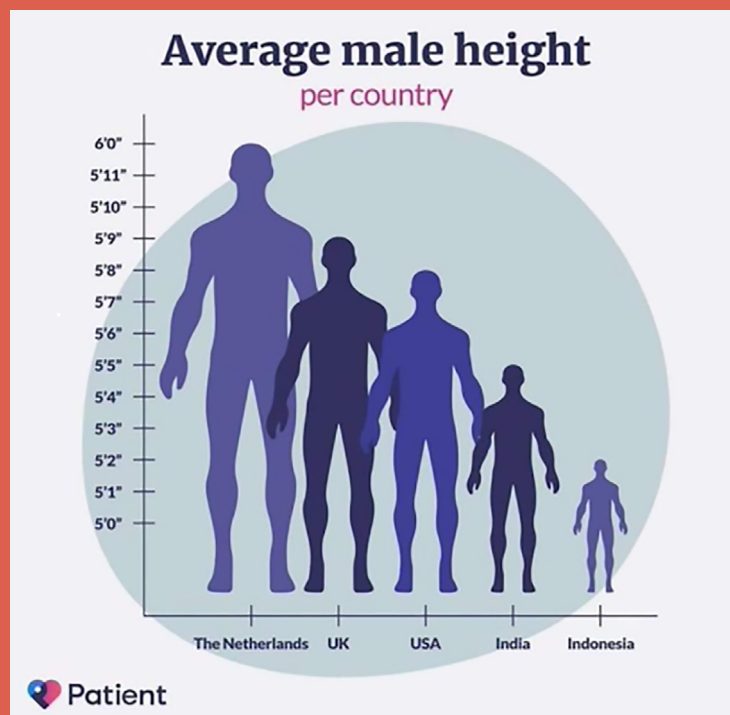


## DataWISE **NOT** Data-FOOLISH



*Taken from an earlier version of this webpage <https://patient.info/news-and-features/whats-the-average-height-for-men>*

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## Dear NCSE Supporters,

Kids today! Wow, do they have access to loads of information that we never dreamed of growing up. The problem is, what they're seeing in their social media feeds and on various online platforms isn't always accurate. Sometimes it's deliberately meant to deceive. To combat this, especially in science, we've developed a tool called DataWISE that we've been sharing with teachers in workshops nationwide. The response has been overwhelmingly positive — no surprise to NCSE Education Specialist Wendy Johnson, who's been leading some of those workshops, as you'll learn (p. 3).

In addition to helping students become "DataWISE," we've also developed a guide for how concerned citizens like you can support climate change education in your statehouse. NCSE Deputy Director Glenn Branch spoke with legislators from eight states to find out what works to help move climate change education bills forward (p. 5). Branch also provides an account of the enactment of a law in West Virginia that initially sought to protect the teaching of "intelligent design" (p. 13). NCSE was instrumental in alerting local and national media about this development; we'll continue to monitor the fallout from the law as the new school year progresses.

Along with DataWISE, our education team has also launched a new modular standards-aligned set of activities called Story Shorts (p. 11). These Story Shorts are based on the lesson sets we've been making freely available to teachers for the past several years. We've taken the best of those curricular units and made them right-sized to meet the needs of new and experienced teachers in their respective class settings. We went in this direction owing to teachers' feedback that they wanted and needed activities that were simpler and could be completed in shorter time windows while still aligning with standards. This first batch of Story Shorts focuses on climate change and continues our mission of helping students resolve common science misconceptions. Keep an eye out for Evolution Story Shorts in the next year!

Finally, I'd be remiss if I didn't mention my interview with new NCSE board member and my good friend Prosanta Chakrabarty (p. 10). We're trying a new format with our Random Samples feature — video! In our first foray into video format, I had the great pleasure of chatting with Chakrabarty about issues related to evolution education, a favorite topic of mine and his. I hope you will watch the video and let me know what you think!

I'm excited by all the innovations supporting accurate and honest science we're trying out this year. None of it would have been possible without your support, for which we at NCSE are incredibly grateful.


**Amanda L. Townley**

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# DataWISE Not Data-Foolish

Wendy Johnson points at a graph (see cover) depicting the average height of human males around the world. Johnson, an NCSE Science Education Specialist, can hardly contain her astonishment at the visual discrepancy between the figure of the Dutchman at 6'0" tall and the Indonesian man at 5'2" tall. The teachers she shares it with find it almost comical. But students could be fooled into thinking that Indonesian people are unusually small by the poorly designed scale for the graph's Y-axis and disproportionate graphical representation of the male figures.

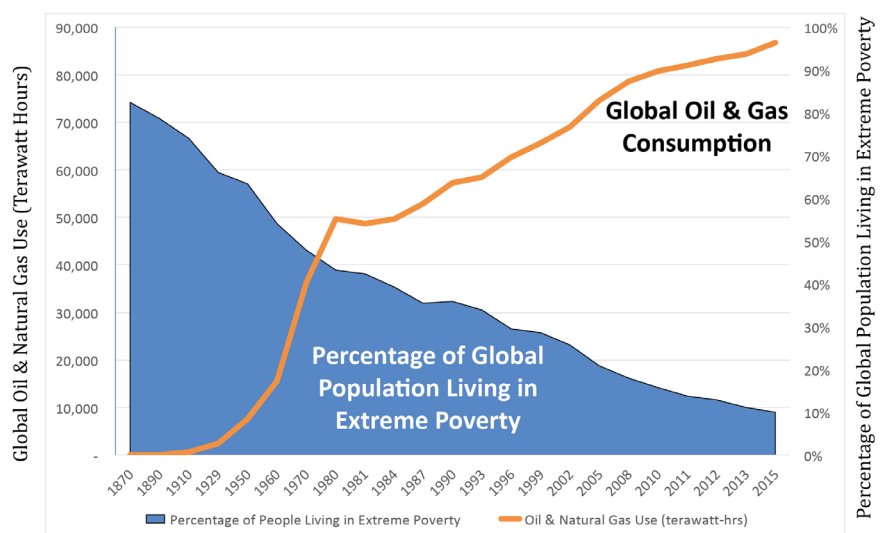
More insidious is an example she shares from the Illinois Petroleum Resources Board (see figure, right) that suggests that increased life expectancy and decreased poverty are the direct results of increasing global oil and gas consumption.

