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In 2021, G-20 education ministers held their meeting with the theme of *People, Planet, and Prosperity* just ahead of the United Nations' climate conference in November. Many stakeholder groups have urged the G-20 leaders to make compulsory climate education a key priority, "**as fundamental as reading and writing,**"



"If just 16% of high school students in middle- and highincome countries were educated about climate change, there would be a tremendous reduction of carbon emissions (nearly 20 gigatons) by 2050. Through education, not simply about climate change itself, but the "green skills" and habits of mind needed to address the effects of climate change, more sustainable future becomes possible."

—Kwauk and Wintrop (2021)

Timeline

- First Lady Tammy Murphy meets with teams of educators across many sectors to develop and refine the standards (adopted 2020)
- NJ School Boards Association and Sustainable Jersey convened a Climate Change Education Thought Leader Committee
- Over several months, members of the committee identified needs and synthesized a comprehensive list of recommendations for the implementation of these standards: K-12 Report on Climate Change Education Needs in New Jersey.
- Formed partnership with Subject to Climate, the New Jersey Audubon, and the National Wildlife Federation, NJ School Boards Association, and NJ Audubon

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Report on K-12 Climate Change Education Needs in New

Jersey

https://www.njsba.org/wpcontent/uploads/2022/02/climate-change-edonline-2-2.pdf



February 2022

PREPARED BY: Dr. Lauren Madden

NJSBA

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Overarching Goals

Goals

- 1. Ensure that all New Jersey public school teachers are prepared to fully integrate climate change education across grade levels and content areas within five years of adoption of the 2020 New Jersey Student Learning Standards.
- 2. Educate all members of school communities, including families, students, teachers, school staff, administrators, school board members and community partners on scientifically accurate information regarding climate change to ensure that schools are designed to foster a sustainable future and economic prosperity.
- 3. Encourage community-focused collaboration among stakeholders including board members, students, families and teachers, facilities professionals and administrators to ensure that schools develop a comprehensive approach to climate change education.
- 4. Use an equity-focused approach to ensure that the neediest schools and districts receive the necessary financial and logistical support for climate change education implementation. Further, the disproportionate effects of climate change seen by communities of color, immigrant communities and low-income communities must be highlighted.
- 5. Center climate change education and experiences on what is happening locally. Place-based approaches to education that emphasize the New Jersey-specific effects of climate change, and the local actions that impact global trends are more likely to make a lasting impact with students and motivate communities to commit to solution-building.
- 6. Provide multiple entry points to allow for school- and teacher-autonomy in deciding how to integrate climate change content within each unique learning context.

Time-Sensitive Recommendations:

To Enact Before June 2022

- All K-12 public school educators, school staff and school board members must be introduced to the climate change standards at the various grade levels and content areas.
- 2. All K-12 public school teachers should be provided with the developmentally appropriate and content-specific explanations of climate change and its effects.
- 3. All K-12 public school teachers should have access to highquality curricular materials beginning in September 2022.

Comprehensive Recommendations: Key Needs

- 1. Professional Learning/Development
- 2. Curricular Resources
- 3. Community-Based Climate Change Education
- 4. Support from Boards of Education



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Ways to Use Local to Global Data and The School Building as a Learning Laboratory

- 1. Place-based Learning
- 2. Design Thinking and Engineering Solutions to Challenges
- 3. Student Choice of Questions and Data-To Form their Own Questions
- 4. Provide Data Collection Opportunities and Authentic Real Time Data
- Climate Deniers?- Explicitly Teach the Nature of Science and Research Methods on Collection of Local and Global Data





Place-Based Climate Change Education



Place-based learning engages students in their community, including their physical environment, local culture, history, or people.

With place-based learning, students get to see the results of their



Storylines-NGSS

A storyline is a coherent sequence of lessons, in which each step is driven by students' questions that arise from their interactions with phenomena. A student's goal should always be to explain a phenomenon or solve a problem. At each step, students make progress on the classroom's questions through science and engineering practices, to figure out a piece of a science idea. Each piece they figure out adds to the developing explanation, model, or designed solution. Each step may also generate questions that lead to the next step in the storyline. Together, what students figure out helps explain the unit's phenomena or solve the problems they have identified. A storyline provides a coherent path toward building disciplinary core idea and crosscutting concepts, piece by piece, anchored in students' own questions.





