

Reprogramming Planet Earth

Zoua Yang, Wellstone Elementary, Saint Paul, MN, USA

Abstract

Students in pre-K through 5th grade designed programs that reflect what they learned about climate change through children's literature and videos. Students spent 1-3 weeks programming various physical computing devices like the Micro:bit, Robot Mouse and Dash, and they used various software like the Scratch Jr. App, Scratch online, and Microsoft MakeCode. A collection of student work can be viewed through this PDF document or view this video for a quick look. Below are resources with direct links to cross-curricular concepts applicable to this thematic unit of climate literacy and programming, and there are brief lesson plans and resources used for each grade level.

Keywords

climate change, climate crisis, climate literacy, computer science, cross-curricular learning, programming, elementary school

Introduction

My name is Zoua and I have been teaching for a decade. I started out as a classroom teacher in grades 3 and 4, but for the past 5 years I have been a technology specialist at Wellstone Elementary in Saint Paul, Minnesota. I work with twenty-five pre-K through 5th grade classes—nearly 500 students! In our school, 90% of our student population is Black, Indigenous, or People of Color, and about 80% are eligible for free or reduced lunch. More than 50% of the student population are English Language Learners and about 15% of the students are in Special Education. We also have a Spanish Dual Immersion program and a Karen Language and Culture program.

As a professional, I have an immense desire to learn new things and apply it to my instruction. As I've deepened my understanding of climate literacy and climate justice, I was devastated to see more clearly that the choices we make here in the USA, as a developed nation, have a greater negative impact on less developed countries who have done very little to contribute to the climate crisis. This is climate injustice. Suddenly, having access to clean water (our 10,000 lakes), an air conditioner and heater, and being able to travel and enjoy lush forests, towering mountains, and serene blue waters have all become a great privilege. They are precious relatives (seeing all living things as beings equivalent to human life) that need to be taken care of and taught about in schools.

I am extremely fortunate to know that I can share what I learned about with my students. I want them to think and ask questions about what is happening around them. I hope they gain new insights and feel inspired to act. I designed sustainable lessons that I can teach each year by integrating climate education into programming education. Pre-K students programmed robotic mice to sort trash after learning about why they recycle and compost at school. Kindergarteners programmed robot mice to build forests after students learned about how trees are essential for living on this planet. First graders learned about different ways trash could be reused and then created characters and objects out of trash and used them to program animations on the Scratch Jr. app. Second graders learned about smaller-scale solutions they can do each day to help protect the Earth and programmed a solution on the Scratch Jr. app. Third graders learned about young climate activists and programmed Dash to become a climate activist who teaches about locations vulnerable to climate change. Fourth grade students learned about larger-scale impacts of climate change and advocated for positive change by programming solutions on the online Scratch platform. Last, fifth graders developed micro:bit solutions to address three sustainable development goals: Good Health and Well-Being, Reduced Inequalities, and Climate Action. Lastly, my fourth and fifth graders

in summer camp reimagined what a greener world would look like by designing their own worlds on Scratch.

I hope the lessons below allow students to think about issues relevant today and inspire them to see themselves as capable of creating change. My service to protecting this planet is to educate these 500 students and hope that their work and their words will extend beyond our classroom to their families, relatives, friends and other professionals and places. I want everyone who comes in contact with climate education to feel inspired enough to help "reprogram" the Earth. This means that we retrain our habits and mindsets so the choices we make will combat the climate crisis or mitigate climate change and "reprogram" the Earth to be healthy again.

Resources

1. [Applicable Cross-Curricular Concepts](#)
2. [Pre-K - Squeak & Sort: A Recycling Coding Adventure](#)
3. [Kindergarten - Growing a Forest One Code at a Time](#)
4. [First Grade - From Recycled Art to Animations](#)
5. [Second Grade - Code Green: Solving Earth's Challenges](#)
6. [Third Grade - Dash the Climate Activist](#)
7. [Fourth Grade - Scratch the Climate Crisis: Solutions in Code](#)
8. [Fifth Grade - Tiny Tech, Global Impact](#)
9. [Fourth & Fifth Grade - A Greener World](#)