

# Reimagining justice-oriented science education through disaster memories: Evidence from the Buffalo Blizzard of 2022

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**June 13, 2024**

ISLS 2024, University at Buffalo



This presentation is based on the Buffalo residents' experiences of a climate disaster that killed 41 people in Buffalo and Cheektowaga, NY.

We will not use disturbing images or vivid accounts of the disaster, but some of you may find this difficult, especially if you have had a similar experience.

# The official account

(That is, how the blizzard will likely be remembered and taught)

## Lessons Learned from the Buffalo Blizzard

Recommendations for Strengthening Preparedness and Recovery Efforts

New York University  
Robert F. Wagner School of Public Service

June 2023

 NYU | WAGNER

 rudin center  
for transportation policy & management

Sublime +  
powerlessness

The victims  
contributed

In December 2022, the City of Buffalo in Erie County, New York experienced a “generational storm” that claimed the lives of 31 residents and brought activity to a standstill for nearly a week. While the city is no stranger to snowstorms, several factors made this particular blizzard uniquely challenging. Hurricane-force winds of up to 80 miles per hour brought whiteout conditions and 15-foot high snowdrifts, wind chill temperatures dipped to 30 degrees below zero Fahrenheit, and the blizzard lasted longer than any prior storm below 5,000 feet of elevation in continental U.S. history.

Use of numbers +  
extraordinariness

To compound the dire situation, the blizzard hit Buffalo during the Christmas season, when many residents had travel plans and some essential workers were already away for the holidays. Employees who remained local were asked to sacrifice their holiday time to serve in extraordinary conditions that resulted in 46 deaths countywide.

# The untold story

## Buffalo blizzard fuels polarized city



By [Brianna Sacks](#)

Updated December 29, 2022 at 1:21 p.m. EST | Published

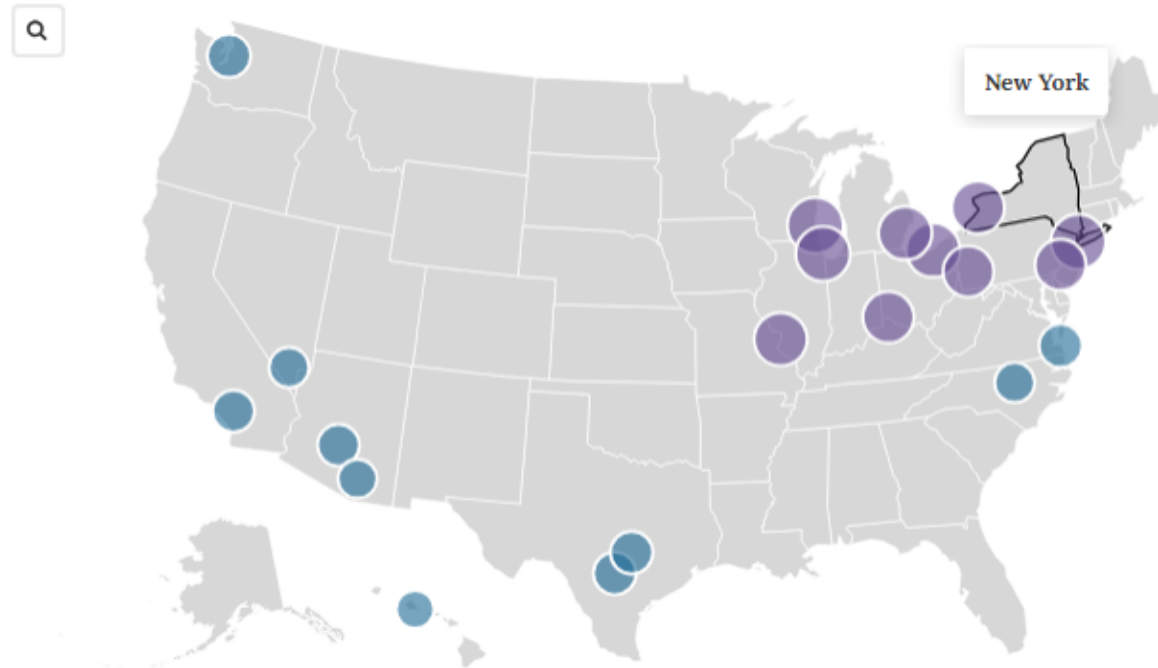


Residents on Woodside Drive take it upon themselves to clear snow from cars. (Images)

