ERIK RUIN

Teaching the Climate Crisis

BY BILL BIGELOW

I sat on a tall stool, facing the class of 9th graders, put a cigarette between my lips and flicked on the lighter.

"Anyone mind if I smoke?"

Yes, they did mind: "That's disgusting." "It's against the law to smoke here." "There's secondhand smoke and it smells bad."

I hoped this opening to a unit on climate change would underscore the idea that—even if students don't have the vocabulary to express it—we are all familiar with the concept of the "commons." In this

classroom, we shared a breathing commons, and I didn't have to convince students that no one had an individual right to pollute it with cigarette smoke. I hoped the cigarette-in-the-classroom stunt would work as a metaphor: The Earth's atmosphere is just a bigger version of the classroom—a finite commons that none of us owns, but that each has a stake in.

I've become convinced that climate change—global warming, climate chaos; call it whatever you like—is the biggest issue facing humanity. As the renowned environmental activist Bill McKibben points out, this crisis

> represents the one overarching global civilizational challenge that humans have ever faced. . . . The evidence gets worse by the day: Already whole nations are evacuating, the Arctic is melting, and we have begun to release the massive storehouse of carbon trapped under the polar ice. Scientists figure the "safe" level of carbon dioxide in the atmosphere is about 350 parts per million. . . . Go beyond it for very long and we will trigger "feedbacks" that will result in runaway warming spiraling out of any human control and resulting in a largely inhospitable planet.

Tim Swinehart, co-editor of this volume and an active member of the Earth in Crisis curriculum workgroup of Portland, Oregon, Area Rethinking Schools, invited me to co-teach a unit on global warming to his 9th-grade global studies students at Lincoln High School. Tim and I teach social studies, not science. We knew that we were ill equipped to offer the kind of hard scientific instruction that would help students grasp exactly how and why the climate is changing. But just as all of us are responsible for the atmospheric commons, climate change falls into a curricular commons; Tim and I were committed to explore the social impact of global warming as well as some of its social roots. How the billions of metric tons of CO_2 we pump annually into the atmosphere affect the Earth's natural systems may be a scientific question. Why we do this, who it affects, and, at least in part, how we can stop it—these are social questions.

We especially wanted students to appreciate the inequality at the heart of climate change: Those who have the smallest carbon footprint are the ones most victimized by its consequences. We wanted students to probe beneath the glib "buy green" solutions to global warming. And Tim and I knew that in this unit we would toe a fine line between communicating the vast dangers of global warming and encouraging students to recognize their power to make a difference.

Global Warming Mixer

Where to start? Global warming feels so overwhelming and impersonal—something happening everywhere, yet nowhere in particular. It can have a kind of science fiction, someday-it's-gonna-get-really-bad feel.

I wrote a mixer activity (see the full activity on p. 92) to introduce students to the ways climate change affects individuals around the world—*today*, not in the distant future. In a mixer, students assume the roles of different individuals and, through meeting one another, learn about an issue that touches us all. For some of the people students portrayed, climate change is crashing through their lives right now. But for others, rising global temperatures have presented business opportunities—like the oil companies poised to exploit the Arctic, where an estimated 25 percent of the Earth's untapped fossil fuels beckons like buried treasure.

All of the 17 individuals in the mixer are based on real people. I wrote them in first person, and many of the roles incorporate the individuals' actual words. For example, Rinchen Wangchuk works with the Snow Leopard Conservancy, a grassroots habitat preservation organization:

> When I was a boy, after school ended for the summer, I remember slipping down the glacier that stretched far down the mountains near my village in the Nubra Valley—in Ladakh, the far northern part of India. Today, that glacier is almost gone. And I am watching the glaciers of the Karakoram Mountains disappear a little more every year. . . . Because it rains only two inches a year in Ladakh, we depend on the glaciers for 90 percent of our water . . . but what will happen if the glaciers disappear? How will we survive?

Students also meet Nobel Prize winner Wan-

Sea level rise threatens to drown the Pacific island nation of Kiribati.

CHRISTOPHER PALA/IPS

gari Maathai of Kenya, who describes unpredictable floods, drought, crop failures, and desertification afflicting huge swaths of Africa; and Enele Sopoaga of the South Pacific island of Tuvalu, who watches as rising sea levels threaten his land and people. Many of the individuals are activists, resisting mountaintop removal coal mining in West Virginia or blocking Bering Sea oil exploration.

