

# Environmental Education Brings Numerous Academic Benefits

## Higher Order Thinking, Academic Performance, Student Engagement Are All Boosted

### Academic Benefits: K-12 Students

A group of researchers at Stanford University conducting a systematic analysis of peer-reviewed research found that environmental education (EE) teaches children about much more than science and the environment. Its emphasis on higher-order thinking can help develop academic skills such as critical thinking, decision-making, and systems thinking. It can help produce lifelong learners and effective problem solvers.

As William Butler Yeats so popularly said it, **“Education is not the filling of a pail but the lighting of a fire.”** This is something that environmental education does well: it has the power to engage and excite students so they are motivated to learn. EE can break through to students who are struggling or are disinterested in school, and further motivates those who are already thriving academically.



*Environmental education helps teachers meet standards across multiple disciplines and can be integrated into existing curricula. Fully-developed lesson plans (for pre-K through college) and tips for developing your own are available on NAAEE’s online platform for EE resources, [eePRO](#).*



“Learning about the environment is just the tip of the iceberg. Environmental education gives students the knowledge and skills that help them succeed in school for years to come.”

– Study Author Dr. Nicole Ardoin, Stanford University’s Graduate School of Education and Woods Institute for the Environment

While some environmental education programs take place in natural settings, students do not have to leave the classroom to reap the benefits. **Studies show that quality environmental education can be taught in the classroom through discussions, computer simulations, and experiments.**<sup>1,2</sup>

Activities such as indoor gardening can also be an effective way to bring the outdoors into the classroom.

## EE improves academic performance:

- Studies found that students enrolled in California, Texas, Washington, and Iowa schools where environmental education was integrated into the curriculum **performed better on standardized mathematics assessments** compared to students in schools with similar demographic and socioeconomic profiles that had not integrated environmental education into the curriculum.<sup>3,4</sup>
- Environmental education is designed to improve proficiencies in a variety of areas. One study, which compared 77 schools, found that students in schools with environmental education **consistently outperformed other schools on state standardized tests in math, reading, writing, and listening.** In Washington state schools examined, 65 percent of the schools with environmental education programs performed significantly better in math.<sup>5</sup>
- In a Washington state public high school, students who had been enrolled in an environmental education class performed **better, on average, on the state science assessment.**<sup>6</sup> High school students in Indiana retained ecological knowledge longer than students using conventional curricula.<sup>7</sup>
- A study of high school students in Florida found that when controlling for factors like GPA, gender, ethnicity, and socioeconomic status, students who participated in environmental education programs **scored significantly higher on measures of critical thinking skills** and demonstrated significantly more likeliness to apply those skills in the future.<sup>8</sup>
- Educators feel their teaching has improved as a result of using well-researched environmental education curricula and have become more confident about their ability to be effective teachers. Ohio-based teachers using environmental education curricula with middle schoolers reported using **more reform-based practices such as inquiry-based, hands-on teaching to advance 21st century skills.** Teachers reported advancing their skills in teaching for depth of understanding and contextualized learning.<sup>9,10</sup>

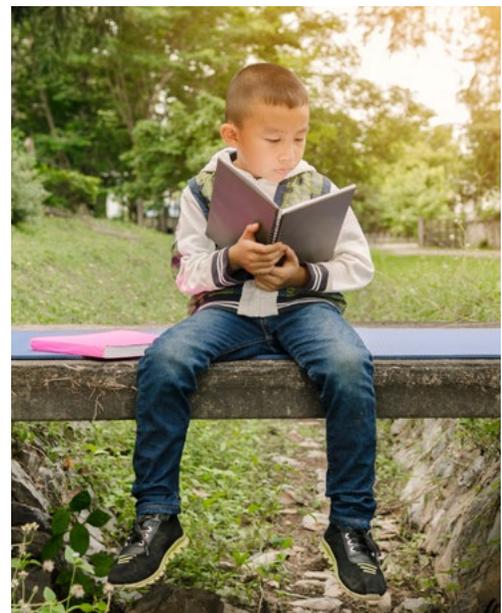


“Experiential activities that infuse content with meaningful experiences help students retain knowledge longer. I’ve done a lot of work with memory models that shows how people retain information better when the content is integrated into a meaningful issue or context. What could be more meaningful or relevant than your surroundings?”<sup>7</sup>

– College Professor, Indiana

## EE is effective for both struggling and advanced students:

- Both teachers and parents note that the experiential components of EE **provide students with Attention Deficit Hyperactivity Disorder and other learning disadvantages with opportunities to better understand complex concepts.**<sup>11</sup>
- Over a six-year period, 63 disruptive and low-performing secondary school students in Spain were integrated into a two-year garden-based environmental education program. The number of **failing students decreased substantially, and the dropout rate was reduced from an initial 30 percent to zero in some years.**<sup>12</sup>
- Environmental education encourages students to participate more in class. **Students have reported greater satisfaction in participatory learning** when compared to a traditional classroom lecture.<sup>12</sup>



- A Louisiana school district with **an outdoor education program saw a decrease in unsatisfactory science scores among their fourth graders** that was double that of fourth graders statewide.<sup>13</sup>
- Middle school students in Ohio demonstrated improved scientific processing skills and citizenship knowledge, with **lower achieving students making the greatest gains.**<sup>14</sup>