These kinds of graphs can be hard for adults to analyze with a critical eye. For young people, bombarded by information that they often accept or reject in the blink of an eye, it can be nearly impossible.

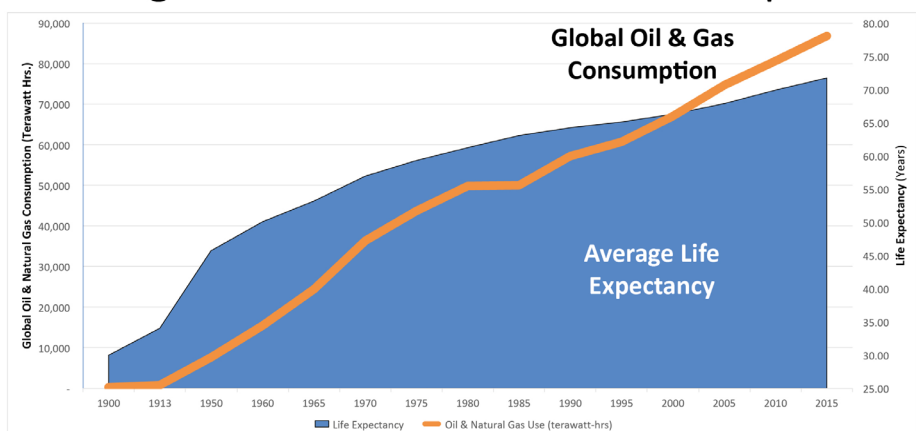
To help students become more information literate when confronting data representations like these, NCSE has launched a set of resources under the rubric [DataWISE](#). Given a claim presented with accompanying data, students use the DataWISE tool to ask themselves a series of questions to judge the source, purpose, presentation, and cogency of the claim and evidence. They

start with questions that allow them to determine whether the claim is **Worthy** of their attention, then **Inspect** the data, ask whether the interpretation of the data and the conclusions make **Sense**, and finally pay close attention to the **Emotions** elicited by the claim and data presented.

## Extreme Poverty Has Declined Dramatically as Oil & Gas Use Has Increased



## Life Expectancy Has Increased Dramatically Along With Global Oil & Gas Consumption



Source: OurWorldinData.org  
(World Bank)



DataWISE is used in several of the NCSE [Story Shorts](#) (modular standards-aligned curricular units). In addition, the DataWISE resource on the NCSE website also includes a few standalone activities that teachers have found helpful.

According to the National Academies of Science, Engineering, and Medicine, the world is facing an “explosion of misinformation and disinformation that has weakened public deliberation and undermined the public’s confidence in science.” Teachers are increasingly being called upon to help students decipher fact from fiction in an unbiased and non-political fashion in the classroom. The DataWISE tool is NCSE’s answer to that need.

NCSE has already led several workshops in Michigan, Colorado, Alabama, and North Dakota, where teachers actively explored the DataWISE tool and associated activities. The response has been overwhelmingly positive.

This comes as no surprise to Johnson, a former high school science teacher. She knows firsthand the emphasis placed on graphs and graphing in the science classroom. Yet she also knows that graphing is usually taught as a skill using broad brushstrokes, almost always divorced from critical media analysis. “DataWISE really just slows you down and makes the steps of analysis really clear to students,” Johnson explains.

Providing this kind of tool to teachers and, by extension, their students makes great sense given NCSE’s sustained efforts over the past several years to shine a light on evolution and climate change misinformation, disinformation, and misconceptions. Graphs and infographics, like the one from the Illinois Petroleum Resources Board, can easily be used to mislead, obfuscate, and confuse. Science teachers, Johnson says, are more likely to tackle misconceptions with their students if they can tie them into existing curriculum. Graphs and graphing provide a perfect medium.

This has been borne out during the NCSE-led workshops for teachers. “I have learned so much that can be applied to my class and my curriculum,” remarked one teacher who attended a workshop led by Johnson in North Dakota. Another said, “Bias in data presentation is part of my curriculum so this session was very helpful.”

## MORE SCIENCE SPECIFIC

For the past few years, NCSE has been using other media literacy tools to help students critically analyze information, many of which have colorful acronyms. For example, one developed by librarians at Chico State University in California is called the CRAAP (Currency, Relevance, Authority, Accuracy, and Purpose) Test and is used to check the reliability of sources. FABLE (Find, Analyze, Bias, Look, and Exert) is another that focuses on logical fallacies. Though helpful, these tools tend to focus on media literacy — the reliability and trustworthiness of online sources, for instance — but don’t always get to the heart of inquiry-based scientific practice, namely, closely examining data and determining whether the data can support whatever claim is being made. Hence the NCSE Supporting Teachers team came up with DataWISE, which like the CRAAP Test and FABLE allows students to analyze the origin of information, but also prompts them to analyze the information itself.

“DataWISE is one way to help students internalize the question they should always be asking of themselves in science, and that is: ‘Does the evidence support the claim?’” Johnson explained.

Using this tool and attaining information literacy is critical for students as they grapple with their understanding of the nature of science. Typically, science teachers focus on the “I” (Inspect) and the “S” (does it make Sense) in DataWISE. However, the “Worthiness” of a claim is critical in this age of social media-driven news and information, while the “Emotions” piece is often overlooked but can blind both the conveyor and recipient of data to biases that affect interpretation.

## THE PANDEMIC AND TRUST IN SCIENCE

Of course, in the not-so-distant past, we vividly felt the need to be able to interpret scientific data presented in all kinds of graphical ways. During the COVID-19 pandemic, the public was bombarded with the latest science updates and health information, often in the form of charts, infographics, and tables.