Design Thinking and Engineering Solutions to Challenges Students use an Engineering Notebook to Complete the **Engineering Design** Process *Works Well with Problem **Based Learning**



Students collect data to form their own questions based on local experiences and observations- We notice the trees do not look as healthy, is it climate change or the Spotted Lanternfly? Is it both?



What additional information do we need to better answer our questions? What story is the data telling us? Let's conduct research and design experiments to collect further data.

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Students design, redesign and share out their solutions with peers.

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Next they implement their solution to collect local data!

Use the Sustainable Schools Actions as a Menu for Student Choice!

ACTIONS FOR SCHOOLS:



150 points across 6 of 22 categories landatory Green Team 3 out of 14 PRIORITY ACTIONS 350 points across 8 of 22 categories

Bronze or Silver certified schools can earn Digital Schools Star Recognition

To become Sustainable Jersey for Schools certified, schools and districts must complete and document actions from this list. Certification is awarded at the school level and is good for three years

DIVERSITY & EQUITY	
Accessible Communications	a m
Breakfast After The Bell	0 m
Diversity on District Task Forces & Comm	nittees 🏦
FOOD & NUTRITION	
Healthy Food Choices Beyond the Ca	deteria 🏠 🏛
Promote Locally Grown Foods	0 🏛
School Gardens	۵
HEALTHY SCHOOL ENVIRONMENTS	
Indoor Air Quality Review 🕑	۵
Classroom Chemical Purchase, Storage & Disposal Policy	0 🟦
Access to Healthy Water in Schools	0
Anti-Idling Education & Enforcement	* * *
Asthma Friendly Schools	0
Classroom Cleanup Protocol & Pract	ices 🏠 🏦
Integrated Pest Management - Education & Organic Lawn Care	٥
Outdoor Air Quality Awareness Progr	ram 🏠 🏦
Radon Testing, Education and Mitiga	tion 🏠
Reporting Process for Indoor Air Quality Concerns	۵
SCHOOL CULTURE & CLIMA	TE
Inclusive Environment Where All Can Th	rive 🖀 🏠
School Culture & Climate Needs Assess	ment 🖀 🏠
Social Emotional Learning Integrated Unit	2 4
STUDENT & COMMUNITY OUTREACH	
Green Team 🔺	0 m
Community Education & Outreach	🕆 🔺
Civic & Stewardship Volunteer Initiati	ves 🏦 🏠
Enrichment Programs through Partne	rship 🏠
Green Challenges	A 0
Green Fair	\$ Q
"Green" Your Green Fair or School E	vent 🎄 🏠

	STUDENT SAFETY				P
	Safe Routes to School District Policy	*		ŵ	
	Pedestrian and Bicycle Safety & Promotion Initiatives	*	•		
	Safe Driving Awareness Programs for High School Students		۵		
	School Travel Plan for Walking & Biking	4	à		ľ
	STUDENT & STAFF WELLNESS				Î
	School Wellness Council 🔮		۵		1
	Policies to Promote Physical Activity			盦	T
	Programs to Promote Physical Activity		۵		1
	Staff Wellness Program		ŵ	ŧ	
≥	BOARD LEADERSHIP & PLANNING				
2	District Sustainability Policy 🖹			m	
iii.	Professional Development		•	1	
5	Cores Enhancement of District				
ő	Strategic Plans			ħ	
Ě.	Strategic Plan Implementation of				
	Green Initiatives			-	
	School Community Asset Mapping	*	۵	盦	
	School District Foundation		-	盦	
	DIGITAL LEARNING LEADERSHIP				
	District Commitment to Digital Learning 🕾	-		m	1
	Equitable Access to Digital Learning 😨	-		盦	1
	Community Engagement	-	۵	Ê	
	District Professional Development Plan	2		盦	
	DIGITAL LEARNING PRACTICES				
	Digital Citizenship 🔮	-		盦	
	Authentic Application of Digital Learning Tools & Content	-	•		1
	Personalized Learning & Growing	-			
	Independent Learners	-	-		
	Professional Growth & Collaboration	-	4		
	DIGITAL TECHNOLOGY ACCESS				
	Data Safety & Security Policy	2		1	
	Digital Device Life Cycle Management	-		盦	
	Infrastructure	-		Ê	
	Support for Digital Teaching & Learning	2		1	
	ENERGY EFFICIENCY				
	Energy Efficiency for School Facilities 🖗		-	盦	
	Behavior-Based Energy Conservation		-		
	Programs		-		

