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EDUCATION NEWS

Houston-area middle schoolers to learn about carbon capture through new grassroots initiative

With the help of a \$2.5 million grant from the U.S. Department of Energy and a sn but growing network of science teachers, educators are spearheading a grassroo educational initiative to provide information about carbon capture and storage al with its potential benefits.

Adam Zuvanich (<https://www.houstonpublicmedia.org/articles/author/adam-zuvanich/>)

| January 13, 2025, 7:00 AM (Last Updated: January 13, 2025, 8:06 AM)



(https://www.houstonpublicmedia.org/?attachment_id=510282)

Adam Zuvanich/Houston Public

Dulles Middle School science teacher Julia Dolive, left, shows a student how rocks are permeable and absorb water on Dec. 9, 2024, in Sugar Land, Texas.

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06:08

SUGAR LAND – Pranav Subhash has watched documentaries about carbon capture, which traps carbon dioxide so it can be repurposed for industrial uses or injected deep into the ground. The idea is to limit how much of the gas goes into the Earth's atmosphere, where it contributes to greenhouse effect and ultimately global warming.

The 13-year-old student at Dulles Middle School near Houston, whose mother works as a chemist for the Environmental Protection Agency, said he's anxious to learn more about a technology that is decades old and starting to gain more traction across the globe and in a region that is one of the world's foremost energy producers — and polluters (<https://www.houstonpublicmedia.org/articles/news/energy-environment/2024/01/26/475695/houston-ship-channel-deemed-sacrifice-zone-in-new-pollution-report-by-amnesty-international/>).

"If we don't change now, the world, it isn't going to be a very bright place anymore," Subhash said. "If this generation learns about it, then we can actually do something about it."

Subhash and his classmates at Dulles, along with some other middle school students in the Gulf Coast region, will soon have that opportunity. His eighth-grade science teacher, Julia Dolive, is one of three middle school educators in the Houston and Corpus Christi areas who will be teaching lessons about carbon capture and storage this spring as part of their existing state-required curriculum about the carbon cycle and how it's impacted by humans.

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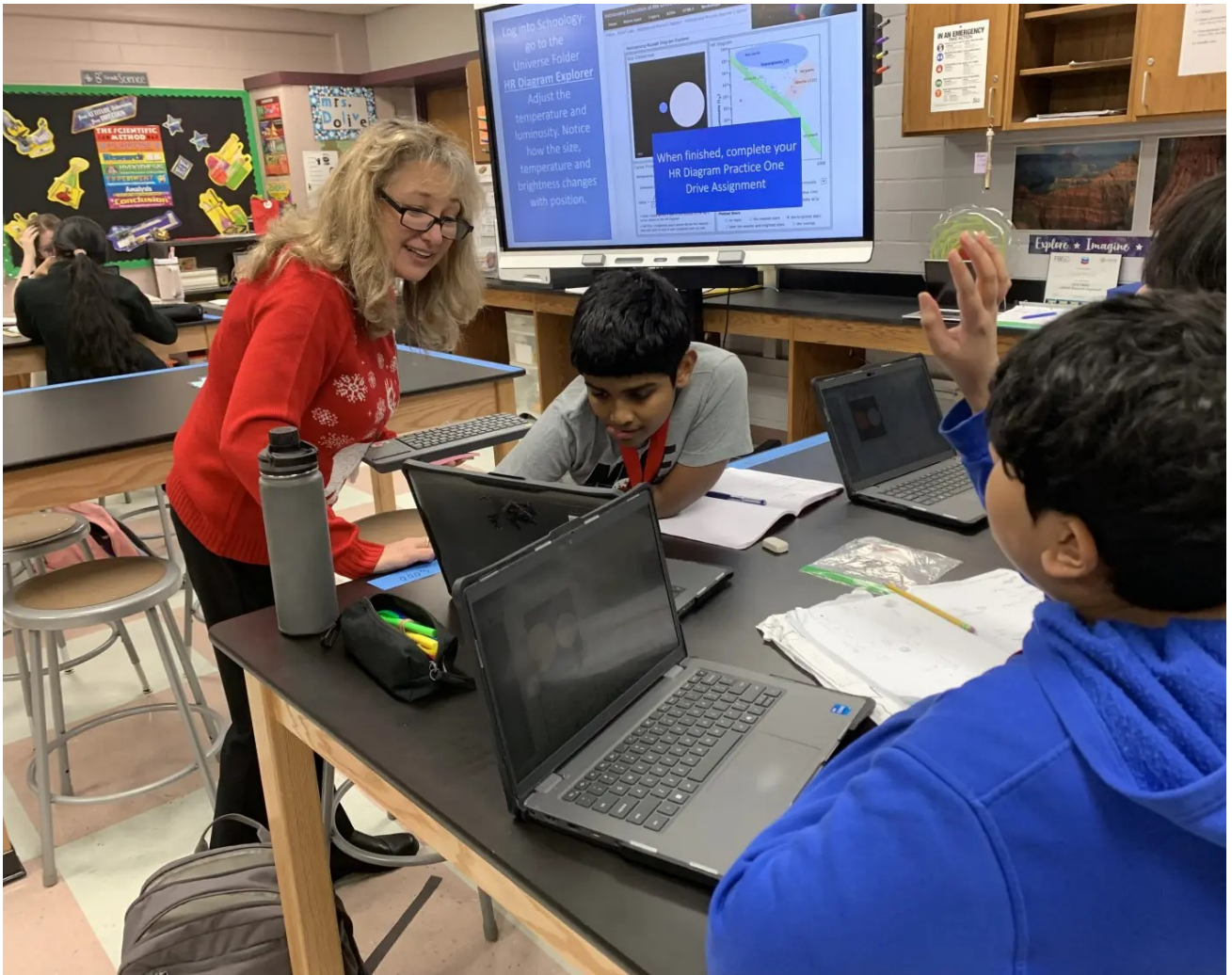
The teachers developed the lessons with help from the geosciences school at the University of Texas at Austin, which is leading a six-university consortium called the [Texas-Louisiana Carbon Management Community](https://gccc.beg.utexas.edu/research/txla-cmc) (<https://gccc.beg.utexas.edu/research/txla-cmc>). The other schools involved are Louisiana State University, the University of Houston, Lamar University in Beaumont, Texas A&M-Corpus Christi and Texas A&M-Kingsville.