“The World Health Organization says that an infodemic accompanied the COVID-19 pandemic,” Johnson notes. “There was so much information, including false and misleading information, that people didn’t know what to



# How to Support Climate Change Education in Your State's Schools: Advice From Eight Lawmakers

**S**o you want to help to improve climate change education. Good for you!

Climate change education is a critical component of any plan for responding to the disruptions caused by a warming climate. Today's students will spend the rest of their lives on a hotter planet, mainly owing to the actions — and inactions — of their elders, and they need to be prepared with appropriate knowledge and know-how. And yet climate change education in the United States is often far from adequate.

If you think that suitable legislation might be the remedy, you're not alone. In the last five years, by my count, no fewer than 90 measures aimed at supporting climate change education have been introduced in the legislatures of 21 states across the country. I interviewed eight of their sponsors by phone or email, and here's what I learned that might help you, as a citizen concerned

believe, and some gave up trying to make sense of it all because they were overwhelmed. And, of course, that is not what we want as science educators."

In the meantime, the NCSE Supporting Teachers team continues to work with teachers to help them figure out how best to integrate the important DataWISE tool into their curriculum. And as teachers use the tool more, they've begun to provide feedback on where it fits best for them,



Photo by Markus Spiske on Unsplash

about the climate crisis, to support the introduction, passage, and enactment of such legislation in your state.

## Seek sponsors who recognize the importance of the issue

Two of the legislators, James Talarico in Texas and Christine Palm in Connecticut, are former teachers themselves, so they didn't have to be convinced of the importance of preparing students.

how they are employing it, and how they're tailoring it to fit their needs.

NCSE has purposely developed the DataWISE tool to be flexible and adaptable. In a rapidly changing, information- and misinformation-dense world, the hope is that DataWISE will keep teachers one step ahead.



Paul Oh is NCSE's Director of Communications. [oh@ncse.ngo](mailto:oh@ncse.ngo)

“Education is the first step in helping create the leaders of tomorrow who will need to tackle this issue head-on,” Talarico told me. “The first step to solving a crisis as complex and existential as climate change is through education.”

### **Harness the energy and enthusiasm of youth activists**

Wendy Thomas in New Hampshire was already concerned about climate change, but it was youth activists from 350nh who convinced her to introduce her resolution supporting climate change education. Youth-led and youth-oriented climate activist groups, including Ten Strands in California, Green Eco Warriors in Connecticut, and Climate Generation in Minnesota, led the support for the measures in their states.

### **Emphasize the injustice of not providing climate change education**

“Disadvantaged communities throughout the state ... are likely to experience the first and worst climate impacts,” even while they have benefited the least from the activities that cause climate change, Andrew Gounardes in New York told me. “We have an obligation to ensure our youngest and most vulnerable community members gain the knowledge and skills to adapt to a rapidly changing world.”

### **Remember that politics is the art of the possible**

Luz Rivas’s bill, which was enacted in 2023, mandated the teaching of climate change in California’s public schools, but a previous version would also have required climate change to be a mandatory topic of study in high school. Why the retreat from the previous version? Rivas explained that California’s schools were under so much stress owing to the COVID-19 pandemic that she decided not to insist on the more ambitious provision.

### **Expect political partisanship to be a barrier**

Juan Mendez in New Mexico noted, “Political partisanship overrides what needs to be done” to improve climate change education.

Chris Larson in Wisconsin similarly reported, “Even critical issues that should be bipartisan are halted due to partisanship.”

Larson added that he wished that he had worked more with the business community, which might have enabled

his climate change education bill “to garner Republican legislative support.”

### **Communicate with your legislators**

All the legislators I interviewed agreed that people who want to support measures like theirs can do a lot to help. Palm in Connecticut emphasized that state government is “the sweet spot” for action on climate change: big enough to make a difference but small enough to be approachable. Simply letting your legislators know that you support climate change education, or a particular measure intended to improve it, can go a long way in motivating them.

### **Make your support for climate change education visible**

Testifying in legislative committee hearings can make a huge difference; even attending hearings without testifying to show your support can be helpful, Nicole Mitchell in Minnesota told me. Mendez in New Mexico stressed the importance of storytelling in any communication with legislators in order to capture their attention and their emotion.

“I can be ignored,” he acknowledged, “but real people who tell their stories are harder to ignore.”

### **Be persistent**

Only two of the legislators I interviewed — Rivas in California and Palm in Connecticut — have enjoyed success with their measures so far, and neither of them succeeded on their first try. Indeed, it took four years and two legislative sessions for Palm’s proposed statutory requirement to teach climate change in Connecticut’s public schools to pass. Talarico in Texas expressed his resolve: “Despite our climate education bill not passing, I’m not giving up — and neither should you.”

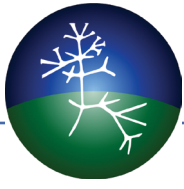
Climate change education is popular: about 75% of Americans agree that schools should teach about the causes, consequences, and potential solutions to global warming. The challenge is to channel the public’s abstract support for climate change education into specific and implementable legislation that will make a real difference in the classroom. That’s how legislators and their constituents can help to equip today’s students to cope with the challenges of the warmer world they will inherit.

Originally published at [Yale Climate Connections](#) on June 4, 2024.

**Glenn Branch** is deputy director of NCSE.  
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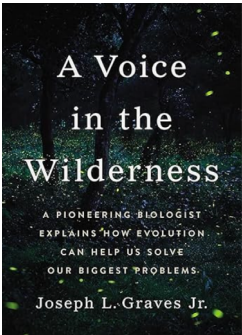




# Member News



**Joseph L. Graves Jr.'s** *A Voice in the Wilderness: A Pioneering Biologist Explains How Evolution Can Help Us Solve Our Biggest Problems* (Basic Books, 2022) was shortlisted for the 2023 Phi Beta Kappa Award in Science, which recognizes superior books by scientists written to illuminate aspects of science for a broad readership. A professor of biology at North Carolina A&T State University, Graves is a member of NCSE's board of directors. *A Voice in the Wilderness* was [reviewed](#) by Vassiliki Betty Smocovitis in *RNCSE* 2023; 43(4): 13–14.