Students also encounter climate change "winners," as Fox News calls them: Chris Loken, an apple grower in New York's Hudson Valley, where milder winters allow new crops of plums and peaches; and Russian oil man Roman Abramovich of Russia's Sibneft Oil Co.:

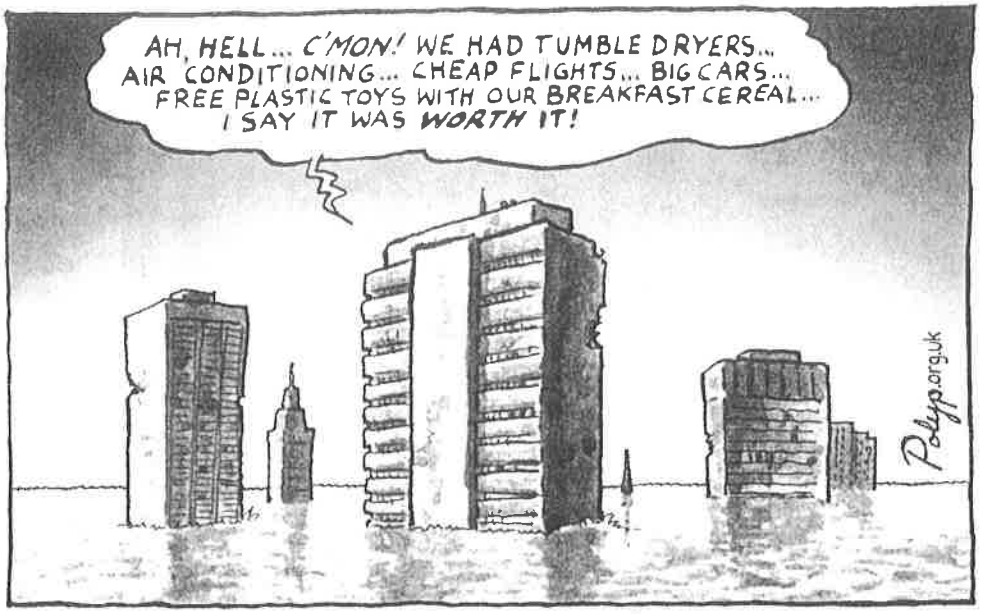
> It's simple: As temperatures rise every year, ice will melt and huge new areas will be open for oil and gas exploration in the Arctic. And as one of Russia's wealthiest men, and head of a large oil and gas company, this is the chance of a lifetime. Researchers tell us that one quarter of the Earth's untapped fossil fuels, including 375 billion barrels of oil, lie beneath the Arctic. . . . I'm a good businessman—a good *oil* businessman—so it's time to get to work.

Tim and I distributed roles to students and asked them to read these several times, to underline key information, and to list the three or four most important points about an individual's situation. The students circulated in the classroom and found a different individual to answer each of eight questions—for example, "Find someone who believes that he or she is hurt by climate change. How has this person been hurt?" "Find someone who believes that he or she might benefit from climate change. How might the person benefit?" A final question asked, "If possible, find someone here with whom you could take some joint action around global warming. What action might you take?"

Students seemed engaged in the activity, which took most of a 50-minute class. They collared one another to talk, grimaced at painful stories, delighted in shared experiences. Afterward, we asked students to write on three questions:

- Whom did you meet—or what situations did you hear about—that surprised you?
- Which themes came up in your conversations?
- Whom did you meet—or what situations did you hear about—that gave you hope?

Kaya wrote that she was surprised that "people from all over the world are being affected." Michael was surprised "that people were actually benefiting



from the global warming. Like Roman [Abramovich, the Russian oil man], who actually is getting richer off the melting glaciers and ice caps. So that was very surprising and a bit upsetting too since guys like mine [Anisur Rahman, from Bangladesh, whose lands are being washed away in horrible floods] are suffering so much." Abramovich may be a special case, but he exemplifies the basic inequality that I wanted students to grasp: We are all affected by global warming, but we're not all affected equally, and we're not equally responsible for its causes. As Carver wrote in his answer to this question, "It seems like the ones who couldn't afford to be affected were affected the most."

We knew that, ultimately, students would act only from a place of hope and if it seemed possible to turn things around.

Alvaro, whose parents are immigrants from Mexico, in a class that was mostly white with a few African American students, was the only individual to note the link between climate and migration. "A lot of people were having problems and having to migrate," Alvaro told the class.

Students repeatedly identified one theme: water. "It was interesting how so many people all over the globe were affected by water that could either disappear or flood them because of global warming," Cole wrote. Aria noticed "how many of these involve water, both sea levels and glaciers," but added, "I also think it's sad that everyone suffers but for some it's life and death and they see it more but don't have the influence or power to change it."

From the beginning, Tim and I wanted students to stay alert for signs that we might not be doomed—thus, the "hope" question we asked students to write on. The enormity of global warming has the potential to overwhelm and discourage. No doubt, Tim and I wanted to impress upon students the threat that climate change represents—a threat so huge that we literally don't have the words to express it. But we knew that, ultimately, students would act only from a place of hope and if it seemed possible to turn things around.

