

# MISEDUCATION

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How Climate Change

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Is Taught in America

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KATIE WORTH

# Miseducation How Climate Change Is Taught in America

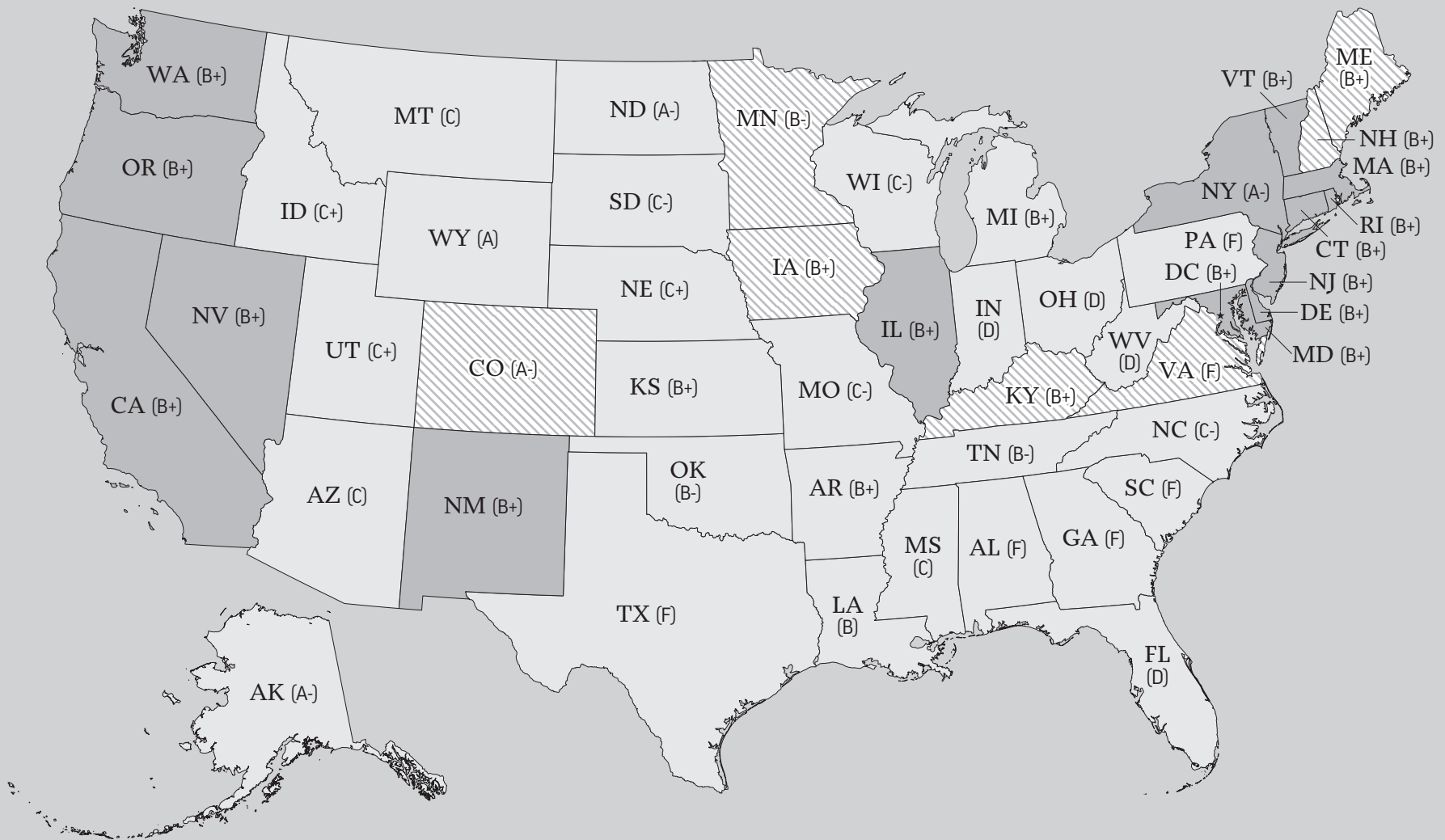
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Excerpt exclusively for

*e*SCHOOL NEWS

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Katie Worth



	Dem.	Rep.	Split
A	1	3	1
B	15	6	5
C	0	10	0
D	0	4	0
F	0	5	1

HI (B+)

States with a Republican-controlled legislature  
 States with a Democratic-controlled legislature  
 States with split control over their legislature  
 \* based on which party won the majority of state elections between 2012-2019  
 (A)(B) Grades—based on how well the state’s academic standards address climate change  
 \* Source: climategrades.org

# Introduction

Sixth-grade science teacher Kristen Del Real had invited me to come by during her prep period, so for the first time since age thirteen, I found myself walking the halls of my alma mater, Chico Junior High School. The corridors were missing their old rows of lockers—an accommodation for the school-shooting era, I supposed—but still smelled of erasers and turmoil. It was spring 2019, and I had been investigating what American kids learn about climate change, so when I traveled to my Northern California hometown for a visit, I reached out to local teachers to ask how they approach the subject.