With the help of a \$2.5 million grant from the U.S. Department of Energy and a small but growing network of science teachers, educators are spearheading a grassroots educational initiative to provide information about carbon capture and storage along with its potential benefits. The goal is to eventually reduce carbon emissions caused by industry — thereby combatting climate change — and to train the next generation of workers in the energy sector.

"The more we learn, the more reason there is to be very anxious about the unmitigated build-up of greenhouse gases in the atmosphere," said Susan Hovorka, a senior research professor at UT Austin who is leading the initiative. "Of course, there are a number of technologies, and we need to use all of them."

Challenges ahead

Hovorka said there is skepticism about carbon capture both within the energy industry — because the practice is costly — and also among environmental advocates, who view the technology as an "excuse to continue burning fossil fuels," she said. There also are questions about whether carbon dioxide injected into the ground will stay there indefinitely, although Hovorka said the technology has proven to be effective and is "safe by design."



(https://www.houstonpublicmedia.org/?attachment_id=510283)

Adam Zuvanich/Houston Public

Dulles Middle School teacher Julia Dolive, left, helps student Pranav Subhash during a science lesson about stars on Dec. 9, 2024, in Sugar Land, Texas.

Another underlying goal of the program is to "demystify" carbon capture and storage, according to Ramanan Krishnamoorti, the vice president of energy and innovation at UH.

"As long as we keep vilifying the sources of energy rather than vilifying the emissions, we're going to have a problem," he said. "There is not an energy source today that is truly clean, in the sense of not having any carbon emissions."