Energy Tracking & Management

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	INNOVATION PROJECTS	Points	GREEN CLEANING			
	Innovative Project #1 🎄 🎕 🏛	10	Green Cleaning Policy & Plan	0 1	10	
	Innovative Project #2 🏦 🎕 🏦	10	Green Cleaning Equipment	0 1	10	
	INTEGRATED SCIENCE, TECHNOLOGY,		Green Cleaning Supplies	白金	10	
	ENGINEERING, ARTS & MATH		Green Cleaning Training &		10	
	ISTEAM Planning & Implementation	15	Education Programs	шш	10	
	ISTEAM Strategic Plan Indicators/ISTEAM Policy	10	GREEN DESIGN			
	ISTEAM Collaborative Units of Study	10-50	Green Building Policy 🖗	盦	10	
	ISTEAM Professional Development Plan	5-20	Design/Build/Certify New Construction &	•	10-50	
	LEARNING ENVIRONMENT		Major Henovations using Green Standard		10	
	All Arts Disciplines Offered	10	Green Building Training	U III	10	
	Curriculum Mapping	15-30	GREEN PURCHASING	-		
	Future Ready Schools Certification	10-15	Green Purchasing Policy 🗑	Ê	10	
	Outdoor Classroom	10	Recycled Paper Purchase	0 1	10	
	Student Participation in the Arts	10	Sustainable Fleets	Ê	5-15	
	STUDENT LEARNING @		SCHOOL GROUNDS			
	(One approved action in this category counts toward priority requirements)		Biodiversity Audit & Management Plan	à	10	
	Education for Sustainability Integrated Unit 🖀 🏚	10-50	Biodiversity Project	0	10	
	Education for Sustainability Pre K-3 🖀 🏠	5	Green Infrastructure	1		
	Education for Sustainability		Assessment & Plan	•	10	
	Grades 4-12 Arts	2	Green Infrastructure Installation	۵	10	
	Education for Sustainability	5	WASTE MANAGEMENT			
	Grades 4-12 Career and Technical Education		& RECYCLING			
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	Education for Sustainability Grades 4-12 Social Studies	C				
	Education for Sustainability					
	Grades 4-12 Technology	E	explore tor the	ne	<u>er</u>	Proplem
5	CLIMATE MITIGATION &					
z	KENEWABLE ENERGY		kased i earr	۱r	nal	
1	School Carbon Footprint 🖗 🏠 🏦					

Buy Renewable Electricity

Geothermal

Solar

On-site Renewable Generation System -

On-site Renewable Generation System -

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To learn more visi

Please note: Program actions and points may be sub

Green Cleaning Policy & Plan	0 1	10
Green Cleaning Equipment	0 1	10
Green Cleaning Supplies	0 1	10
Green Cleaning Training & Education Programs	0 11	10
GREEN DESIGN		
Green Building Policy 🔋	盦	10
Design/Build/Certify New Construction & Major Renovations using Green Standard	۵	10-50
Green Building Training	0 1	10
GREEN PURCHASING		
Green Purchasing Policy 🔋	Ê	10
Recycled Paper Purchase	0 1	10
Sustainable Fleets	Ê	5-15
SCHOOL GROUNDS		
Biodiversity Audit & Management Plan	۵	10
Biodiversity Project	۵	10
Green Infrastructure Assessment & Plan	۵	10
Green Infrastructure Installation	۵	10
WASTE MANAGEMENT & RECYCLING		
Waste Audit 🛞	0	10

GREEN CLEANING

PREMIER REFERENCE SOURCE

Cases on Inquiry through Instructional Technology in Math and Science

Louis C. Lonnex & Kimberely Fletcher Nottleto



Advances in Educational Technologies and Instructional Design Series

Teaching the Greenhouse Effect with Inquiry-Based Computer Simulations: A WISE Case Study

Edward Cohen (Piscatway Township Schools, USA) and Timothy D. Zimmerman (Rutgers University, USA) Source Title: Cases on Inquiry through Instructional Technology in Math and Science Copyright: © 2012 | Pages: 30

How can computer simulations be used to connect local and global data for meaningful student learning?