## America's most and least segregated cities

Rust Belt cities remain some of the most segregated between white and African American populations

■ High segregation ■ Low segregation



Source: Brookings Institution's analysis of 2020 U.S. Census figures



REPORT

2018

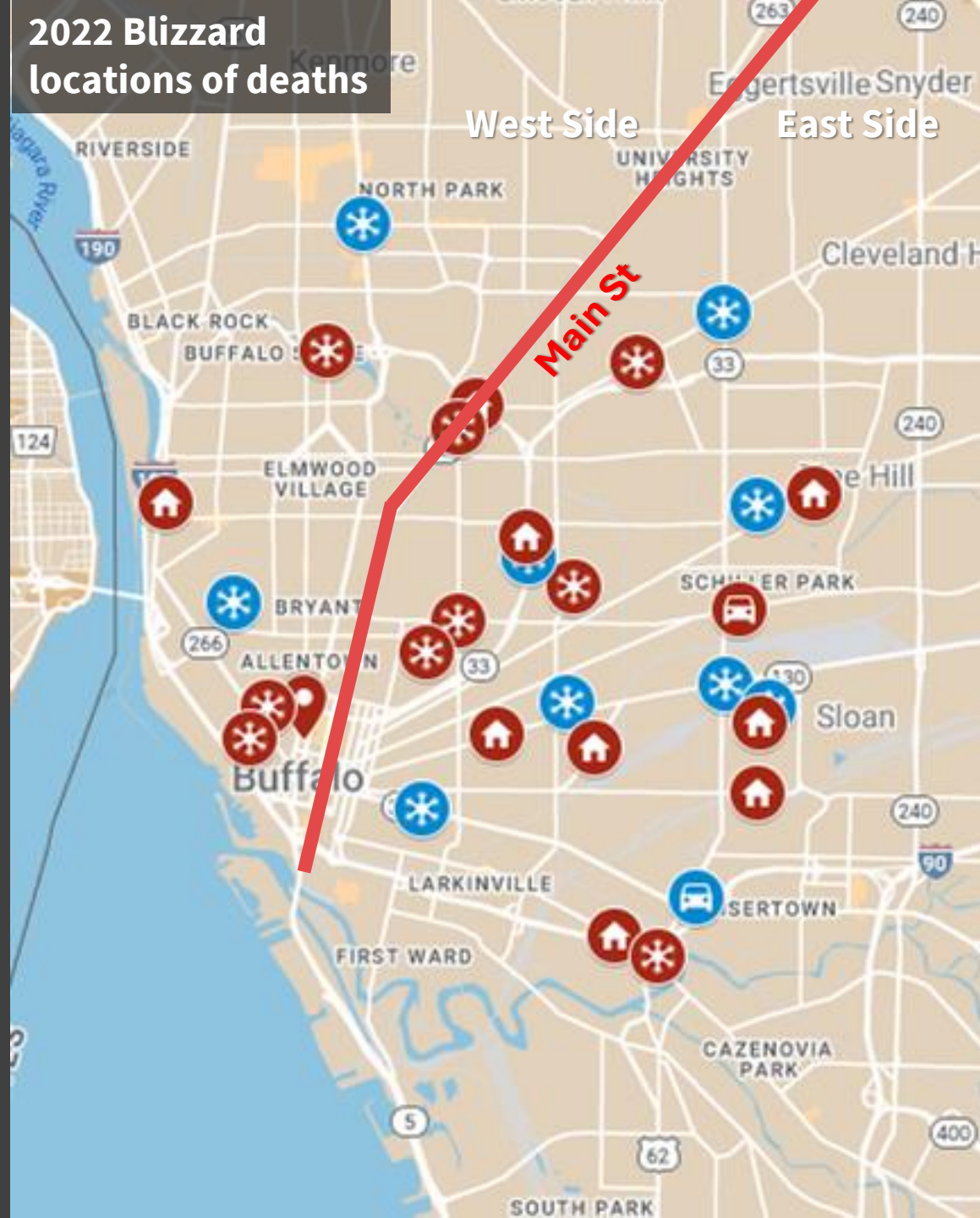
## City Divided: A Brief History of Segregation in Buffalo