Ironically, some students found cause for hope in the problem's immensity. Selena wrote, "The more people [who are] affected badly, the more people want to help. This is good." And Adrian drew inspiration from the militancy of some activists: "I found out there were people who take the global warming fight to people's front doors. They break into oil company compounds to protest against drilling. I wish I could find these people so I could join them." (I had not included any activists breaking into oil company compounds, but one of the individuals in the role play—Stephanie Tunmore of Greenpeace—tried to physically block BP's oil drilling in the Beaufort Sea, north of Alaska.)

Obviously, I could have written hundreds of more roles, but the main aim of the activity was to introduce students to the breadth and inequality of global warming's impact. The media cast this as an "environmental issue," and it is. But global warming is also a racial and class issue. Those affected most profoundly are poor people and people of color. They are the most vulnerable to—and least responsible for—this catastrophe. Global warming also reflects the dynamics of empire, that so-called developed countries blast greenhouse gases into an atmosphere that the entire world depends on. As surely as Western colonial powers stripped the colonized world of resources, so too are the wealthy countries

"mining" the atmosphere. Atiq Rahman, the Bangladeshi chairman of the Climate Action Network South Asia, captures the Third World's resentment when he warns, "If climatic change makes our country uninhabitable, we will march with our wet feet into your living rooms."

Textbook Disinformation

James Hansen, formerly of NASA, one of the world's leading climate scientists, said recently that the CEOs of large fossil fuel companies should be put on trial for high crimes against humanity and nature for spreading disinformation about global warming—disinformation that would end up in school textbooks. As Exhibit A, Hansen can use our textbook, *Modern World History* (Holt McDougal, 2012), adopted by Portland Public Schools for all required high school global studies classes. The book discusses global warming in three wretched paragraphs, buried on p. 679.

To provide students a bit more background before evaluating their textbook, we read and discussed an article from a special issue of *National Geographic* on the climate crisis. The article, "Proof Positive," describes the certainty of human-caused climate change and the relationship between carbon dioxide and global temperature changes. (See p. 106.) It lays out the science undergirding the Intergovernmental Panel on Climate Change's models that forecast dramatically rising temperatures this century, but also acknowledges the unpredictability of the many "amplifying feedbacks" and their consequences on Earth's natural systems.

Tim and I then asked students to look critically at their textbook. We had them read the three-paragraph passage and write about its adequacy and inadequacy, and to note which perspectives were missing.

Confirming Hansen's prediction that corporate-funded "scientific" research would find its way into the nation's textbooks, the second of *Modern World History's* three paragraphs on climate change begins "Not all scientists agree with the theory of the greenhouse effect." As science teachers have explained to me (and as "Proof Positive" confirms), this is inaccurate; the French physicist Joseph Fourier proposed the "greenhouse effect" in 1824. Today, no scientist disagrees with the "theory of the greenhouse effect." Surely what the textbook writers meant to say is that the *human-caused* greenhouse effect is a theory, and this is what some students locked in on: Human-caused global warming is "just a theory." (After this article was first published in *Rethinking Schools,* Holt McDougal removed this one line from *Modern World History.*)

Maybe it shouldn't have surprised me that so many students doubted humans were changing the climate. It was a good lesson about how, even in an activity encouraging students to think critically about textbooks, the textbook's authority can undermine widespread scientific consensus. Tim and I explained that a scientific theory is more than a hunch. As Stephen Jay Gould wrote in his book *Hen's Teeth and Horse's Toes,* "facts and theories are different things, not rungs in a hierarchy of increasing certainty. Facts are the world's data. Theories are structures of ideas that explain and interpret facts." In other words, a scientific theory is a big deal; it must be consistent with all existing data. Tim and I had assumed we could proceed from the premise that human-caused global warming is real, not "just a theory." There was a lot of teacher-talk in this activity that we hadn't planned on.

As surely as Western colonial powers stripped the colonized world of resources, so too are the wealthy countries "mining" the atmosphere.

Nonetheless, having gone through the role play, students recognized that the textbook does not mention a single individual, community, or culture affected by climate change. There's no story, no humanity, no appreciation of what's at risk. Nor does the text introduce students to activists like the people they met in the mixer.

Whether describing climate change, the Great Depression, or the Vietnam War, the biggest textbook bias is the failure to alert students to the power of organizing and collective action. When it comes to global warming, the textbook tells them to trust their leaders: "To combat this problem, the industrialized nations have called for limits on the release of greenhouse gases. In the past, developed nations were the worst polluters."

As one student pointed out, "This makes it sound like the rich countries are the good guys."

Exactly. And the bad guys? According to *Modern World History*, "So far, developing countries have resisted strict limits." Sadly, the textbook stands reality on its head.