I found Ms. Del Real in the 400 wing, preparing a lesson about geological time. She reminded me of many people I know from my hometown: She wore a fleece vest over her jeans, her makeup-free face tan from jogging the oak-lined trails of our local park. She also reminded me of teachers I'd met all over the country. Her demeanor was gentle but authoritative, laugh lines supporting the enthusiasm of her smile.

It was March, and her class wouldn't learn about global warming until May, but unbeknownst to her students, they were already preparing to grasp it. Her lesson on geological time would set them up to understand Earth's natural cycles. Then she would bring in legume sprouts to demonstrate how rhizomes pull nitrogen from the air and turn it into soil nutrients. That would lead to lessons on the atmosphere, solar radiation, the greenhouse effect, and weather systems. "Once all those pieces are in place, when we get to global warming, the kids will just *get it*," she said.

After that would come the part of the year Ms. Del Real loves best: solution projects. For the month of May, her students would work in groups, inventing ways to solve the planet's greenhouse gas problem. "Children are so perceptive. They understand things aren't necessarily great, and it frightens them," she said. The solution projects help dispel that fear, reminding them that "humans are amazing at innovation and invention when we have to be, and the time for that is now."

Three years earlier, her students had been in the middle of their solution projects when they started showing up crabby. Usually, she said, they were excited to get to work. Now, they thought their projects were dumb. "Why are we even doing this?" they asked her. "We don't need to worry about climate change." She soon learned the source of their discontent: Her students had been leaving her lab and walking into history class, where the teacher was showing them YouTube videos alleging that global warming was a hoax, that it was caused by natural solar cycles, and that it was nothing to worry about.

The next day, she walked to the 300 wing and confronted the history teacher about undermining her curriculum. She

- 12 explained her lessons and methodology, the evidence she has her students examine and analyze, and the California science standards the curriculum fits into. “I said, ‘They’re eleven. We need to be really mindful of when one adult they trust says one thing and another adult they trust says, “Don’t worry about it.”’ He said, ‘Well, I just want them to know both sides.’”

If today is a school day in America, approximately 3 million teachers are educating 50 million children enrolled in 100,000 public schools right now. The scene in each class is playing out differently, since there is no national curriculum. States provide guidelines of what students should learn each year, but schools can use any method they’d like to get them there. Which is to say, it’s impossible to definitively describe what kids are learning about recent climate change, since that happens behind the closed doors or on the individual Zoom screens of classrooms in every community in America.

But there’s a lot that can be known. To that end, I reviewed scores of textbooks, built a fifty-state database, and traveled to more than a dozen communities to talk to kids about what they have learned about the phenomenon that will shape their future. What I found were points of friction in abundance: Teachers who disagree over whether to teach it. Students who want to learn about it but are not taught. Others who are taught it but reject what they learn. District officials who struggle with teachers who refuse to teach it, or with those who insist on teaching it. Parents who rage that their children are taught it, or that they are not.

That the classroom is not an ideologically neutral space when it comes to climate science is, in a way, strange, because climate science itself is ideologically neutral. The evidence

for human-caused climate change is now as strong as the evidence linking cigarettes and cancer. Yet—as in the case of the children shuttling between the 300 and 400 wings of Chico Junior High—students are often asked to debate a subject that scientists themselves do not. Adult politics soak into the spongy minds of schoolchildren in a number of ways. Many of the nation’s most popular textbooks introduce them to alternate theories for which there is no evidence. Teachers, usually unwittingly, find their way to online lesson plans created by moneyed interests. Some states require a robust climate science education, while others carefully omit it from their academic standards. Every year, lawmakers propose legislation aimed at swaying what children learn about the subject. And, of course, kids hear it outside school, too: One of America’s two major political parties—the one that, until recently, held power in all three branches of the US government and still dominates most statehouses—approaches any mention of the climate crisis with something ranging between hesitation and outright denial. Children absorb these messages from the adults in their lives.

It all adds up. Young people are more likely than their parents or grandparents to accept that humans are messing with the climate, but nonetheless, a 2021 UN survey found that a quarter of Americans under eighteen declined to call it an “emergency”—a rate higher than any other nation surveyed in Western Europe or North America.

Why does this matter? Because just as it behooves us to teach students to read or add sums together, we will all benefit if the next generation has basic literacy in the metamorphosing world they find themselves in. Heat-trapping pollution has already begun roiling Earth’s natural systems. Among other

14 things, it has unleashed natural disasters with greater frequency and fury than at any time in human memory. Virtually no matter where they live, today's children will bear witness to human-caused climate catastrophes in their communities.