BY ANITA BLATTO

PARTNERSHIP  
FOR THE  
PUBLIC GOOD

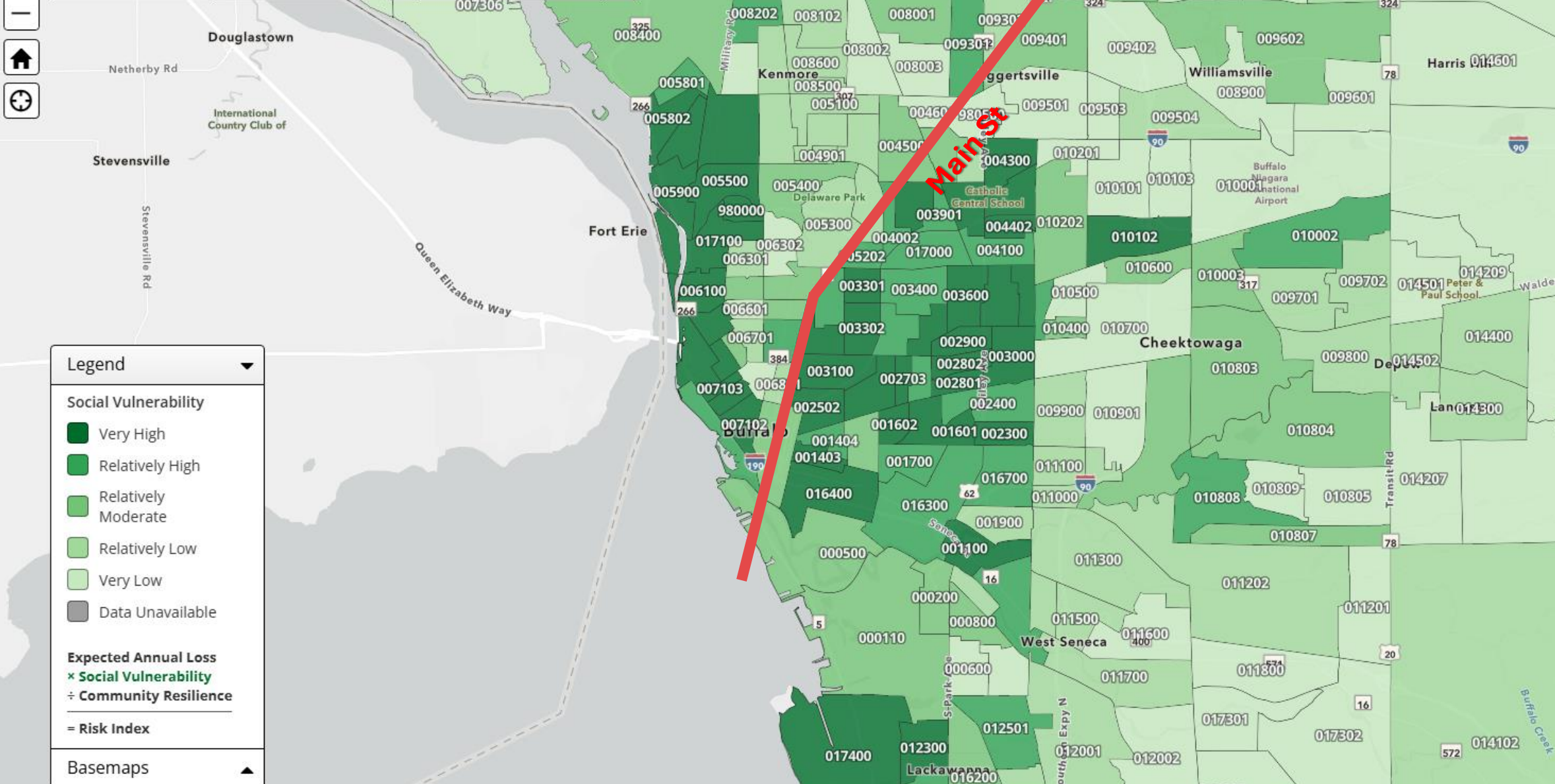


# 2022 Blizzard locations of deaths



Winter Weather (RI) Expected Annual Loss Social Vulnerability Community Resilience