Students also noted that the textbook communicates its disregard for climate change as a serious issue by burying its meager three paragraphs near the end of a 700-plus-page book. I suppose this is what we should expect when gigantic corporations produce our textbooks. These corporations are not neutral spectators to the social processes they describe; they benefit from today's global distribution of power and wealth, and whether it's climate change or free trade agreements, the textbook companies show no interest in helping students think critically about the world.

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Perhaps Tim and I should have introduced the textbook critique later in the unit when students had more background knowledge—and next time, we will. However, even this possibly misplaced activity alerted students to the fact that people make choices in how they describe the world, and students have a right to question those choices.

Thingamabobs and Climate Change

I've taught global studies on and off for more than 30 years. It's a class that exposes students to myriad forms of injustice: invasion and occupation, poverty and hunger, sweatshops and child labor—and now the causes and ravages of climate change. Lessons can turn into a litany of "people doing bad things to other people." Many students are not content to absorb injustice after injustice in the curriculum without wanting to make a positive difference. But how?

"Go shopping," George W. Bush told the country in the wake of 9/11. Even social justice organizations often encourage people to make things better through the marketplace: Buy fair trade chocolate, boycott Walmart. A consume- (or recycle-) your-way-to-justice orientation is especially prominent in today's responses to climate change. We're urged to buy compact fluorescent lightbulbs and hybrid cars; take a cloth bag to the grocery store. These actions can raise consciousness, reduce greenhouse gases, and help us identify with environmental justice on a daily basis. But if we respond to injustice only as consumers, we miss other potential responses.

We live with an economic system that distributes rewards on the basis of profit. Production decisions are largely privatized, even when we all bear the social and environmental costs. From the standpoint of greenhouse gas creation and the impact on the climate, this global capitalist system is, to put it mildly, problematic.

I decided to adapt a simulation I developed a number of years ago. "The Thingamabob Game" puts students in the position of executives in corporations that produce "thingamabobs"—which symbolize any manufactured good. I divide students into companies. Students name their companies and compete over five rounds to try to make the highest profit. The top four profit-makers get candy bars—the most for the top producers. The bottom three profit-makers get nothing. The catch is that the production of thingamabobs has environmental consequences; there is a trigger number of total thingamabob production that, if exceeded, leads to environmental catastrophe and everyone loses, no matter how much profit any particular company has amassed.

One trick for a successful game is having desirable goodies that students want to win. The best chocolate in Portland is Moonstruck, and so I bought lots of Moonstruck chocolate bars—organic dark chocolate, organic milk chocolate, ivory chocolate, and my personal favorite, dark chocolate espresso. Before I explained the rules, I told students, "I want to take a few minutes to tell you about the prizes we have for the winners." I have my teaching weaknesses, but I can describe the delights of chocolate with the best of them.

These chocolate bars were not BMWs, vacation homes in Maui, or home entertainment systems, but they might as well have been. After "meeting" the chocolate bars, students paid close attention as I went over the instructions:

> You are managers of a company that produces thingamabobs. You are in competition with other thingamabob companies. Even though you have highly paid managerial jobs, these are not necessarily secure. As with any capitalist company, you need to continually grow

and make a profit. Fail to return a sufficient profit and you'll lose your job.

Each company begins the game with $1,000 in capital. Each thingamabob costs $1 to produce. You will make $2 off of every thingamabob you produce and sell. So, for example, if you produce 100 thingamabobs in round one, you will spend $100, but you'll get $200 back, and end up with a total of $1,100.

To streamline the game, we assume that all the thingamabobs produced are also sold. Thus in the first round of the five rounds, a company that makes the maximum number of thingamabobs ends up with $2,000. With each successive round, companies have more capital and greater capacity to produce thingamabobs and profit. The catch is that the production of each combined 1,000 thingamabobs adds two parts per million of CO_2 to the atmosphere. The game begins roughly where the planet was in 2008, at 380 ppm of CO_2. The game's tension is that if the seven groups' total production exceeds a trigger number somewhere between 420 and 460 ppm CO_2—between 20,000 and 40,000 thingamabobs—the Earth's environment is damaged beyond repair and everyone loses. In other words, no Moonstruck for anyone. On the wall I taped a folded piece of paper with the exact trigger number, 450 ppm—35,000 thingamabobs—but no one knew that number as they entered the game. (For more detailed instructions and teaching materials, see p. 147.)

It's possible that some, or even all, the groups can win this game. But it takes cooperation, lots of discussion, enforceable rules, alertness to the big picture, and collective restraint. Unfortunately, just like in the real world, the dynamics of a me-first, profit-driven economic system make this unlikely.