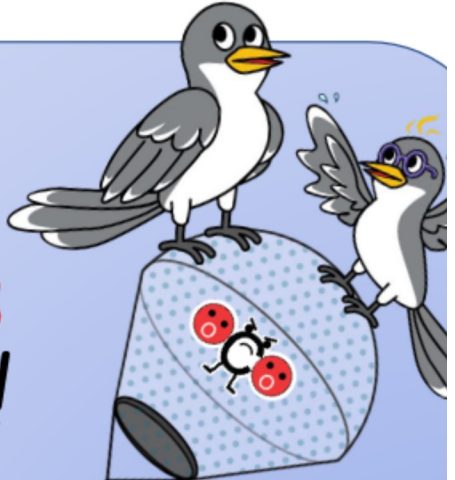
Another challenge is that some still question the validity of manmade climate change. Trustee Cy-Fair ISD near Houston, for example, voted last year to [remove climate change references](https://www.houstonpublicmedia.org/articles/news/education-news/2024/05/09/487046/cy-fair-isd-trustees-vote-to-omit-textbook-chapters-about-topics-such-as-climate-change-and-vaccines-from-their-middle-school-science-textbooks-calling-the-topic-controversial) (<https://www.houstonpublicmedia.org/articles/news/education-news/2024/05/09/487046/cy-fair-isd-trustees-vote-to-omit-textbook-chapters-about-topics-such-as-climate-change-and-vaccines-from-their-middle-school-science-textbooks-calling-the-topic-controversial>) from their middle school science textbooks, calling the topic "controversial."

That's partly why the carbon capture and storage lessons are being pitched directly to teachers at public and private schools and not to the State Board of Education, which sets curriculum standards for public schools in Texas, even though statewide adoption could expand their reach. Dolive at Dulles Middle School, a Fort Bend ISD campus, and science teacher Stephanie Hurst at Cleveland Middle School northeast of Houston both said they got approval to teach the lessons within their school districts.

The lessons will be taught in a straightforward yet subtle manner, according to Hovorka. Comic book-like graphics have been created to complement the curriculum and make it relatable and understandable.

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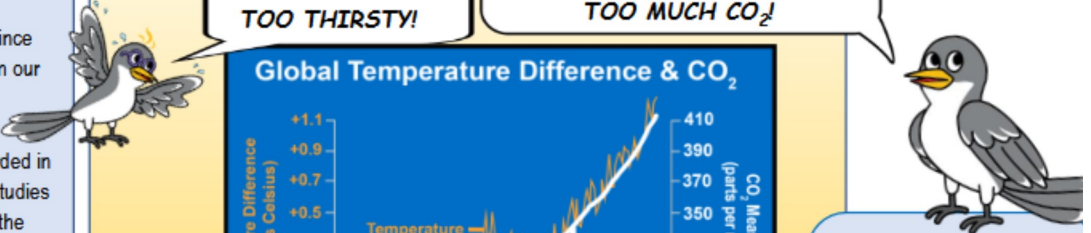
What is carbon dioxide (CO₂)?

CO₂ is known as a **greenhouse gas**, since this gas *traps* heat in our atmosphere.

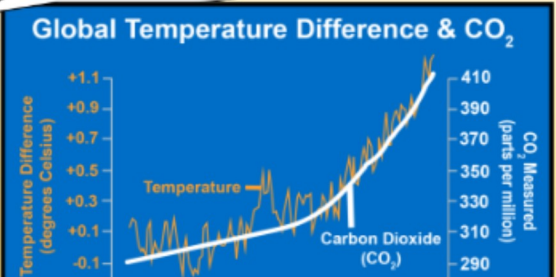
CO₂ has been recorded in the atmosphere in studies done since 1958 at the Mauna Loa Observatory in Hawaii.

Cosmo,
I am getting too hot
and too thirsty!
TOO HOT!
TOO THIRSTY!

Oh gee Maya!
There is a rise in average
temperature on Earth, because there
is too much CO₂ in the atmosphere.
TOO MUCH CO₂!



Global Temperature Difference & CO₂



CO₂ comes from a variety of natural sources, but **human-related emissions**

"One of the reasons why we're approaching it the way we're approaching it is we're not talking about climate change per se," Hovorka said. "Of course, that's the subtext, the purpose of the activities, but it's not the front and center. We're talking about the carbon cycle and how you use chemistry for engineering purposes and how you get jobs."

Industry of the future?

There is one carbon capture facility operating in the Houston area, at the coal-fired W.A. Parish Plant in Fort Bend County. The \$1 billion Petra Nova facility there, which debuted in 2017 (<http://www.houstonpublicmedia.org/articles/news/2017/01/12/183375/nrg-begins-operation-of-carbon-capture-plant-southwest-of-houston/>), traps carbon dioxide and sends it to a nearby oil field to help extract more oil through a process called enhanced oil recovery.