County View Census Tract View Find a county or address



Legend
Social Vulnerability
Very High
Relatively High
Relatively Moderate
Relatively Low
Very Low
Data Unavailable
Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index
Basemaps

# Overall Vulnerability

## Socioeconomic Status

Below 150% Poverty

Unemployed

Housing Cost Burden

No High School Diploma

No Health Insurance

## Household Characteristics

Aged 65 & Older

Aged 17 & Younger

Civilian with a Disability

Single-Parent Households

English Language Proficiency

## Racial & Ethnic Minority Status

Hispanic or Latino (of any race)

Black or African American, Not Hispanic or Latino

Asian, Not Hispanic or Latino

American Indian or Alaska Native, Not Hispanic or Latino

Native Hawaiian or Pacific Islander, Not Hispanic or Latino

Two or More Races, Not Hispanic or Latino

Other Races, Not Hispanic or Latino

## Housing Type & Transportation

Multi-Unit Structures

Mobile Homes

Crowding

No Vehicle

Group Quarters

# The blizzard was not a “natural” disaster

Risk is ultimately **the result of decisions that we make**. We make decisions about the hazards to which we are willing to expose ourselves, we make decisions about where to build schools, factories, dams and dykes and how much to invest in disease surveillance and we make decisions about how our societies organize and care for vulnerable people and assets. (UNDRR, n.d.)

## #NoNaturalDisasters

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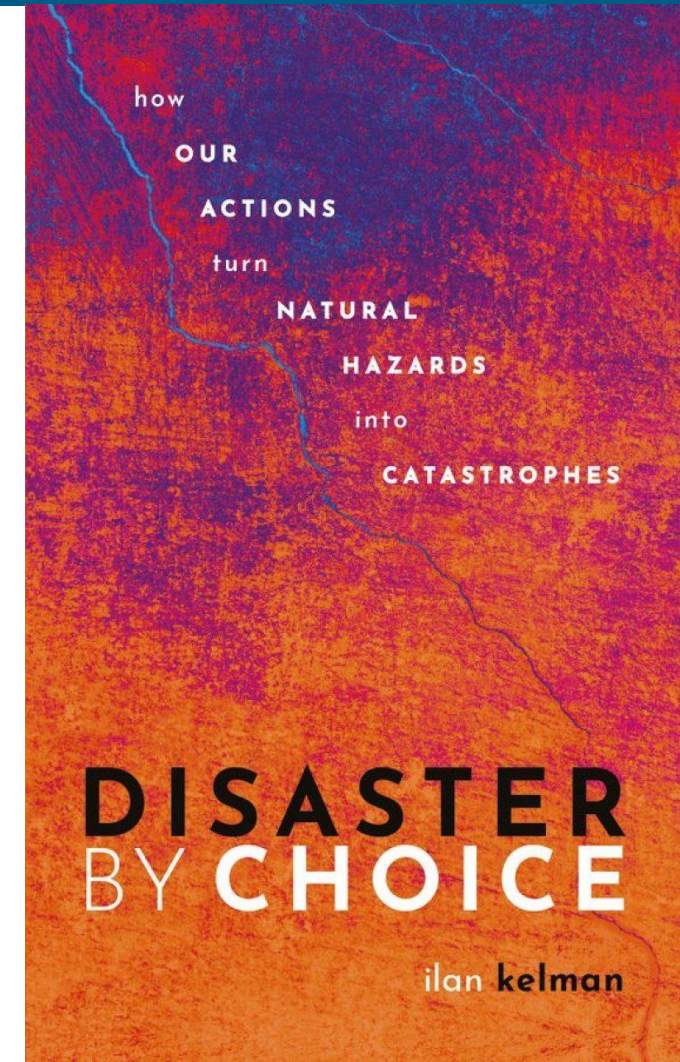
**There's no such thing as a 'natural' disaster...**

### Our aim

We want to change the way organisations, politicians, the media and people **in positions of power talk about disasters**.