As we begin, I don't tell groups that they cannot cooperate, but I fan the flames of competition with disparaging comments about some groups' low production: "No way can you win this game with puny production like that." Around the second or third round, I pick up a Moonstruck bar and ask, "Did I tell you how great this chocolate is?"

I've played this game with high school freshmen and juniors, graduate students, teacher education

cohorts, and groups of teachers. Alas, every group has destroyed the Earth. Tim's 9th graders went over the trigger figure by round four. The victorious company, Jellyfish, ended the game with a total of $12,000. But, as the saying goes, it was like winning at poker on the *Titanic*.

As the game concluded and students realized that I would keep my chocolate, Tim and I asked them to make sense of what we'd just gone through. We posed three questions:

1. Who or what was responsible for the Earth's destruction?
2. What are the real-world lessons of how you played the Thingamabob Game?
3. Suppose we were to play this game again. Give the class some advice on how you could or should approach it differently.

Most students tended to personalize blame for the Earth's destruction: "We were all reckless." "Greedy people." One student blamed me: "You said candy was the reward and it made us be competitive." Zak blamed "the companies," and added, "They would rather have money than help save the world."

Students recognized that this was not simply a game, that there was something happening in the classroom that had its counterpart in the world. As Selena wrote, "For me it made me think about all the greed in the world and how many think, 'We will be fine. I'm sure someone is doing something about it.'"

"No one once said anything like 'remember we have to consider the environment.' It was still all about the prize."

Their writing was a fascinating stew of blame and insight. But no one identified the structure of the Thingamabob Game itself as the root of the problem. Ninth graders, along with all the rest of us, are not practiced in considering how the economic rules of the game can be identified and challenged. And another dynamic was also at play. No one stepped forward as a climate change organizer or activist, and said, "Look at what's happening. We're going to thingamabob ourselves to death."

Although Tim and I intended the game to raise questions about how our economic system is on a collision course with the Earth, we worried that the game might leave students with a sense of inevitable doom—that even as they saw what was happening, they still went ahead and destroyed the Earth. The next day, we gave students a second chance.

We began by reading aloud an article, "How to Be a Climate Hero," by Audrey Schulman, from *Orion* magazine. The article describes research on the "bystander effect"—that people tend to freeze when confronted by injustice or emergency if they're around other people who also don't respond. We asked students for examples from their own lives, and students shared moments such as walking by a possibly injured or ill person lying on the sidewalk, and not protesting when a classmate was treated unfairly because no one else spoke up.

The hopeful piece of this, according to Schulman, is that knowing about the danger of group inaction can prompt us to take action. Tim and I wanted students to see themselves as activists, to interrupt the insane spiral of greenhouse gases—in the real world as well as in Thingamabob's candy quest—and not allow others' passivity to lull them into a similarly deadly inactivity.

Before relaunching the game, we left them with some advice: "Remember, this is a game. The rules are made by humans and can be changed by humans. . . . Talk to each other. You control the game, the game doesn't control you."

Unfortunately, students returned to their "corporations" without having a conversation about how they wanted to replay the game. By the third round, they were only marginally kinder to the planet than the first time around. Various students called out to slow it down, to be "greener." And they were. However, ultimately, chocolate lust prevailed and production skyrocketed by 27,400 thingamabobs in the fifth and final round, leading to a game- (and Earth-) ending level of CO_2 production.

I was disappointed. I thought the group would find a way to resist the previous day's production war. Playing the game a second time with 11th graders across town at Franklin High School another year, one global studies class took to heart my "you control the game" message. They began the second game with a class meeting and essentially voted to abolish capitalism. They erased the corporate divisions, and the chaotic competition these created, and formed one big group. Relieved of competing against each

other, they were able to collectively control thingamabob production at a sane and gradual pace.

Tim and I asked students to write about why, after they saw what happened the first time around, they destroyed the Earth a second time. They were pensive in their failure. Alvaro wrote that they lost "maybe because the competition still stayed in our minds. . . . It blinded us again." And Kaya pointed out that their class lacked climate hero/activists: "No one once said anything like 'remember we have to consider the environment.' It was still all about the prize."

During our discussion, many students seemed amazed that another class had created one big team, allowing everyone to "win." "You didn't tell us we could do that," one student complained. In fact, I did. Students simply couldn't hear it, because they are used to playing games by the established rules and not calling those rules into question. And, really, this was the game's punch line: We have to think systemically; we have to question the rules of the game; we have to work together to imagine new ways to "play" and "win."

