

For girls, learning science outside linked to better grades, knowledge

April 6 2021, by Kathryn Stevenson



Muddy Sneakers program uses the outdoors to engage kids in science. Credit: Capturing WNC

In a new study, North Carolina State University researchers found that an outdoor science program was linked to higher average science grades and an increase in a measure of science knowledge for a group of fifth grade girls in North Carolina.

The findings, published in the *International Journal of Science Education*, indicates [outdoor education](#) could be a promising tool to help close gender gaps in science.

"The outdoors is a space where teachers can find tangible ways to make science come alive," said the study's lead author Kathryn Stevenson, assistant professor of parks, recreation and tourism management at NC State. "The natural environment is also a place that everybody has in common. In a way, it's also a great context for employing reform-based teaching practices like hands-on, inquiry-based learning or group work. These practices can be good for all students, but they may be particularly good for reaching students who aren't as well-served in classroom settings."

The researchers studied the impact of an outdoor science education program called Muddy Sneakers on fifth graders' science grades and knowledge of, and attitudes about, science. Fifth graders from western North Carolina attended between six and 10 days of Muddy Sneakers during the 2016-2017 school year. They had science lessons in nearby natural areas, including state parks and school grounds. Outdoor lessons followed the standard course of study for science through hands-on activities, hikes, science journaling, nature exploration and reflections.

Researchers compared the performance of 237 students who learned about science in the classroom to 403 students who participated in the outdoor program. They compared students' grades—which were provided by their teachers—and also used surveys to evaluate students' knowledge about how science works and their feelings about science.

When researchers evaluated students' science grades by gender, they saw that girls who participated in the outdoor science program maintained their science grades on average, while girls' average grades in the traditional science classes dropped. They also saw that participation in

the outdoor program helped girls learn more about how science works on average, but traditional classrooms did not.

Boys in the outdoor and traditional class settings had fairly stable science grades on average and saw similar gains in knowledge of how science works.

The researchers reported their findings for girls was consistent with research that shows that girls start to disengage with science around age 10. The outdoor program could be providing a learning context that is different than those that enforce traditional gendered narratives about science and science learning, they argued.

"Outdoor education seems to be one of those contexts that helps everyone learn, but it may be really, really helpful for some students in particular," Stevenson said.

On average, students of both genders who participated in the program saw an increase in science grades. In comparison, they saw a decrease in grades for students who didn't participate. In addition, students from both genders reported greater knowledge of how science works on average, but there was no difference between the treatment groups. They did not see significant differences for students of color.

When they evaluated ratings of self-efficacy, which is students' confidence in their own science ability and interest in the field, they found boys' and girls' ratings actually declined on average.

The researchers argued that the measure of science efficacy may be missing an important component that could be more important for encouraging long-term interest in science: an attitude of persistence despite failure. It could be that the results captured that the students were less likely to see science ability as an innate talent rather than the product

of hard work.

They also say the outdoor program could have been a new challenge for students. That might explain why students were less confident in their science ability after the program, but still showed gains in science [grades](#) and knowing how [science](#) works.

"A good combination for students to sustain success is—you need them to learn, but you need them to feel comfortable with not knowing it all," Stevenson said. "While self-efficacy dropped, achievement was stable."

More information: Kathryn T. Stevenson et al. How outdoor science education can help girls stay engaged with science, *International Journal of Science Education* (2021). [DOI: 10.1080/09500693.2021.1900948](https://doi.org/10.1080/09500693.2021.1900948)

Provided by North Carolina State University

Citation: For girls, learning science outside linked to better grades, knowledge (2021, April 6) retrieved 23 June 2024 from <https://phys.org/news/2021-04-girls-science-linked-grades-knowledge.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.