The married couple **Brad Hoot** and **Cathy Hoot** recently established the Bradley and Cathy Hoot Endowed Fellowship in Evolution in the College of Natural Science at Michigan State University, the first such fellowship there. The endowment funds graduate students working on evolution, with a preference given to students who would be willing to engage with creationists. Brad, who used to debate evolution with Cathy's father, a creationist, told *Connection*, the college's newsletter, "I hope the recipient would represent the evolution side in any kind of debate or public exposure — to try to get the thinking that's behind it out to the public."



**William F. McComas**, the Parks Family Distinguished Professor in Science Education at the University of Arkansas and the editor of *The American Biology Teacher*, received the Honorary Member award for 2023 from the National Association of Biology Teachers. The award, NABT's highest honor,

is conferred to individuals who have "achieved distinction in teaching, research, or service in the biological sciences." According to NABT, "The usually easy-going and well-spoken Bill McComas was at a complete loss for words upon learning of his award. 'All I can say is

"wow!'" He then added, "Please know how much I appreciate the support of my colleagues and NABT leadership regarding this honor. Wow, and thanks.'" McComas received NCSE's Friend of Darwin award in 2020.



NCSE is pleased to congratulate **Bill Nye** "The Science Guy" for receiving the Richard Dawkins Award for 2023 from the Center for Inquiry. "The award is bestowed to a distinguished individual from the worlds of science, scholarship, education, or entertainment who publicly proclaims the values of secularism and rationalism, upholding scientific truth wherever it may lead," according to CFI. Among the previous recipients of the award is NCSE's former executive director **Eugenie C. Scott**.



# UPDATES

Are there threats to effective science education near you? Do you have a story of success or cause for celebration to share? E-mail any member of staff or [info@ncse.ngo](mailto:info@ncse.ngo).

## CALIFORNIA, SAN DIEGO

The University of California San Diego Academic Senate approved a new climate change graduation requirement on October 10, 2023. Starting in fall 2024, new students at UCSD will be required to complete a one-quarter class that satisfies the Jane Teranes Climate Change Education Requirement, named for the late professor who established the climate change studies minor at the university in 2019. Certain general education courses, courses required for majors and minors, and diversity, equity, and inclusion courses may be used to fulfill the requirement. The requirement will be reassessed every five years.

## CALIFORNIA, SANTA MONICA

At its November 2, 2023, meeting, the school board of the Santa Monica–Malibu Unified School District approved a climate literacy resolution provided by Team Marine, a student environmental group at Santa Monica High School. The resolution calls on the district to “support present curricula and practices in order to prepare students to combat climate change and educate for the greater good,” including by enhancing curricula in elementary and secondary schools, providing professional development and resources to the staff, and encouraging teachers to examine “the climate crisis through a social, economic, political, and/or scientific lens (in addition to NGSS[-]aligned lessons).”

## COLORADO, BOULDER

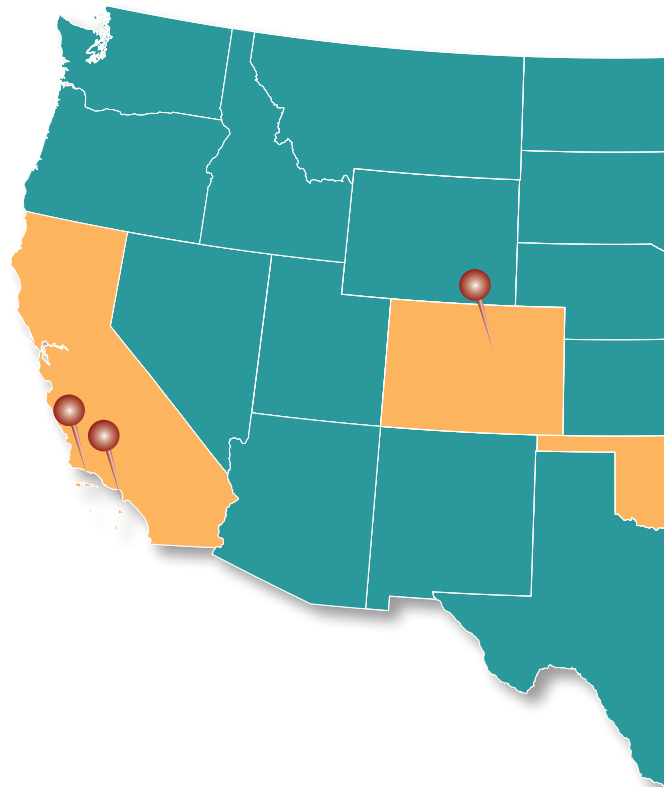
At its November 28, 2023, meeting, the Boulder Valley School District school board voted unanimously to adopt a student-initiated resolution based on the national Green New Deal for Schools proposal. The resolution committed the district to, among other things, “[c]ontinue building professional development, curricular, and extracurricular activities to increase knowledge of and opportunities for action on climate change, including by: ... auditing textbooks and instructional materials for inaccuracies and inadequacies relating to the reality, cause, severity, and solutions to global climate change.”

## OKLAHOMA

Three “intelligent design” bills died in Oklahoma on February 29, 2024, when a deadline for bills to pass committee in their house of origin expired. Senate Bill 1871 would, if enacted, have required any public or charter school teacher who teaches evolution to ‘also provide instruction to students on the concepts of creationism and/or intelligent design.’ House Bill 3122 and House Bill 3543, both styled the Oklahoma Freedom of Religious Expression Act, would, if enacted, have permitted teachers “to teach and discuss the theory of intelligent design.” Resistance to the bills was coordinated by the grassroots pro-science-education organization Oklahomans for Excellence in Science Education.