A "very small amount" of carbon is captured, compared to the total emissions at the power plant according to JX Nippon Oil & Gas Exploration spokesperson Dave Knox, whose company owns the carbon capture facility. However, he said the Petra Nova operation has proven the technology to be cost-effective and has "tremendous potential."

"Right now, it's a very small amount," Knox said. "But it's shown that it works and has the potential to reduce dramatically more as it is built out."



(https://www.houstonpublicmedia.org/articles/news/2017/01/12/183375/nrg-begins-operation-of-carbon-capture-plant-southwest-of-houston/attachment/img_5086/)

Florian Martin/Houston Public

Pictured is the Petra Nova carbon capture system at the W.A. Parish Plant in Fort Bend County in 2017

About 50 million tons of carbon dioxide are captured annually across the globe, according to

Krishnamoorti, who says about 4 million tons per year are captured in the Houston area. He says the latter figure is expected to grow to 10 million tons by 2032 and to 50 million tons by 2050.

That's because several more carbon capture and storage projects are in the works. Nearly 90 projects are proposed in Texas and Louisiana, with most along the Gulf Coast, according to the [Environmental Integrity Project \(https://environmentalintegrity.org/wp-content/uploads/2024/06/TexasCCSProjects_FactSheet_4.10_Final.pdf\)](https://environmentalintegrity.org/wp-content/uploads/2024/06/TexasCCSProjects_FactSheet_4.10_Final.pdf).

Krishnamoorti said he's consulting local energy companies to identify future careers in the carbon capture industry and also working with junior colleges in the region to help create a pipeline of potential workers. UH already has a micro-accreditation program in which it teaches about carbon capture and storage, he said.

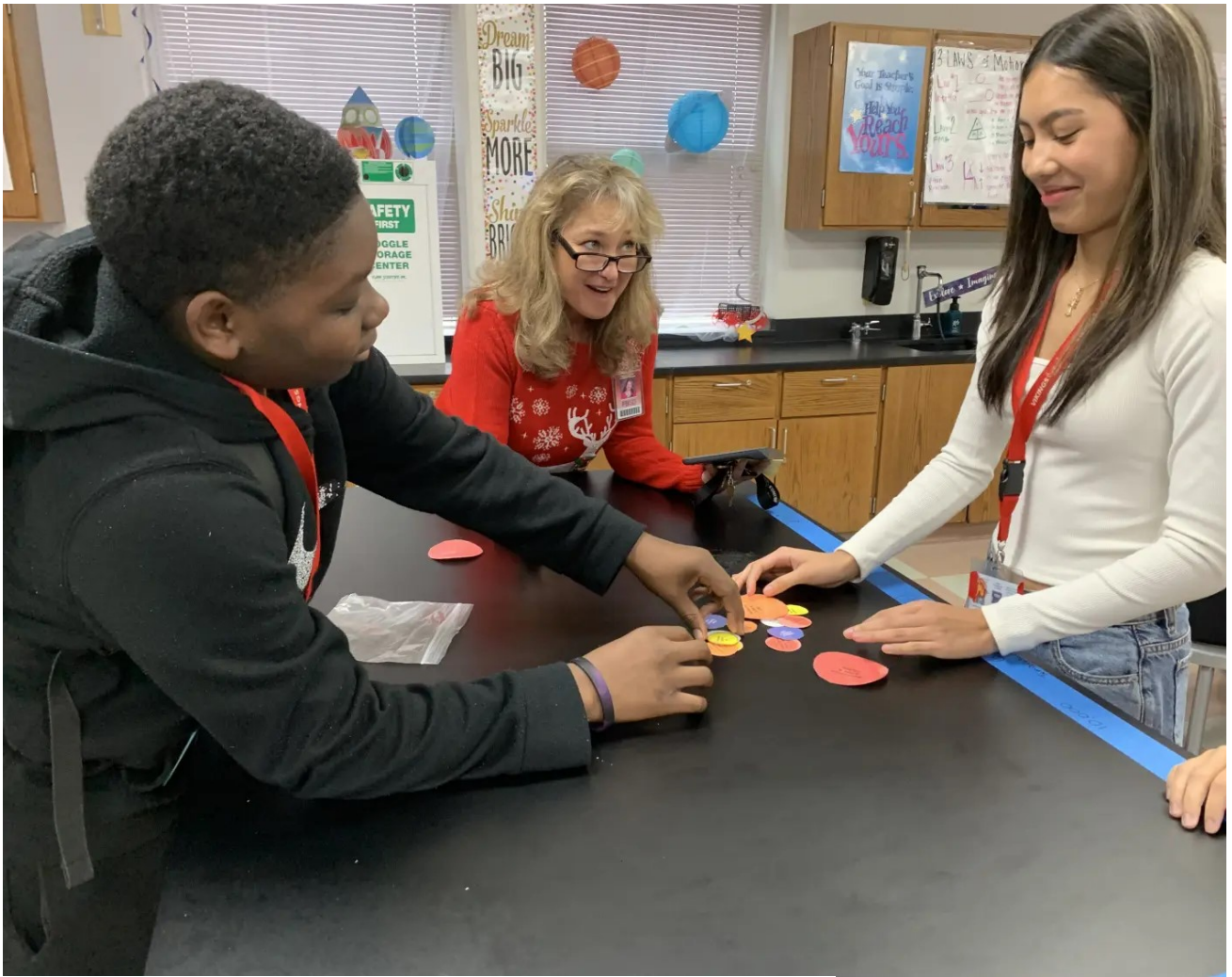
"With our schools being Title I and most kids are going to not go off to college, we need to be able to introduce them to something that is going to be blowing up economically," said Hurst, the science teacher in Cleveland ISD. "Being able to bring it to my students and potentially helping them in their future, it's just incredible."