The Thingamabob Game is still in process and it's not without its accompanying "fine print." All simulations are metaphors and highlight some aspects of social reality and distort other aspects. For one, these days we need to be going backward toward 350 ppm CO_2, not going up from the 2014 400 or so ppm. Thinking of the game's 450 ppm as the actual tipping point is wishful thinking. For another, not all thingamabobs are equally hostile to the atmosphere. Some, like solar panels or light rail cars or bicycles may be carbon-friendly. And, as the 2008 economic meltdown illustrates with devastating clarity, not all thingamabobs that are produced will be consumed. Finally, the simulation may communicate that all CO_2 pollution comes from the manufacturing of stuff, whereas much comes from transportation, agricultural practices, cutting down rainforests, and even how (and how much) we heat our homes.

Nonetheless, despite shortcomings, the Thingamabob simulation's essential insight remains: A fundamental incompatibility exists between an economy premised on an unquenchable drive for profit and the ecological imperative to reverse greenhouse gas pollution. Like the Franklin class that won the Thingamabob game, we have to recognize that our society's productive decisions are not private. What we produce, how we produce, and how much we produce all affect the atmospheric commons. These are decisions for us all.

Connection and Loss

One of the struggles in building a curriculum around climate change is searching for ways to help students grasp, *in a personal way,* what's at risk. Tim and I realized something was missing. We were hitting kids' heads but not their hearts.

Ultimately, climate change is about our connections to places and to people, and also about the potential loss of those connections. We decided to pause and ask students to explore these ideas. We asked students to write on one of two broad themes:

- Write a story about a special or "sacred" place. Describe an event or events that took place there that made it such an important place to you, that "rooted" you to the place.
- Write a story about a time in your life when something you cared deeply about was taken or stolen from you. This might be a precious possession, a place where you lived, a person you cared about, or something less physically tangible, like your innocence or your sense of hope.

Tim and I gave examples from our own lives and shared two stories students had written, one about a girl returning to a special place only to find that it had been "developed," and another about family turmoil and the loss of a parent. We wanted to offer powerful stories as models but also give students multiple points of entry, with different levels of risk in sharing. We told students we'd ask them to read their stories aloud in class but that they were free to pass or to have us read them anonymously.

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After we brainstormed possible topics, I turned off the lights and asked students to close their eyes,

Connection and Loss

In a *Los Angeles Times* article, "Civilization's Last Chance," Bill McKibben quotes then-chief NASA climatologist James Hansen, who says that because of climate change, humanity is at risk of losing "a planet similar to that on which civilization developed and to which life on Earth is adapted. . . ." This should make us pause and consider what exactly this means to us personally—losing a planet that gave birth to civilization.

The only way we have to think about the future is in relation to things we've experienced in the past. Hansen's warning raises issues about our relationship to places that we are connected to, and that mean a great deal to us. It also suggests the threat of enormous loss.

That's what this writing assignment is about: connection and loss.

Assignment choices:

- Write a story about a special or "sacred" place. Describe an event or events that took place there that made it such an important place to you, that "rooted" you to the place.

- Write a story about a time in your life when something you cared deeply about was taken or stolen from you. This might be a precious possession, a place where you lived, a person you cared about, or something less physically tangible, like your innocence or your sense of hope.

put their heads down, and not talk. I led students through a guided visualization—a strategy I learned years ago from my wife and teaching partner, Linda Christensen. I asked students to visualize the place or person that they'd be writing about. I paused for 30 seconds to a minute after each instruction: What does the place look like? Let your mind's eye be a video camera. Try to capture as many details as you can. Which smells or sounds can you recall? . . . Now focus on the people involved. See their faces, hear their voices. Try to recall as many details about the people and place as you can. . . . Now try not to think in words. Let yourself be surrounded by the feelings you had about this place or incident. Just let the feelings wash over you. . . .

I told them that when I turned on the lights I didn't want to hear a single voice. They could keep their heads down and continue to recall details or they could begin writing. Tim and I would be available in the hall, if they had questions, but we didn't want any talking in the classroom as people wrote. The lights came on and they wrote in silence, with passion and determination.

The next day, we circled the desks and students read their writing aloud. Although the assignment gave students the option of writing about the loss of a prized possession, everyone wrote about the connection to and the loss of a beloved person or place. Several students wrote heartrending pieces about the death of parents and grandparents. After each student read, other class members offered positive comments about the writing, the content, or the reading. We also asked students to take notes on each other's pieces, and told them we'd be writing a "collective text" on two questions: (1) What common themes did you notice from our stories of connection and loss? (2) How do these themes connect to our study of climate change?

In the weeks I'd been in Tim's class, I'd never seen students reach so hard for ideas and discuss with such intensity. In her "collective text" answer to the first question, Kadee summed up what she'd heard: "Most stories started with a 'normal day,' and ended in 'I'll always remember.' There is kind of a theme of how the stories really impacted their life more than they felt at the time. No one wrote about objects or stuff. Shows how that 'new iPod' doesn't compare."