## WISCONSIN

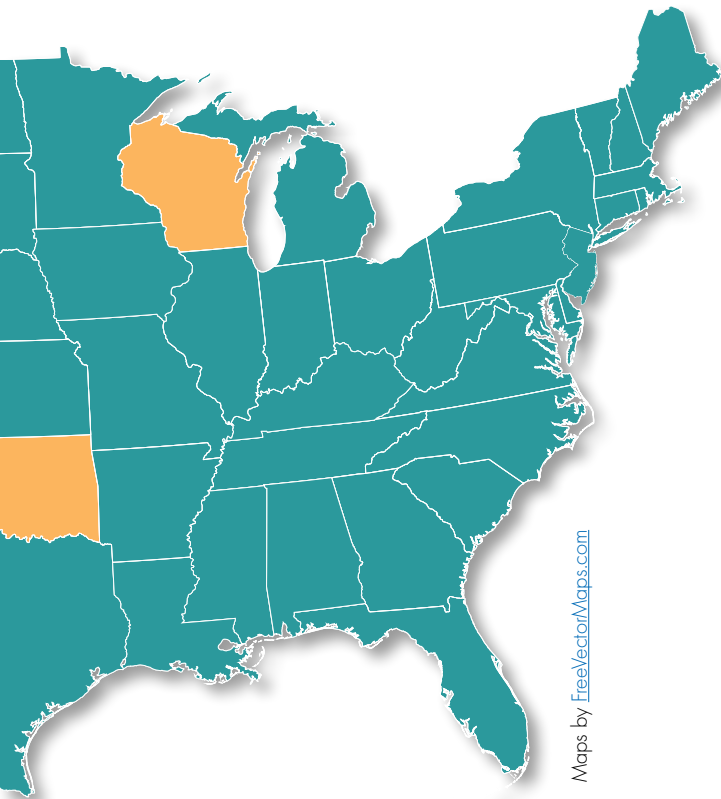
A bill purporting to give parents rights over the education of their children attending public schools, which might have harmed science education in Wisconsin, was vetoed by Governor Tony Evers (D) on March 29, 2024.



Wisconsin's Assembly Bill 510 would, if enacted, have provided that parents have "[t]he right to opt out of a class or instructional materials at the child's school for reasons based on either religion or personal conviction" and "[t]he right to timely notice by the child's school, through a process consistent with school policy, of when a controversial subject will be taught or discussed in the child's classroom," where "controversial subject" is defined as "a subject of substantial public debate, disagreement or disapproval."

Although no scientific topics are explicitly mentioned in the bill, there are frequently requests or demands for students to be excused from evolution instruction, as NCSE's Eugenie C. Scott and Glenn Branch described in *Evolution: Education and Outreach* in 2008. And both evolution and climate change are arguably subjects of "substantial public debate, disagreement or disapproval," even though there is clearly a scientific consensus on both (see, for example, the Pew Research Center's description of a 2014 survey of members of the AAAS).

Describing himself as "a former science teacher, principal and state superintendent," Governor Evers wrote, "I am vetoing this bill in its entirety because I object to sowing division in our schools, which only hurts our kids and learning in our classrooms."



Maps by [FreeVectorMaps.com](https://www.freevector.com)

## PAKISTAN, BANNU

"In a shocking turn of events, a biology professor issued a public apology for teaching Darwin's theory of evolution, bringing to the fore the issue of growing extremism in the province [Khyber Pakhtunkhwa] and the curtailment of freedom of expression and scientific ideas," *The Express Tribune* reported in October 2023. The professor in question, Sher Ali at Government Post Graduate College, was criticized by local clerics for his remarks about women's rights in Pakistan at a seminar. Ali defended himself on Facebook. In the course of his defense, he explained that he taught evolution, saying, "Chapter 24 of the biology textbook discusses Darwin's theory of biological evolution and if someone has problems with this topic, then they should approach the government for the removal of the chapter from the course," according to *Dawn*. Subsequently, after the district administration intervened, Ali affirmed in writing that "all scientific and rational ideas, which were in contradiction to Islamic Sharia, including Darwin's theory of evolution, are falsehood."



## RUSSIA

"Russia's science and higher education ministry has dismissed the head of a prestigious genetics institute who sparked controversy by contending that humans once lived for centuries and that the shorter lives of modern humans are due to their ancestors' sins," the Associated Press reported in January 2024. The scientist in question, Alexander Mikhailovich Kudryavtsev, was formerly the director of the Russian Academy of Science's Vavilov Institute of General Genetics. He offered the controversial remarks during a short presentation for the plenary session of the Third International Scientific and Theological Conference "GOD-MAN-WORLD" in March 2023. The Russian Orthodox Church protested his dismissal, although it is not clear that it was motivated by his remarks.

## UNITED KINGDOM, WALES

Evangelists from Louisiana teamed up with churches in Bridgend, Wales, to visit state schools in the Bridgend area to make proselytizing presentations in which creationism was taught as fact, according to a new short film, "[How Tragedy Brought US Evangelicals to Welsh Schools](#)," produced by the News Movement. According to a September 2023 press release from Humanists UK, "A science teacher is ... interviewed in the film, and explains that the visitors would come into her lessons and tell the pupils that, for example, evolution is a lie." The presentations were discontinued during *the* pandemic, but they are expected to resume in 2024. Teaching creationism in the public schools is not banned in Wales as it is in England, and evolution is not required to be taught in primary schools.



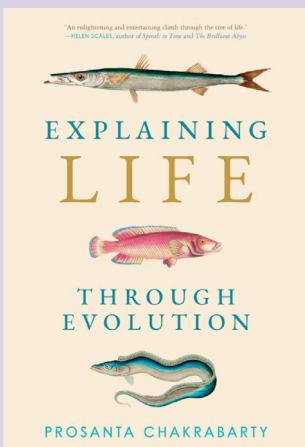


Prosanta Chakrabarty is the George H. Lowery Professor in the Department of Biological Sciences and Curator of Fishes at the Museum of Natural Science at Louisiana State University and a member of the NCSE Board of Directors. He is a TED Senior Fellow, an Elected Fellow of the American Association for the Advancement of Science, a Fulbright Distinguished Chair, and a National Geographic Certified Educator. He is also the author of a recent popular book, *Explaining Life Through Evolution* (MIT Press, 2023).