Abstract

This case study focuses on how students use a greenhouse effect simulation. The simulation is embedded within an inquiry-based technology-mediated science curriculum known as the Web-Based Inquiry Science Environment (WISE). For this research, students from a suburban, diverse, middle school setting were asked to use the simulation as part of a week-long class lesson on global warming and climate change. Using a combination of student interviews, focus groups, and students' conversations while they used the simulation, the authors present evidence of shifts in student motivation, understanding of science content, and ideas about the nature of science, all connected to the use of the simulation. From this data, the authors derived ways that teachers can help students develop deeper understandings of climate science topics through educational technology. Examples of these pedagogical approaches included allowing students to conduct "extreme testing" and increasing the time for free exploration of the simulation.



Welcome to CoCoRaHS! "Volunteers working together to measure precipitation across the nations."

Connect by Using Real Time Data!

What do you notice and wonder about this data?





CoCoRaHS Mapping System

🖻 Day 🛗 Range

08/26/2011 - 08/30/2011

🝪 Map Options



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Accumulated Precip	Details 🖸			
NJ-MS-3: Morris Tw	p 0.8 NW			
	2011-08-26			
🛱 Last Obs Date	2011-08-30			
Days covered by Obs	5			
Precip	10.03 in			
Accumulated Sn	owfall			
E Depth	0.0 in			
SWE	NA			
* Max Snowpack	2			
E Depth	NA			
SWE	NA			
Observation Counts				
Daily Obs Count	5			
Daily Obs w/Precip	4			
Daily Obs w/Trace	0			
Multi-day Obs Count	0			



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How Do Scientists Conduct Research on Ancient Environments?

Overview

In this activity, students sequence a series of captioned photographs to determine the scientific process of one scientist, Dr. Tracy Quan, as she uses deep sea core data obtained by the JOIDES Resolution research vessel to investigate the climate during the mass extinction that took place 66 million years ago. During the activity, students learn about specific data, tools, and techniques used to study the past. Then by comparing their pathway with others, they learn that science is a dynamic, non-linear, and creative process that can be conducted in different ways.



Learning Objectives

- 1. Students will be able to explain one way in which deep sea cores are used in scientific investigations.
- 2. Students will be able to justify how scientific endeavors are dynamic, nonlinear, and based on the individual needs of the scientist and investigation.
- 3. Students will be able to explain how science is a human endeavor.
- 4. Students will be able to explain that science is tentative in nature and our knowledge changes as new information and processes are created.
- Students will be able to explain that science is conducted various ways including testing of ideas, exploration and discovery, and community analysis and feedback.

Climate Deniers?-Explicitly Teach the Nature of Science and Research Methods on **Collection of Local** and Global Data



Thank You

I would love to support you and your school district. Please reach out to me for how I can best support you!

EdwCohen@docs.rutgers.edu

Session slides will be available on at sustainablejersey.com by 6/30.



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What is your personal connection to climate change?







What are some of the challenges teachers might face when trying to integrate climate change into their classroom?



Why is climate change NOT being taught in the classroom?



The New Jersey Climate Change Education Initiative Timeline

Announcement			Initiative Formation		Platform La		m Launch	
First Lady Tammy Murphy announces New Jersey incorporating climate change education across its K-12 student learning standards		The Ne Initiativ recom <u>Climate C</u>	The New Jersey Climate Change Education Initiative forms to implement the short term recommendations from the <u>Report on K-12</u> <u>Climate Change Education Needs in New Jersey</u>			The New Jersey Climate Change Education Initiative launches platform.		
•	21	•		•				
June 2020			Feb 2022			J	une 2022	
	Committee	Formation	ation	Budget & Office Formation				
	The New Jersey (Education Thought I was convened. Res report with recomme implement these sta	Climate Change Leader Committee solves to develop a endations on how to andards statewide.		Governor Murphy allo FY 2023 budget to I climate change educa an Office of Climate C in NJ Department	Fovernor Murphy allocates \$5 million in FY 2023 budget to K-12 schools for limate change education and will form office of Climate Change Education in NJ Department of Education.			

www.njclimateeducation.org



Quick Activity

- 1. Go to njclimateeducation.org.
- 2. Depending on your role, find:
 - An teaching resources you might use to supplement your lesson next year.
 - An exemplar lesson plan you might want to try in your classroom.
 - An exemplar lesson plan you might share to help teachers integrate climate change into their lesson.
 - A professional learning opportunity you might recommend to your teachers.
- 3. We'll do this for 5 minutes and then, do a quick shareout!





Thank You

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