I thought we might be on thin ice asking students to relate these stories to climate change. But

questions such as "What does this remind you of?" consistently generate valuable student insights, and this time was no different. Brandie wrote:

> Kadee's story was about losing her childhood. In her story, she had a line that went something like this, "In life, there are no rewinds or pauses, only play." In the real world and to global climate change, this line relates. There are no do-overs. We can't go back and try to change our mistakes, or pause so we can have time to fix things. . . . In my story, my grandma was like the world. She was like the world in the sense that she had a house (shelter) who everyone lived in. She provided food to them, shelter and happiness to people who needed it. Like the Earth. . . . People loved her, but took advantage of her, like the Earth. And one day, she wasn't there anymore, and left everyone in a mess. Like the Earth COULD.

This recognition of the power of our relationships to people and places, but also the fleeting character of these relationships—"we start out so naive and don't know what's going to happen next"—was a theme that ran through students' papers. Tim and I wanted to move back to the content of climate change, but fundamentally, this *was* the content: The "developed" world's patterns of production and consumption were putting at risk our relationships to everything and everyone that mattered.

We followed our read-around and discussion with the PBS NOW documentary *Paradise Lost*, about the South Pacific island nation of Kiribati, and asked students to think about the connection between the themes we identified in our own writing and what's happening to Kiribati. (See p. 118.)

Kiribati is the proverbial canary in the coal mine. It's spread over 33 tiny islands, with a population of 100,000. Its highest point is about 6.5 feet above sea level, if you don't count the coconut trees. Climate change—melting glaciers, warming seas—has doomed Kiribati. The ocean is rising and Kiribati's first climate refugees have already abandoned the islands for New Zealand.

Following our writing about connection and loss, the words in *Paradise Lost* of Ueantabo Mackenzie, who directs the local branch of the University of the South Pacific, resonated with students: "This country has been the basis of my being. And when it's no longer there, you know, it's unthinkable."

The lights came on and they wrote in silence, with passion and determination.

As with our opening mixer about stories of the global impact of climate change, we wanted to show students what these developments meant in people's lives. But it was the stories of their own lives that created the basis for a deeper bonding between "us" and "them." It was as if, after hearing each other's stories of connection and loss, students said to themselves, "This is what it must be like to lose your land and way of life."

Students for Climate Action

We were running out of time. But we wanted to close this unit on a hopeful note and to prompt students to think of themselves as people who could take action. Young people from around the country were about to converge on Washington, D.C., for a week of lobbying, called Power Shift, and direct action: mass civil disobedience at the coal-fired power plant that serves the Capitol building. This seemed a good time to alert students to activism.

We created an activity that would allow them to take on the roles of student climate activists and to confront some strategic and tactical choices that actual campaigners encounter. We chose a role-play form that puts the entire class in the same position—in this case, members of a fictional Students for Climate Action—and offers six activities for students to debate and decide which to prioritize. Actions included helping climate refugees; lobbying Congress; engaging in civil disobedience; working on education in schools, churches, and community organizations; building climate coalitions with organizations in the Global South, like China and India; and getting people in the United States to reduce consumption. The actions certainly overlap, and we took some liberties mixing strategies and tactics, and intentionally left some open-ended. But the broad aim was to get students to imagine themselves as organizers. (A couple of weeks after this activity, several young climate activists who descend-

Brandon: "Obviously the whole idea of doing civil disobedience is that you're acting and you care."

ed on Washington, D.C., were interviewed on Amy Goodman's radio-TV show *Democracy Now!* Tim showed a clip after our unit and said that students were rapt, listening to other young people tell why they traveled to D.C. for this activism.)

Students had to settle on three broad areas to tackle and to list them in order of preference. This meant deciding not to concentrate in three other areas. We seeded their discussions with pro and con arguments. For example, here is the civil disobedience option we presented:

> Many Students for Climate Action members believe now is the time to increase pressure on the government to take dramatic action, and say that civil disobedience is the perfect tactic and coal the perfect target. They are concerned that the U.S. government isn't acting fast enough or boldly enough to reduce carbon emissions. They argue that big energy corporations, like ExxonMobil and Peabody Energy, still have too much power to influence the government, and that things won't change until the people act. One way that the people of the United States have exercised their power in the past is through civil disobedience—breaking the law in order to bring attention to a particular injustice. Many students at this conference are calling for widespread civil disobedience to bring attention to the injustice caused by the U.S. government's failure to act quickly to deal with climate change—but especially the injustice caused to your generation, which will bear the largest burden of slow action.
>
> Other SCA members agree that coal is a huge problem and that these issues are urgent, but believe that civil disobedience is exactly the wrong thing to do. Why should we break laws and alienate people all over the country at the very time that more and more people are coming to agree that global warming is a serious problem? They argue that we'll look like a bunch of extremists or crazy people, if the police haul hundreds, or even thousands, of us off to jail. And at the very moment that we finally have a president who agrees that climate change is real and needs to be dealt with, why would we choose a strategy of breaking the law? That would be nuts.