“ I wanted to write something my kids could read ... and their peers could read. I wrote it for people who may not otherwise pick up an evolution textbook.” — Chakrabarty on his book, *Explaining Life Through Evolution*.



by saying if we evolved from monkeys why are there still monkeys well because we're not monkeys we're



“ To spread the knowledge about why it’s important to learn about evolution at a time when it may come under attack again.”  
— Chakrabarty on why he joined the NCSE board.

# Listening to Science Teachers, NCSE Launches New Climate Change Story Shorts

**NCSE** is excited to announce the launch of our new [Climate Change Story Shorts](#): flexible mini-units that can be completed in as little as a week. The Story Short format is a unique approach to standards-aligned instructional storylines developed through our collaborative work with teachers. Each Story Short addresses one [performance expectation](#) while also directly confronting common misconceptions about climate change.

[Storylines](#) have emerged as the gold standard for science instruction because they engage students in the [three dimensions of science](#) to explain a phenomenon or solve a problem. However, facilitating students' sensemaking about a complex phenomenon while simultaneously achieving multiple NGSS performance expectations often requires a long and complicated storyline. Three-dimensional teaching and learning also require shifts for both teachers and students, including more student talk and less teacher talk, a clearly established purpose for each activity connected to a driving question, increased collaboration among students, and more authentic assessments. Developing instructional resources that adequately support both students and teachers in making all of these shifts has proven to be a formidable challenge.

Since its inception, the Supporting Teachers team has worked closely with master teachers to develop instructional materials. We have purposely tackled topics, including

evolution, climate change, and the nature of science, that are challenging to teach because they involve social controversies. As a result, students may come to the classroom with deeply held [misconceptions](#) that are difficult to resolve. Our approach has always been to tackle these misconceptions head-on in a non-confrontational way that we describe as [BRAVE classroom practices](#). Starting in 2021, we conducted a two-year national curriculum field test (CFT) of our instructional units. Much of the CFT feedback echoes the challenges teachers across the country face as they take up standard-aligned storylines — they are overwhelmingly complex and difficult to orchestrate. Over the past year, we have used this feedback to entirely revise our climate change units into our new Story Short format. This format addresses four main issues:

## Issue #1 Phenomenon fatigue:

A critical feature of storylines is that each learning activity is explicitly related to a driving question about a specific phenomenon that drives the entire unit. Storylines are often complicated and take many weeks or months to complete, leading to a weariness among teachers and students that has been dubbed “phenomenon fatigue.” Storylines become long and complicated when they address multiple performance expectations. Integrating many performance expectations is a worthy goal because it allows for answering more complex questions, making important connections between topics,



## Climate Change Story Shorts

and accurately reflects the nature of science. However, students also crave novelty and can get frustrated when they feel like they have been learning about the same topic for too long. In addition, teachers often have difficulty keeping the “thread” of the unit going when there are so many different ideas to connect.

## Our solution: Story Shorts are streamlined storylines

that address just one performance expectation. We knew that we needed to find ways to simplify our storylines without watering them down. Rather than addressing multiple performance expectations, each Story Short aims to support students in meeting just one standard, which can be completed in as little as five hours of class time. In addition, our resources are targeted at helping students resolve specific common misconceptions about that topic. We carefully revised our materials based on the latest research and best practices in the field to ensure that each activity in the Story Short directly addressed a piece of the performance expectation as well as a common misconception.

## Issue #2 Teaching to a script:

When teachers try a new approach, they often feel like they are enacting a script written by someone else. This scripted feeling is especially associated with storylines because they are designed to lead students on a specific learning path that highlights many important connections along the way. At the same time, the goal of a storyline

is to make sense from the students' perspective, so the teacher has to merge the predetermined "script" with the students' ideas and questions. As a result, implementing a storyline can often create tension for teachers as they attempt to weave together their own understanding of the content and the many responsibilities they carry in the classroom, the vision of teaching and learning promoted by the curriculum, and the ideas, interests, and questions put forth by their students.

**Our Solution: Story Shorts are flexible storylines** that clearly identify key activities necessary for achieving the performance expectation and resolving a specific misconception while offering optional activities that dig deeper or make other important connections. We call these optional activities Side Quests because they enhance the storyline, but their inclusion is based on the teacher's discretion. The main activities of the Story Short are the essential building blocks for resolving the targeted misconception and achieving a particular standard-aligned learning goal. Side Quests offer additional opportunities for going deeper into a topic, filling in missing background information, meeting the needs of specific students, or for place-based adaptations. Side Quests are not merely optional extension activities to do if you have extra time, but rather ways that the storyline can be adapted to the needs of particular groups of students. Side Quests invite teachers to pay attention to their students' interests, needs, and cultural ways of knowing and to veer off the "script" with intentionality. We believe the Side Quest feature helps teachers imagine how storylines can be adapted to their context and how they might construct and add their own Side Quests in the future.

**Issue #3 Meaningful assessment:** Assessment is an integral part of teaching and learning because it allows the teacher and students to better understand student thinking and how it compares to the target performance. The nuances of formative and summative assessment have been debated endlessly in the field, leaving teachers to grapple with concrete implementation issues, such as assigning grades and meeting accountability measures. New types of formative assessment have emerged as standardized assessments have transitioned to three-dimensional performance tasks. Meanwhile, teachers have been left questioning how to integrate all of these changes into the existing structures within their schools.

**Our solution: Story Shorts seamlessly integrates formative and summative assessments.** The first activity in each Story Short is specifically designed to uncover misconceptions students hold about a topic while supporting them in expressing their ideas and questions on a driving question board. Teacher support materials help teachers anticipate and respond to students' ideas and questions and connect each learning activity back to students' ideas and questions. Learning activities also invite students to directly respond to common misconceptions using the latest scientific evidence. Finally, each Story Short concludes with a summative assessment task that requires students to apply the knowledge and skills they learned to explain a slightly different phenomenon.

**Issue #4: Mismatch between resources and the needs of teachers:** Just like students, teachers have different strengths, weaknesses, and preferences. While NGSS-aligned resources often highlight how to meet differing students' needs, they

rarely take teachers' differing needs into account. When resources consider teachers' needs, it usually means adding more information, resulting in longer and more complicated instructions. To be fair, this is a tricky balance for curriculum developers! Some teachers need additional support with the science content, some need support with pedagogical strategies, and others need logistical support in managing students and materials. To further complicate things, teachers' needs shift based on the context of the lesson and at different points in the school year. Thus, it is understandable that teacher support resources often become long and complicated.

