

The Florida Science Teacher

Winter 2022



Florida Association of Science Teachers

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The Florida Association of Science Teachers (FAST) is the state's largest non-profit professional organization dedicated to improving science education at all levels, pre-school through college. The association's membership includes science teachers, science supervisors, administrators, and scientists.

The Calm Before, During, and After the Storm: How Addressing Eco-Anxiety Through Action Can Help Students in The Long Run

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Adolescence has always been a difficult time, with young people struggling to find their place in the world and how they will navigate it as independent adults. Over the past year, there have been many additional stressors that negatively impact this age group in particular, with the loss of peer groups due to virtual learning, COVID transmission, and an increasing sense of eco-anxiety, also referred to as climate anxiety, due to the overwhelming threat of climate change.

Eco-anxiety is a persistent sense of worry about the outlook of the planet and its livability into the future. Many young people report feeling as though they have limited options for the future, in a world where resources will be insufficient, and destruction of the environment will lead to poor health outcomes. One of the main drivers of this anxiety is knowing that danger is coming, due to news reports, school presentations, and a greater awareness of the climate crisis thanks to youth activists, but lacking the tools or agency to mitigate or adapt to the threat (Ingle, Mikulewicz 2020). Long-term stress is well known to reduce mental health outcomes and can lead to maladaptive despair, which does not result in action or motivate learning. Teachers benefit from resources that help them support their students' emotional wellbeing when dealing with these difficult topics (Baker et al. 2020).

One way to reduce the distress students feel about the climate crisis is to empower them and give them the tools they need to take action. Students want information about climate change and how it will affect their world and their future, but many feel it is not being properly addressed in their schools (Janzer 2021). Even when it is taught, the topic is often siloed into AP Environmental Science or AP Biology classes, which not all schools offer. Furthermore, though they frequently cite concern regarding the changing climate, students often hold outdated or misinformed views on the topic (Bedford 2016, Wu and Otsuka 2021). However, by linking climate change to social issues and creating relevancy, teachers can not only empower students to act in their communities to mitigate and adapt to a changing climate, but also drive interest in science and deepen their understanding.

Addressing current events surrounding the climate crisis creates relevancy around science topics including biology, chemistry, physics, and earth science. While some students are deeply concerned about climate change, others perceive it to be far away in both space and time from their lived experiences because many portrayals of climate-related topics focus on coral reefs, melting ice, or tropical rainforests. For many students in urban environments, this is less of an immediate concern than more day-to-day issues such as food and housing insecurity (Gubler et al. 2019). By helping students to understand the link between climate change and their lived experiences, they are more likely to feel the need to learn more and to be more deeply invested in classwork that has authentic, real-world applications. Students feel more connected when their experiences in their communities are recognized and linked to the climate crisis. This could include urban heat islands and heat waves, more intense tropical storms and wildfires, loss of agricultural efficiency and increased food prices, and increased range or season of vector-borne diseases.

Students are more intrinsically motivated to learn when the subject matter has meaning to them, so this can be a way to integrate their concerns with STEM topics and provide agency when they're given the tools to take action. For underrepresented populations in STEM (girls in particular), they are more motivated by altruism and assign a higher value to helping others than other potential reasons for studying science and potentially pursuing careers in STEM. By aligning science education with a cause like the climate crisis and climate justice, there is potential to increase their motivation to take higher-level science and math classes, and choose relevant topics as college majors (Wang et al. 2017).

This is one of the strengths of The CLEO Institute's Climate Resilient Schools program, starting with Climate Across the Curriculum workshops. These are professional development opportunities for educators that use vetted science and pedagogy to introduce teachers to the most up-to-date information and tools to integrate climate issues into all subjects and grade levels. CLEO also has a Teachers Network that provides a quarterly newsletter with resources and interdisciplinary, standards-aligned lesson plans.

Teachers are welcome to request Climate 101 presentations for their classrooms, and to act as sponsors for the Climate Leadership Information Program, an after-school club that uses project-based learning to help students develop Earth Day campaigns addressing the effects of a changing climate in their communities (LaForce et al. 2017). They are provided with materials such as slide decks, webinars, and data from reputable sources including NOAA and NASA.

Florida teachers are invited to make use of these free resources to address eco-anxiety in their students and help develop skills and interest in STEM:

CLEO Teachers Network and Lesson Plans:

<http://bit.ly/CLEOTeachersNet>

Request a Climate 101 Presentation:

<http://bit.ly/CC101Presentation>

Climate Leadership Information Program:

http://bit.ly/CLEO_CLIP

Example of an Earth Day campaign by CLIP students



References

- Baker, C., Clayton, S., & Bragg, E. (2020). Educating for resilience: Parent and teacher perceptions of children's emotional needs in response to climate change. *Environmental Education Research*, 1-19.
- Bedford, D. (2016). Does climate literacy matter? A case study of US students' level of concern about anthropogenic global warming. *Journal of Geography*, 115(5), 187-197.
- Gubler, M., Brügger, A., & Eyer, M. (2019). Adolescents' perceptions of the psychological distance to climate change, its relevance for building concern about it, and the potential for education. In *Climate change and the role of education* (pp. 129-147). Springer, Cham.
- Ingle, H. E., & Mikulewicz, M. (2020). Mental health and climate change: tackling invisible injustice. *The Lancet Planetary Health*, 4(4), e128-e130.
- Janzer, C. (2021, January 20). *Florida Students Said They Weren't Learning About Climate Change. Now They're Teaching Each Other*. Next City. <https://nextcity.org/daily/entry/florida-students-werent-learning-climate-change-now-teaching-each-other>
- LaForce, M., Noble, E., & Blackwell, C. (2017). Problem-based learning (PBL) and student interest in STEM careers: The roles of motivation and ability beliefs. *Education Sciences*, 7(4), 92.
- Wang, M. T., Degol, J., & Ye, F. (2015). Math achievement is important, but task values are critical, too: examining the intellectual and motivational factors leading to gender disparities in STEM careers. *Frontiers in psychology*, 6, 36.
- Wu, J., & Otsuka, Y. (2021). Exploring the climate literacy of high school students for better climate change education. *International Journal of Global Warming*, 23(2), 151-168.

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The CLEO Institute is a 501(c)(3) non-profit, non-partisan organization exclusively dedicated to climate crisis education and advocacy. Founded in 2010, we work with communities across Florida to build climate literacy and mobilize climate action for a just, resilient future.



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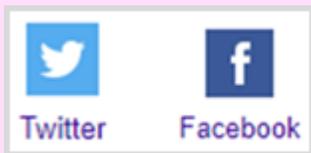
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