That's certainly the case for Ms. Del Real's students, who in their short lives have already experienced more megafires—fires that burn more than 100,000 acres—than their parents and grandparents ever did. Her classes each year now include a handful of students who once lived in Paradise, a town in the Sierra foothills fifteen miles east of Chico. In 2018, a megafire called the Camp Fire burned 90 percent of buildings in Paradise, earning it the distinction of being the most destructive fire in California history. Scientists generally avoid blaming any individual disaster on climate change, but this one, they say, was covered with its fingerprints. The changes to Earth's atmosphere have shortened California's rainy season both in the spring and the fall; when the Camp Fire caught on November 8, Paradise had received just 0.88 inches of rain in the previous six months. Moreover, California's summers have steadily warmed; Paradise's five hottest summers had all occurred in the five summers before the Camp Fire. That relentless heat had sucked moisture from the town's clay soil and ponderosa pine cover.

As bad as California's fires are today, worse await. If emissions aren't sharply curtailed, a state-funded study found, extreme wildfires will strike 50 percent more often and burn 77 percent more land by 2100. As these fires burn, coastal areas worldwide—places now home to 200 million people—could fall permanently below the high tide line. To survive, those people will have to move somewhere, along with hundreds of millions of others displaced by droughts, storms, and floods. Today's



children are likely to watch as catastrophes, displacements, and extinctions tick up with metronomic regularity, transforming their lives regardless of what they once learned in science class.

If preparing children for their own future wasn't reason enough to teach them accurate climate science, these children will soon be decision-making adults, and we know education can powerfully sway those decisions. A study led by climate education researcher Eugene Cordero of San Jose State University followed students who had taken an intensive college course on climate change, and found they made more environmentally friendly decisions than their peers for years after. These decisions—what car to buy, what foods to eat, how to dispose of waste—added up to 2.86 tons less carbon emissions per student per year. Were students across the nation to take a class like this, the paper concluded, the potential reduction in heat-trapping pollution would be about as much as other major mitigation strategies, like rooftop solar and electric vehicles.

This education can be infectious. As science educators Kim Kastens and Margaret Turrin wrote in a 2008 treatise on the subject: “What sets the agenda for public discourse in America—the topics people talk about at the dinner table, the bus stop, the haircutter? The media and popular culture certainly play a key role. But the conversations of today and tomorrow also will be influenced by the ideas and questions that children bring home from school.” Sure enough, a study of middle-school children in North Carolina found that parents grew more concerned about the climate crisis after their children were taught about it. This intergenerational effect played out most strongly in conservative families. Daughters were especially influential, and fathers

16 were especially influenced. Furthermore, young people who do understand the climate crisis have proven capable of leading the rest of us in action. In 2019, more than a million students worldwide skipped school to bring adult eyes to the crisis. Teen activist Greta Thunberg is now a towering figure in the movement to slow emissions. In Eugene, twenty-one young people aged eleven to twenty-three sued the federal government for not protecting their future.

Classrooms have emerged as a battleground in the American political war over climate change because what kids learn about climate change now will directly impact the speed and ambition of action taken for decades to come. That in turn will decide the quantity of fossil fuels extracted from Earth. If a significant portion of young people grow up to doubt the climate crisis is real, as their elders do, little is likely to change. The inertia of the status quo is so high that even a modest dose of doubt inoculates against action. After all, who can justify removing a pillar of our economy without certainty that it is necessary, and that it will work? Confusion and doubt over the causes and impacts of global warming could reign in American politics another three years or another thirty years. That difference is a matter of trillions of dollars for the fossil fuel industry, and of accelerating chaos for the planet.

How did we get here? Why are millions of American children learning mixed or false messages about the phenomenon that will dictate their future? How did there come to be a red–blue divide in climate education? Who has tried to influence what children learn, and how successful have they been? I spent years tracking down the answers to these questions. What I found were the unmistakable signs of moneyed interests

and entrenched ideology. Fossil fuel lobbyists, flaccid textbook companies, networks of free-marketeers and evangelical leaders, and the American political machine have each had a role in the widespread, calamitous, and in some cases, intentional miseducation of our children. It's safe to say that across the country, intrepid teachers rigorously educate their students about climate science. It's also safe to say that, commonly, a teacher down the hall is miseducating them about it.

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Ms. Del Real prevailed over the history teacher. After their confrontation, he begrudgingly agreed to stop showing the climate hoax videos to her students. But it is unlikely to be the last time those children run into an adult with his views. Ms. Del Real teaches in what she calls "a mixed community politically." Chico has the crunchy liberal trappings one would expect of a California college town. But it sits in a deeply conservative agricultural county. Her students often arrive with preconceived and unsupported notions about climate change. She is careful to treat those notions with respect, but also to submit them to the rigors of scientific thinking, as she would any other subject. Usually, by the time they get to the solutions projects, even the doubters understand the implications of a changing atmosphere and are eager to dream up answers. She's sure that one of these years they'll come up with something life-altering. "I really believe that eleven- and twelve-year-olds can save our world," she said, a broad smile underscoring her optimism. "They're brilliant."