**Solution: Enhanced teacher support targeted to different needs.** While we can't solve every problem for teachers, we listened carefully when they told us that the teacher resources for most publicly available NGSS storylines are too long and complicated. As former teachers, the NCSE Supporting Teachers team understands how busy teachers are and that they don't have time to dig through long documents to find what they need. Many features of our new Story Shorts were explicitly designed to address these challenges. We developed an overview document for each Story Short that allows teachers to see the big picture and access the materials quickly. From the overview, teachers click on a link for each activity and find teacher instructions with links to all the resources they need, including student handouts, slide decks, and supplementary resources such as cards and data sets. The teacher instructions are organized to allow teachers to easily access what they need. The instructions for each activity begin with a series of simple graphic organizers that help teachers swiftly understand

# WEST VIRGINIA ENACTS A CRYPTOCREATIONIST LAW

*The integrity of science education in West Virginia's public schools was jeopardized on March 22, 2024, when Governor Jim Justice signed Senate Bill 280 into law. The new law provides that "[n]o public school board, school superintendent, or school principal may prohibit a public school classroom teacher from discussing or answering questions from students about scientific theories of how the universe and/or life came to exist." But the legislative history shows that the intention of the bill is to encourage the teaching of "intelligent design."*



## THE FORERUNNER

In the previous legislative session, Amy Grady (R–District 4) and Jay Taylor (R–District 14) introduced Senate Bill 619, which proposed to allow “[t]eachers in public schools, including public charter schools, that include any one or more of grades Kindergarten through 12, [to] teach intelligent design as a theory of how the universe and/or humanity came to exist.” Introduced on February 14, 2023, the bill passed the Senate


Education Committee on February 21 and then the Senate on a 27–6 vote on February 25. The bill then landed with the House Education Committee.

National civil liberties and science education organizations then added their voice to the state groups opposing the bill. The American Civil Liberties Union and Americans United for Separation of Church and State reminded the House Education Committee that teaching “intelligent design” in the public schools is a clear violation of the Constitution. The National Association of Geoscience Teachers warned that “this bill threatens to make West Virginia’s students unprepared for college coursework and for careers that depend upon solid understandings of science.”

how the activity fits within the larger Story Short and access materials. These graphic organizers are often all a veteran teacher would need to facilitate the activity. However, we also include step-by-step directions below the graphic organizers that support teachers in implementing each part of the lesson should they need it.

## FLEXIBLE APPROACH


The flexible approach to three-dimensional instruction embedded within NCSE’s Story Short format best serves the needs of both teachers and students. Throughout the revision process, NCSE’s teacher ambassadors and field testers implemented new activities and provided feedback on the materials. We have shared the process of developing Story Shorts at



**Story Shorts are a unique approach to standards-aligned storylines**


**Solution for phenomenon fatigue**

A Story Short is a streamlined storyline completed in as little as 5 hours to achieve one performance expectation.




**Allows for flexibility**

Story Shorts offer optional Side Quest activities that teachers can choose to include based on available time and their students’ needs and interests.




**Integrated assessments**

A Story Short integrates formative assessments, including the driving question board, discussions, and written tasks, then culminates with a 3D summative assessment.




**Streamlined teacher resources**

Story Short resources are designed to be easily accessible for busy teachers and offer multiple levels of support.



Access NCSE’s Climate Change Story Shorts [ncse.org/climate-change-story-shorts](https://ncse.org/climate-change-story-shorts)



multiple regional, state, and national conferences and received very positive feedback from teachers and teacher educators alike. The Supporting Teacher’s team is thrilled to finally be able to share our five Climate Change Story Shorts with the public. We invite you to try them out this school year and share your experiences with us either in the NCSE Supporting Teacher’s Facebook group or via email at [touchet@ncse.org](mailto:touchet@ncse.org).

PS: And, in case you’re wondering, our next team project will follow the same process to update our current evolution and nature of science storylines. So stay tuned!

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Senate Bill 619 subsequently died in the House Education Committee, where it never received a hearing, when the legislature adjourned sine die on March 10, 2023. “The failure of this misguided bill is a victory for the integrity of science education in West Virginia, and I congratulate all the Mountaineers who worked to ensure that it failed,” commented Ann Reid, then NCSE Executive Director. She presciently added, “But the bill progressed too far and too fast for us to be complacent that there won’t be future attacks on evolution education.”

## THE SWITCHEROO

Indeed, on January 11, 2024, Grady, Taylor, and six of their colleagues in the West Virginia Senate introduced Senate Bill 280, which was identical to Senate Bill 619 from 2023. The Senate Education Committee passed the new bill on January 17, but not before amending it to provide instead that “[n]o public school board, school superintendent, or school principal shall prohibit a public school classroom teacher from discussing or answering questions from students about scientific theories of how the universe and/or life came to exist.”

On its face, the revised version of the bill, unlike the original, offers no comfort to creationists, since neither “intelligent design” nor “creation science” is recognized by the scientific community as a genuine scientific theory. But Grady insisted that the revised bill still would protect the teaching of “intelligent design,” according to West Virginia Watch (January 23, 2024). The revised bill passed the Senate on a 31–2 vote on January 23, in what

the *Charleston Gazette-Mail* (January 23, 2024) editorially described as “another blow against education.”

The National Science Teaching Association warned the legislature that “[e]nacting SB 280 would engender significant confusion about what West Virginia’s public school teachers are allowed to teach, potentially leading to litigation if misguided teachers elect to teach ‘intelligent design’ under the shield of the law,” citing the outcome of *Kitzmiller v. Dover* in 2005. Nevertheless, the bill (with inconsequential amendments) passed the House Education Committee and then the House on a 89–9–2 vote on March 9, 2024, and then was signed into law by Governor Justice.

