Introduction

Global climate change poses one of the most pressing environmental and social challenges of the twenty-first century. Understanding the impacts on young people and the commitment of youth to climate change mitigation, the United Nations Framework Convention on Climate Change (UNFCCC) extended membership rights to youth to encourage them to help keep these groups informed, active, and engaged (United Nations Youth, n.d.). Additionally, UNESCO advocates for climate change education for children as a way to influence responsible behavior and teach students empathy. In response to international commitment to climate change education among young people, school administrators, curriculum specialists, and teachers of grades Kindergarten through twelve must increase climate change exposure and awareness for young students. Educators must consciously and carefully select materials and use instructional methods that promote science, rather than opinion, and introduce students to human-environment interactions.

Through this project, I hoped to understand how scientists, politicians, and educational experts view climate change education for elementary students, organize current learning standards that relate to climate change education in Virginia and Oklahoma, highlight specific ways to incorporate climate change education in the classroom, and provide resources for teachers to use in the future.

Methods

Determine what scientists and educational experts say about climate change science instruction
Identify how standards and science curriculum currently allow for environmental and climate education
Create a lesson plan and other instructional suggestions for increased environmental and climate education

Background

From Kindergarten through twelfth grade, science education remains important, and good science instruction in elementary school allows for a greater understanding of science material in more advanced middle and high school courses (Matkins and Bell, 2007). In many states, teachers receive minimal science education themselves, making it hard for them to effectively administer the science curriculum to their students, so states must provide more comprehensive science training for teachers (Turner 2016; Matkins and Bell, 2007).

Nationally, science education, and specifically climate change science, needs more time and focus within public schools. Education World and National Public Radio (NPR) suggest that teachers have received less training from parents, criticism from colleagues, and challenges from school board members as a result of climate change education in their classrooms (Gorman, 2007). The standards for science instruction do not always reflect best practices, rather public education officials favor common, rigid, and tested instructional approaches over more adaptable approaches, which is also true for other subjects (Spilane and Cahall 1999). In response to a need for more climate education for young children, government and non-government organizations have released free climate change material for teachers.

Some resources available to teachers and curriculum specialists:
- NASA’s Climate Kids guide: https://climatekids.nasa.gov/menu/teach/
- The National Science Foundation Earth and Environment Class Resources: https://www.nsf.gov/ news/classroom/earth-science
- Green Schools National Network, evidence-based models for healthy, green, sustainable schools: http://greenschoolsnationalnetwork.org/
- Environmental Education Activities and Resources from the National Education Association: http://www.nea.org/ools/Env/EnvironmentalEducationActivitiesAndResources.html

Instructional Suggestions

- With creative thinking and extra planning time, teachers can create science lesson plans that address the impacts of climate change (see the orange boxes under Table 1 and Table 2 that relate to the standard highlighted in orange)
- Materials exist online, for free and for charge, to assist teachers with climate change education and instruction (some references are included in the Background section of this project)
- The use of experimental learning is critical. Teachers should find ways to use the classroom and the school as a living laboratory (example: classroom greenhouse, school garden, school-wide recycling program, playground space, green spaces outside)

Conclusions

• Students enjoy science instruction, especially when it is hands-on.
• Teachers and administrators prioritize reading, math, and writing due to high-stakes standardized tests.
• Since state standards leave room for climate-related lessons, but it is up to individual educators and curriculum specialists to create pacing guides and lesson plans that engage students with climate change.
• For teachers to feel more comfortable using best practice science instructional methods and teaching climate change in their classrooms, teacher education programs must increase science training nationwide.
• Teachers and administrators can create physical spaces throughout the school that reflect a commitment to sustainability, climate change mitigation, and environmental stewardship (David and Gordon, 2007; Figures 3-4).
• School gardens or classroom gardens allow students to work with nature and natural life processes and give students ownership over plant growth. Gardens teach students responsibility, practical life skills, and how to respectfully interact with the environment.
• School should encourage school-wide or classroom-wide green community service projects. City and local politicians can strongly influence how teachers approach climate change and environmental education in their classrooms, since state officials create state standards and local officials create curriculum guides.

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References