We explained to the class that we'd be available to answer questions of fact, "but this is your show. You need to figure out how to run your discussions and how to arrive at decisions." Although this group of 9th graders interrupted each other and fell to squabbling, many of their conversations were substantial and interesting. I took notes as students discussed. Here's a sliver of debate from the civil disobedience issue:

> Cara: I vote yes. Last year we did the walkout against the war and many high school students did this. People did listen to us. We walked out of school and went downtown and talked to people. I think that civil disobedience works if a large group of people do it.
>
> Daniel: I disagree. If we do this it will just get people angry and they will focus on us breaking the law.
>
> Brandon: Obviously the whole idea of doing civil disobedience is that you're acting and you care. If you're going to act, why not break the law and help climate refugees?
>
> Kadee: It is a good thing to bring attention to climate refugees. But this is such a big issue that breaking the law is not going to do anything. We have to act on it not just walk out.
>
> Symara: I see it this way. Yeah, climate change is a huge issue, but segregation was an even bigger issue. It ended because people broke the law. We shouldn't worry if people get angry with us. We have to keep doing it.
>
> Sam: If we do this we are going to come off like a bunch of radical crazies.
>
> Brandie: No, we shouldn't do this. With Martin Luther King, they had rules that needed to be broke, and they broke those rules. But what rules do we break with climate change?

Yes, the discussion was pretty narrowly tactical and abstract, and perhaps we had not offered enough background about the coal plant issue. We'd also framed the question in a way that urged them to focus on civil disobedience rather than on the injustice the tactic might address. Still, Tim and I were encouraged that, on the whole, students took their activist roles seriously. (By the way, students voted 14 to 13 not to engage in civil disobedience.)

As Tim had predicted, students' top priority was to educate people on climate change issues. As Tim said, "No matter the role play, students always believe that education is the most important thing to do." Folded into that vote, however, was a decision to "educate" people to buy less stuff. "This is us educating us," Kadee pointed out. The SCA also voted overwhelmingly to reach out to grassroots environmental groups in the Global South with the aim of knitting together green alliances.

After about six weeks, my time at Lincoln had ended. Tim built on the activism we'd simulated in class, taking students to Salem, the state capital, where legislators were discussing global warming legislation. All along, we'd wondered whether our curriculum had found a balance between emphasizing the scope of the problem and highlighting how people can make a difference. In meeting with climate change activists from around the state, Tim wanted to connect students to individuals who grasp the civilization-threatening danger of global warming, but are not defeated by it. He also assigned students to interview and educate at least three people about climate change issues, helping students see themselves as teachers.

I'd done pieces of the activities in this unit over the years, but this was the first time I'd been part of creating a curriculum on global warming. I have a "this-should-have-been-so-much-better" feeling after almost any unit, but this sense was even more acute after this one. Ultimately, climate change is about every*thing* and every*one* on Earth. Deciding what to include and exclude is impossibly difficult—one more reason why all educators need to join the conversation about studying climate issues.

At times in this unit, I felt like a trespasser, a social studies teacher wandering through Scienceland. But if ever there were an issue that reveals how phony the divisions are between disciplines we call social studies and science, this is it. I ended my time at Lincoln feeling the urgency of teacher collaboration on curriculum that grounds students in a rich scientific understanding of Earth's natural systems as it exposes them to the social causes, consequences, and potential solutions to climate change.

This grassroots collaboration is all the more necessary, as textbook corporations become the de facto curriculum departments of U.S. schools. The gap couldn't be wider between our need for honest, critical curriculum on climate change and the pathetic materials available—witness the Holt McDougal/Houghton Mifflin global studies text described above. And, it's worth noting that Portland's physical science text adoption, *Physical Science: Concepts in Action* (Pearson/Prentice Hall, 2006), is as dismissive of human-caused climate change as the global studies adoption, hiding its misleading few paragraphs on p. 782.

That leaves curriculum development in our hands—teachers, environmental justice activists, scientists, communities affected by climate change. A billion people in Asia get their drinking water from glaciers that are disappearing, island nations like Kiribati and Tuvalu are drowning, huge swaths of Africa are becoming deserts, farmers in Australia are killing themselves in response to that country's worst drought on record, low-lying communities like New Orleans face the prospect of even more intense storms as oceans warm.

The threats are *so* dire that they have begun to prompt a profound social rethinking. Environmental justice movements are beginning to imagine a future that is greener, more cooperative, more democratic, and less oriented toward profit, consumption, and economic growth. This promises to be an era both terrifying and exhilarating. We have our work cut out for us.

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