We want to make sure that when a hazard creates a disaster because of actions taken by humanity (even historic decisions), that those in positions of power **do not blame nature or use it as a convenient tool to avoid responsibility**.

We will work to ensure (before, during and after a disaster) that those with the power to **reduce vulnerability, exposure and risk** are held accountable for their decisions, especially when those decisions increase the damage, loss and suffering associated with disasters.





How can we disrupt the “natural disaster” framing of the blizzard through justice-oriented science education?

How can people’s lived experiences of the blizzard inform climate justice education for young people in Buffalo?

# Justice-oriented STEM education

Forms of Learning Activity and Design

The Roles of Teachers, Teacher Education, and Professional Learning

The Roles of Curricular Materials

*Approach #4: Seeing science and engineering as part of justice movements.*

Children learn about the connection between the natural world and human actions and decision making.

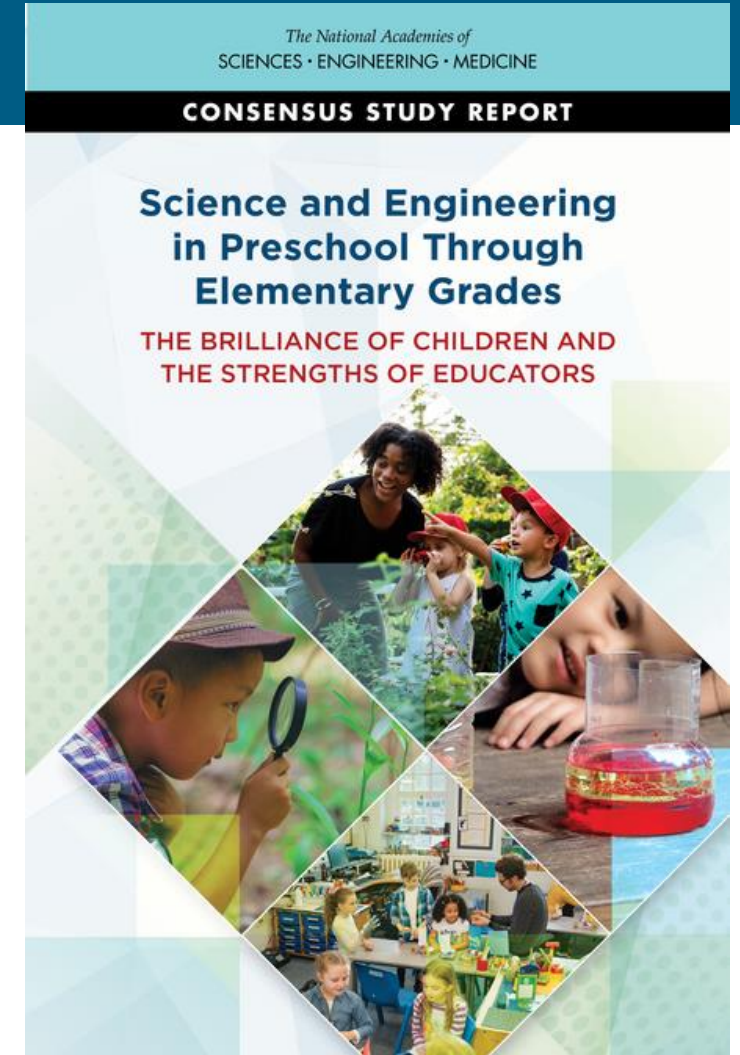
Children investigate how Black, Indigenous, and other communities of color experience disproportionate effects of food deserts, natural hazards, and environmental pollution.

Teachers

- recognize the connection between their own power and positionality, Western or Eurocentric science and engineering, and children's and families' engagement in science and engineering.
- learn about the connections among a science phenomenon or engineering design, local or global instances of the phenomenon or design, and implications for communities.