Untapped potential

Abel Russ, a senior attorney with the nonprofit Environmental Integrity Project, said he's skeptical about how many of the proposed carbon capture projects along the Gulf Coast will materialize. He also questioned the effectiveness of the technology and said there's not yet enough government oversight for the carbon capture industry, adding that getting away from fossil fuels would be ideal.

But like Knox with JX Nippon Oil & Gas Exploration, Russ said he backs the teaching initiative.

"I'm absolutely 100 percent supportive of teaching kids about climate change and thinking about all the potential solutions," Russ said. "I think this is definitely something that should be discussed as a potential solution. I think they've just gotten out ahead of it a little too far."



(https://www.houstonpublicmedia.org/?attachment_id=510279)

Adam Zuvanich/Houston Public

Dulles Middle School science teacher Julia Dolive, center, interacts with students during a lesson about stars on Dec. 9, 2024, in Sugar Land, Texas.

It remains to be seen whether the carbon capture lessons will be embraced by students in Cleveland, Sugar Land or elsewhere. One of Dolive's eighth-grade students at Dulles, 13-year-Pahy'tton Williams, said some of her classmates "might find it boring."

Some could be inspired by what they learn, though. Aditi Bhambhani, another 13-year-old at Dulles, said her dream is to become a doctor, but perhaps she'll instead pursue a career in the energy industry.

"I'm excited to learn about it," she said. "I want to learn more about the Earth. I feel like in science it's very broad. There's many topics to learn about. But one topic that I feel that's not elaborated about is saving the Earth."

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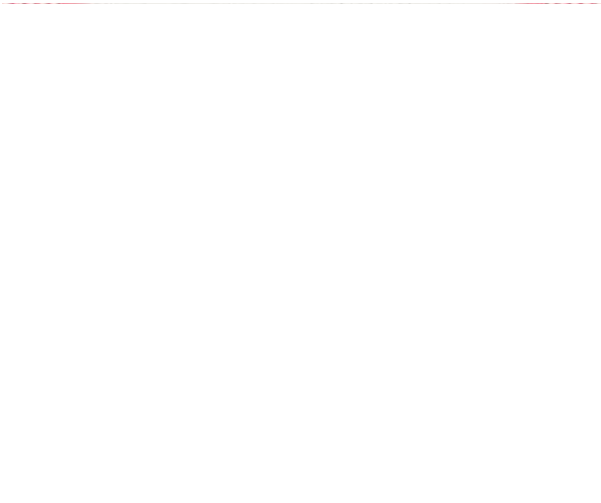
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Adam Zuvanich writes locally relevant digital news stories for Houston Public Media. He grew up in the Houston area and earned a journalism degree from the University of Texas before working as a sportswriter in Austin, Lubbock, Odessa, St. Louis and San Antonio. Zuvanich returned home to Houston and made...

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