AND ENACTING CHANGE

Students need to learn about what they can do as individuals, families, and community members to decrease their own emissions and lower their "carbon footprint." This is a crucial dimension of climate change education particularly for Americans, especially middle class and above, who use the most greenhouse gases www.nature.org/greenliving/carboncalculator. Equally, and perhaps more important, English students can and should consider the larger social and political dimensions of addressing climate change.

In thinking about using literary texts to address climate change, Lidström and Garrard (2014) emphasize responding to literature in ways that examine collective, institutional forces influencing climate change and engagement to make a difference. Previously cited English teacher David Kangas talks about how he used the film *The Hunger Games* to focus his high-school students on moral issues and making a difference:

> My experience in teaching climate change began when I taught ethics and *The Hunger Games*. Popular culture is a rich source for teachers and students to explore the ethical dimensions of climate change. We viewed the film as a class, taking note of where characters faced moral dilemmas using contemporary ethical theories to interpret Katniss' actions and to ask whether the film favored one ethical view over another. This popular film provides a means for students to understand these philosophical theories by giving them necessary background to begin reading informational argumentative texts about how climate change challenges our traditional ethical views. Students engaged in researching why dystopian texts appear to be so popular and what this might mean in a context of climate change action. What would Katniss do, became a question students used to inform different climate change contexts from large scale climate talks to personal actions like the consumption of meat.

As English teachers, we believe that the collaborative envisioning component which draws on discussion, writing, and the imagination offers many creative and valuable starting points. In this sense, the classroom can foster the practice of freedom (Freire, 2000) and promote the kinds of understanding necessary for the world in which our students will live. In Chapter 9, and throughout this book, we relate stories and examples of teachers and students taking action, enacting change as they develop their own projects and join with and participate in organizations addressing climate change (for a list of these organizations, visit the book's website http://tinyw.in/qUpp).

Given their engagement in addressing climate change, students can create texts—reports, blog posts, websites, videos, drama productions, and so on, designed to challenge problematic media messages and influence their peers and other audiences to think critically about sustainability and environmental justice. Doing so requires that they employ effective rhetorical strategies using appropriate language, narrative, and images/videos to clearly communicate

scientific knowledge and information about climate change, as well as consider how to engage their audiences' beliefs and attitudes (Pearce, Brown, Nerlich & Koteyko, 2015). These activities meet numerous Common Core Standards. When the Standards are applied and practiced through meaningful projects such as those addressing climate change, they are far more likely to be deeply understood and internalized.

In 2015, a group of children began a lawsuit to pressure then President Obama to fight climate change (Light, 2015). Students can engage in activities promoting sustainability, such as encouraging restaurants to purchase food from organic farms, supporting farmers' markets, pressuring businesses that waste energy, and praising companies that have switched to clean energy options or are improving their sustainability practices.

Literature has been written for students of all ages with examples of collective acts of consciousness raising and actions that have successfully challenged overwhelming odds. Students can benefit from learning about places and times when people have come together to challenge injustice, from Gandhi's resistance to British colonialism in India to the Civil Rights Movement in the United States, and from the indigenous resistance to the privatization of water in Bolivia to Wangari Maathai's Green Belt Movement against deforestation in Africa. Much can be learned from studying environmental actions like Greenpeace's media campaigns, protests at climate change conferences, and indigenous resistance to protect the Arctic from drilling, and the efforts of student-founded groups such as 350.org in stopping the tar sands project in Canada.

TOO LARGE TO BE COMPREHENDED?

The award winning poet Jane Hirshfield has a short poem called "Global Warming:"[1]

> When his ship first came to Australia,
> Cook wrote, the natives
> continued fishing, without looking up.
> Unable, it seems, to fear the too large to be comprehended.

Indeed, there is nothing small about the problem of global warming. The Australian natives Captain Cook describes couldn't know what the arrival of the Europeans meant for their world, and there was probably little that they could have done had they known more.

Our situation with climate change is different in the sense that we know what is coming and there are things we can do, and must do, to minimize global warming's impacts. At the time of writing this book most scientists agree that there are emission pathways that can likely keep warming at or near 2 degrees Celsius. There is a growing global movement to demand an end to fossil fuel extraction and create a more just and sustainable world. The price of wind and solar have been dramatically falling . . .

The English language arts classroom is an empowering space to read and write, critique and create written stories, multimedia narratives, and public discourse about our changing climate. Our classrooms are a space to use the imagination to understand climate change not only as science, but in its human meaning and social complexity. They are a space to imagine alternative futures, futures where climate change runs wild, and futures where global warming is substantially mitigated. English teachers and students need to be part of the effort to educate and mobilize citizens to provide the groundswell of public support needed for governments to take action.

Change happens when many people make decisions to go in the same direction. The next chapter sets forward first steps you and your students can take.

For additional resources, activities, and readings related to this chapter, go to http://tinyw.in/qsli on the book's website.

NOTE

1 "Seventeen Pebbles: Global Warming" from AFTER: POEMS by JANE HIRSHFIELD. Copyright 2006 by Jane Hirshfield. Reprinted by permission of HarperCollins Publishers (U.S.A. & its Dependencies, Canada, The Philippines) and by Jane Hirshfield.

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