Climate Change and Michigan Forests

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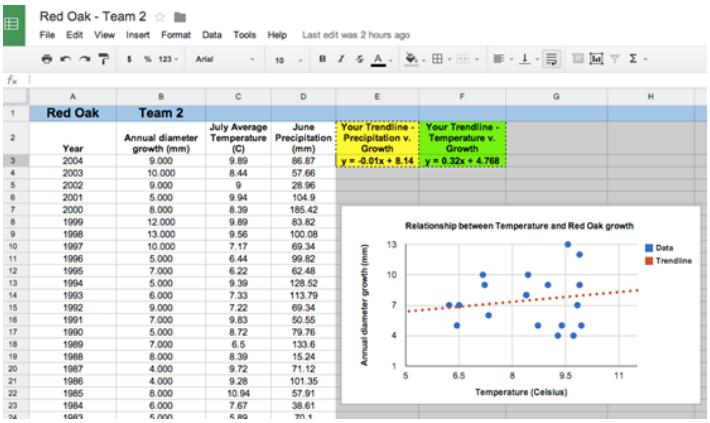
The School of Natural Resources & Environment (SNRE) at the University of Michigan is collaborating with Ann Arbor Public Schools to integrate a 10-day unit titled "Climate Change and Michigan Forests" into the district's 7th grade science curricula. This unit introduces students to scientific research techniques and mathematical modeling through a combination of in-class activities and field trips to local forests.

Dr. Ines Ibáñez and Dr. Michaela Zint, faculty members at SNRE, started this project with funding from a USDA Forest Service Mcintire Stennis Grant. Dr. Ibáñez studies how forest communities are impacted by climate change and Dr. Zint is an expert in environmental education program evaluation, making this project a great opportunity for collaboration. Other project partners include University of Michigan graduate students, curriculum specialists, and Ann Arbor Public Schools teachers and staff.

The lessons draw on Dr. Ibanez's research and support inquiry-based learning. Lesson development included significant contributions from teachers and math and science curriculum specialists to ensure the lessons supplemented Ann Arbor 7th grade math expectations and life science class work. The unit was also designed to meet the Michigan Department of Education's Grade Level Content Expectations in Science, the forthcoming Next Generation Science Standards, and support Climate Change Literacy. "Climate Change and Michigan Forests" begins with background information on weather, and climate, climate change, and an introduction to basic tree and forest ecology through a combination of class discussions and videos. Complementary teaching materials include examples of tree cookies and tree cores that were collected by Dr. Ibáñez and the Global Change Ecology Lab at the University of Michigan.



The next several lessons allow students to measure tree growth, identify the factors that influence tree growth and survival (which will influence how they will be affected by climate change), and interpret simple mathematical models. Students collect their own data by measuring tree core growth rings using enlarged, laminated images. They then match this growth data to the correct year and corresponding precipitation and temperature patterns. We created a GoogleDoc spreadsheet that acts as an interactive data entry and graphing tool (Figures 1-3). Using this tool, students create a scatterplot and the corresponding line-of-best-fit, which functions as a basic model. The decision to incorporate simple mathematical models into this unit was driven by the need to strengthen students' understanding of the role of these models play in science generally and climate science in particular.

To date, nine 7th grade teachers have been recruited to help develop, pilot-test, and revise the lessons and associated teaching materials. Teachers participated in a 1-day professional development during which they were introduced to the curriculum's instructional materials and resources. They were given continued support while pilot-testing the curriculum and received a stipend.

In addition, a University of Michigan graduate student is investigating to what extent these instructional materials can reinvigorate middle school students' interest in trees, forests, and climate change, and the pursuit of science careers. Pilot study results revealed that interest in science and scientific inquiry played a much stronger role in predicting interest and desire to learn about climate change, compared with students' perceptions of climate change risk. Research results will be submitted for publication to peer reviewed science education journals. In addition to this research, it is our plan to make the materials available to a broader audience through education networks like MAEOE, CLEAN, Project Learning Tree, and the US Forest Service, and other websites targeting science teachers.