## What people are saying about EE:

Let's talk  
**ee.**

- "I'll be honest—school did not come naturally to me, I felt very lost at times and it was this constant game of catch up. Education is like a blanket that doesn't cover everyone. But **when you incorporate sustainability, outdoor trips, and community building, you reach those students who would otherwise be left out.**"<sup>15</sup> – High School Student, California
- "**Environmental education has changed the way I feel about school...**and now I realize that I can pretty much do what anybody else can do. I have a better view of what I can be in the future."<sup>8</sup> – Middle School Student, Florida
- "As an educator, **EE forces me to facilitate rather than dictate...watching 25 young minds start to make their own discoveries...**you must sit back and watch the magic work...I think I'm a better teacher because of environmental education. It has kind of completed the 'whole package.' The framework unified all my best approaches and it made my instruction much easier." That magic is clear from the words of one of her sixth grade students: "[The program] helped me achieve my goals. I can be what I want to be."<sup>16</sup> – Sixth Grade Teacher and Student, Hawaii
- "**Our teachers are turned on by the new instructional strategies and the improvements they are seeing in their students.** And we all know a turned-on teacher is a better teacher."<sup>17</sup> – High School Principal, Florida
- "I have students with a variety of learning styles and learning abilities. The hands-on aspect [of environmental education] was an equalizer. **The kids who have trouble learning, and for the kids who are super advanced, they're all having the same discussions.** There's more collaboration and engagement and it contextualizes what they're learning."<sup>11</sup> – Middle School Teacher, New York
- "**My students [engaged in EE] began to perceive themselves in a different light, as more responsible and more confident.** They no longer saw themselves as the class dunce—they felt they could learn more effectively, pass exams, and have an identity and a voice in the classroom."<sup>12</sup> – High School Teacher, Spain
- "**My son is now constantly speaking about what he is learning.**"<sup>12</sup> – Parent of a Middle School Student, Spain

## Endnotes:

1. Bodzin, A. M. (2008). "Integrating Instructional Technologies in a Local Watershed Investigation with Urban Elementary Learners." *Journal of Environmental Education* 39 (2): 47-58.
2. Schneller, A. J. (2008). "Environmental Service Learning: Outcomes of Innovative Pedagogy in Baja California Sur, Mexico." *Environmental Education Research* 14 (3): 291-307.
3. Wheeler, G. & Thumlert, C. (2007). Environmental Education Report. Olympia, WA: OSPI.
4. Danforth, P.E., Waliczek, T.M., Macey, S.M., & Zajicek, J.M. (2008). The effect of the National Wildlife Federation's Schoolyard Habitat Program on fourth grade students' standardized test scores. *HortTechnology* 18(3): 356-360.
5. Bartosh, O., Tudor, M., Ferguson, L., & Taylor, C. (2006). Improving test scores through environmental education: Is it possible? *Applied Environmental Education and Communication* 5(3): 161-169.
6. Bartosh, O., Tudor, M., & Ferguson, L. (2005). *Environmental education and its impact on students' test scores: A study of Washington State schools*. San Francisco, CA: Annual Meeting of the American Educational Research Association, April 7-11, 2005.
7. Co-author of the reviewed study: Farmer, J., Knapp, D., & Benton, G.M. (2007). An Elementary School Environmental Education Field Trip: Long-Term Effects on Ecological and Environmental Knowledge and Attitude Development. *The Journal of Environmental Education*, 38(3): 33-42. doi:10.3200/joe.38.3.33-42.
8. Ernst, J., & Monroe, M. (2004). "The Effects of Environment-Based Education on Students' Critical Thinking Skills and Disposition toward Critical Thinking." *Environmental Education Research* 10 (4): 507-522.
9. Haney, J. J., Wang, C. Keil, & Zoffel, J. (2007). "Enhancing Teachers' Beliefs and Practices through Problem-Based Learning Focused on Pertinent Issues of Environmental Health Science." *Journal of Environmental Education* 38 (4): 25-33.
10. Warren, L. L., & Payne, B.D. (1997). Impact of middle grades organization on teacher efficacy and environmental perception. *Journal of Education Research*, 90(5), 301-308.
11. Schneller, A.J., Schofield, C.A., Frank, J., Hollister, E., & Mamuszka, L. (2015). A case study of indoor garden-based learning with hydroponics and aquaponics: Evaluating proenvironmental knowledge, perception, and behavior change. *Applied Environmental Education & Communication* 14:1-10.
12. Ruiz-Gallardo, J. R., Verde, A., & Valdés, A. (2013). Garden-Based Learning: An Experience With "At Risk" Secondary Education Students. *The Journal of Environmental Education*, 44(4), 252-270. <http://doi.org/10.1080/00958964.2013.786669>.
13. E. Emekauwa. (2004). *They remember what they touch: The impact of place-based learning in East Feliciana parish*. Retrieved August 20, 2007, from Rural School and Community Trust Web site: <http://www.promiseofplace.org/pdf/EastFelicianaParish2004.pdf>.
14. Keil, C., Haney, J., & Zoffel, J. (2009). Improvements in student achievement and science process skills using environmental health science problem-based learning curricula. *Journal of Science Education*, 13(1).
15. Lam, Carolyn. "From Chance to Change." Nature's Voices Project. Accessed June 5, 2016. <http://www.naturesvoices.org/from-chance-to-change/>.
16. Volk, T. L., & Cheak, M. J. (2003). The effects of an environmental education program on students, parents, and community. *The Journal of Environmental Education*, 34(4), 12-25. doi:10.1080/00958960309603483.
17. The National Environmental Education and Training Foundation. (2000, September). *Environment-Based Education: Creating High Performance Schools and Students*. Washington, DC: National Environmental Education and Training Foundation.