## THE AFTERMATH

Reporting on the enactment of the bill, the Associated Press (March 22, 2024) quoted NCSE’s description of it as “threatening the integrity of science education in the state’s public schools.” Encouragingly, it also reported that “Aubrey Sparks, legal director of the American Civil Liberties Union of West Virginia, said the organization would be watching the law’s implementation closely. If the wording of the legislation is ambiguous to her, she said, it’s going to be ambiguous for teachers, students and parents, too.” NCSE is cooperating with the ACLU of West Virginia to monitor the situation there.

NCSE Executive Director Amanda L. Townley commented on the passage of the bill for *Scientific American* (April 3, 2024). She suggested that its sponsors and supporters mistakenly think that learning about evolution threatens students’ faith and that

exposing students to creationism promotes religious freedom. She also warned of unforeseen consequences, writing, “With no definition of ‘scientific theories’ in the law ... the sky’s the limit.” She concluded, “Failure to maintain the separation of church and state ... opens a door that, one day, people will wish could be closed.”

Writing in the *Charleston Gazette-Mail* (April 4, 2024), Herman Mays, a biology professor at Marshall University in Huntington, West Virginia, added, “Promoting religion seldom ends well for school districts, even in West Virginia,” citing recent settlements of legal cases involving school districts accused of proselytizing to their students. He also observed, “Bills like SB 280 are an embarrassment and likely will discourage high-paying, high-tech industries reliant on an educated workforce from moving to West Virginia. Ultimately, children in our state will pay a price.”

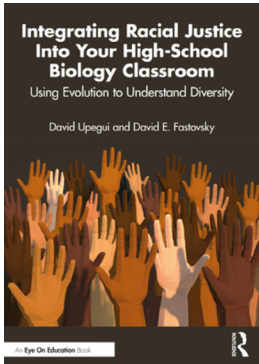
What is the significance of the new law (West Virginia Code §18-5-41a)? It is not a novelty: similar laws are already on the books in Kentucky, Louisiana, Mississippi, and Tennessee. While there is no evidence that teachers in those states intentionally avail themselves of the license that such laws afford them, these laws nevertheless implicitly encourage teachers to miseducate their students about evolution. In enacting its new cryptocreationist law, West Virginia is sending a dangerously antiscientific message to teachers, students, and parents across the Mountain State.



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# THE RNCSE REVIEW



## *Integrating Racial Justice into Your High-School Biology Classroom: Using Evolution to Understand Diversity*

**authors:** David Upegui and David E. Fastovsky  
**publisher:** Routledge  
**reviewed by:** Blake Touchet

“While bad (e.g., specious) science has historically oppressed people, good (e.g., robust) science can actually liberate them” (page 183). This passage, from the conclusion of *Integrating Racial Justice into Your High-School Biology Classroom*, succinctly summarizes the book’s thrust.

David Upegui (a science teacher) and David E. Fastovsky (a paleontologist) open their book with the argument that evolutionary theory is the best place to integrate racial justice into the K–12 curriculum. High school students are at the right developmental stage to discuss racial justice, and the history of evolution provides plenty of examples of specious and misappropriated uses of science for racial discrimination and oppression as well as the opportunity to highlight the nature of science and its self-correcting

properties. They use the frameworks laid by critical scholars such as Paulo Freire, Henry Giroux, and Derek Hodson to argue that the purpose of general education, and science education specifically, is for students to use literacy for empowerment and liberation. By gaining an understanding of what modern evolutionary theory says about humanity’s diversity and interconnectedness, students can come to see how bad actors in the past relied on ignorant or biased assumptions to create false racial categories and stereotypes.

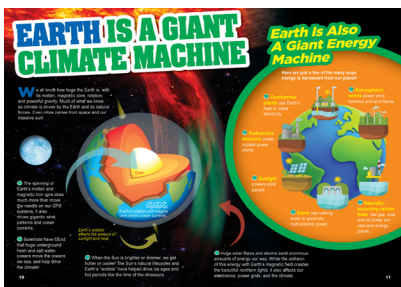
Through a series of suggested activities with accompanying articles and videos featuring scientists such as Joseph L. Graves Jr. (a member of NCSE’s board of directors) and Agustin Fuentes, Upegui and Fastovsky demonstrate ways in which these insights may be discussed

in connection with teaching about evolution. These lessons also highlight the interdisciplinary nature of racial justice by combining the nature of science, specific evolutionary content, and an investigation of the historical, political, and economic factors that contributed to the past and present marginalization of certain groups in the United States and around the world.

The second half of the book provides teachers who choose to use these lessons an in-depth understanding of the history of racial oppression in the United States from the 17th century to the present, the history of “scientific” racism used to justify the trans-Atlantic slave trade and Jim Crow laws, the history of the development of evolutionary theory from before Darwin up to the present, and an overview of pedagogical practices for including racial justice in biology classes. While not all teachers will be willing or able to use the lessons in this book in their classrooms, it is an excellent primer for those who would like to educate themselves on the complex historical interplay between history, science, and racial justice.



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## WHAT WE’RE UP AGAINST Oceans of Nonsense from Climate Change Deniers

Climate News, with reference to “The Kids Guide to the Truth about Climate Change,” a climate-change-denial booklet peddled by Mike Huckabee’s EverBright Kids. “It’s highly slanted with a clear ideological message, and it’s very unreliable as a guide to climate change for kids.” A particularly bizarre example of the booklet’s unreliability is the claim that “huge underground fresh and salt water oceans move the oceans we see, and help drive the

“It’s propaganda,” NCSE’s Glenn Branch [told](#) Inside

climate.” Although it is tempting to suppose that the claim reflects a hazy memory of Jules Verne’s 1864 novel *Journey to the Center of the Earth*, which features a subterranean ocean, it is equally possible that it was based on scientific research suggesting, in the words of a 2018 [article](#) in *Quanta*, “that Earth’s mantle might hold more water than all the oceans combined.” The problem is that the research suggested only the existence of hydrous minerals in the mantle — not liquid water.

— GLENN BRANCH

# NCSE HELPS TEACHERS TEACH SCIENCE

