

## Implementing Equitable Learning Experiences to Increase Environmental Awareness and Science Proficiency in Alabama's Schools and Communities

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**Abstract :** Alabama has a long history of racial injustice and unsatisfactory educational performance. In the 1870s Jim Crow laws segregated public schools and disproportionately allocated funding and resources to white institutions across the South. Despite the Supreme Court ruling to integrate schools following Brown vs. the Board of Education in 1954, Alabama's school system continued to exhibit signs of segregation, compounded by "white flight" and the establishment of exclusive private schools, which still exist today. This discriminatory history has had a lasting impact of the state's education system, reflected in modern school demographics and achievement data. It is well known that Alabama struggles with education performance, especially in science education. On average, minority groups scored the lowest in science proficiency. In Alabama, minority populations are concentrated in a region known as the Black Belt, which was once home to countless slave plantations and was the epicenter of the Civil Rights Movement. Today the Black Belt is characterized by a high density of woodlands and plays a significant role in Alabama's leading economic industry-forest products. Given the economic importance of forestry and agriculture to the state, environmental science proficiency is essential to its stability; however, it is neglected in areas where it is needed most. To better understand the inequity of science education within Alabama, our study first investigates how geographic location, demographics and school funding relate to science achievement scores using ArcGIS and Pearson's correlation coefficient. Additionally, our study explores the implementation of a relevant, problem-based, active learning lesson in schools. Relevant learning engages students by connecting material to their personal experiences. Problem-based active learning involves real-world problem-solving through hands-on experiences. Given Alabama's significant woodland coverage, educational materials on forest products were developed with consideration of its relevance to students, especially those located in the Black Belt. Furthermore, to incorporate problem solving and active learning, the lesson centered around students using forest products to solve environmental challenges, such as water pollution- an increasing challenge within the state due to climate change. Pre and post assessment surveys were provided to teachers to measure the effectiveness of the lesson. In addition to pedagogical practices, community and mentorship programs are known to positively impact educational achievements. To this end, our work examines the results of surveys measuring educational professionals' attitudes toward a local mentorship group within the Black Belt and its potential to address environmental and science literacy. Additionally, our study presents survey results from participants who attended an educational community event, gauging its effectiveness in increasing environmental and science proficiency. Our results demonstrate positive improvements in environmental awareness and science literacy with relevant pedagogy, mentorship, and community involvement. Implementing these practices can help provide equitable and inclusive learning environments and can better equip students with the skills and knowledge needed to bridge this historic educational gap within Alabama.

**Keywords :** equitable education, environmental science, environmental education, science education, racial injustice, sustainability, rural education

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