Curricular materials invite

- children to ask and answer their own questions about community-relevant issues and make decisions for ethical futures.
- children, families, and teachers to examine issues from historicized lenses, and understand how contemporary scientific practices or concepts may have deep roots in racist or other oppressive histories.



National Academies of Sciences, Engineering & Medicine (2022)

# Study design

## Social design-based experiment

SDBE was developed to systematically address “urgent problems of practice relevant to redressing educational inequities for vulnerable student populations and communities” (Gutiérrez et al., p. 332).

history and  
historicity

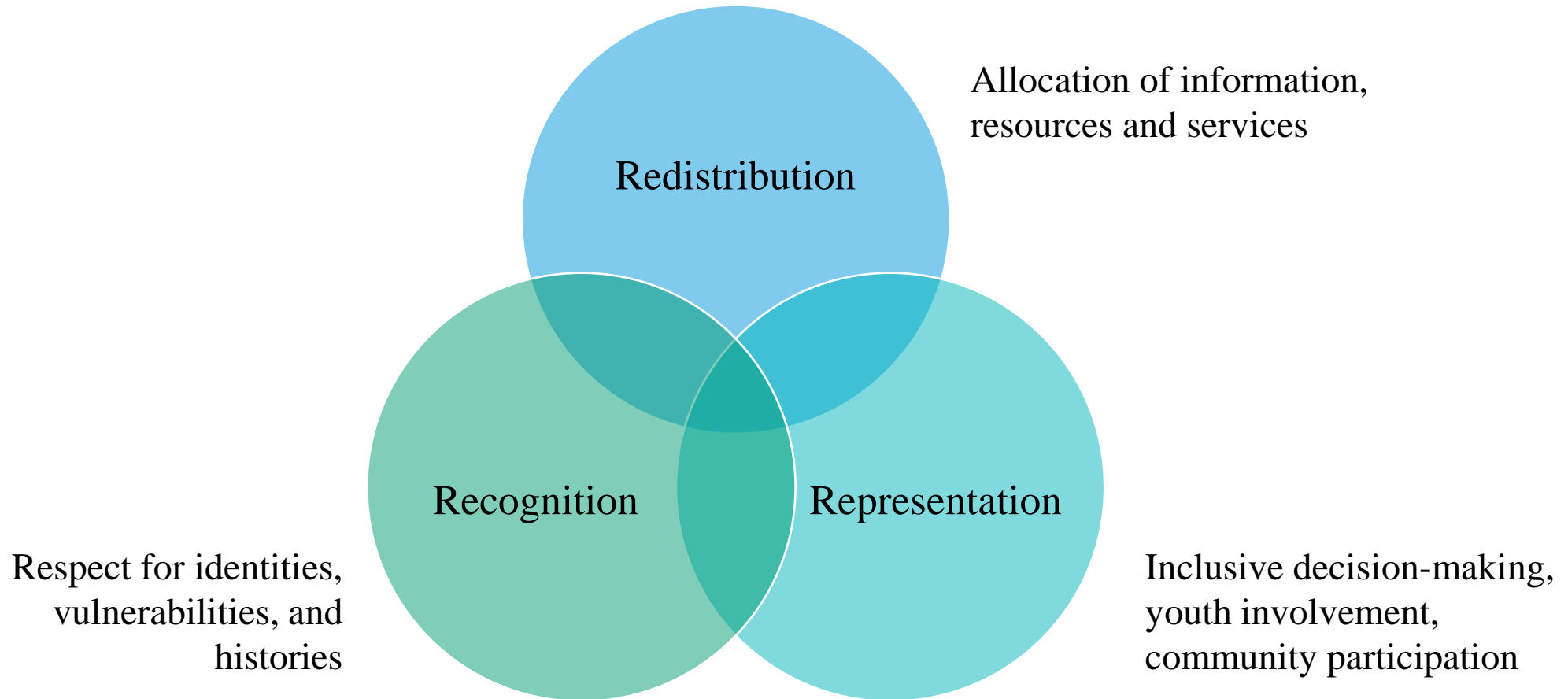
prolepsis, bringing  
the past to the  
present

employing a dynamic  
model of culture

emphasis on  
resilience and  
change

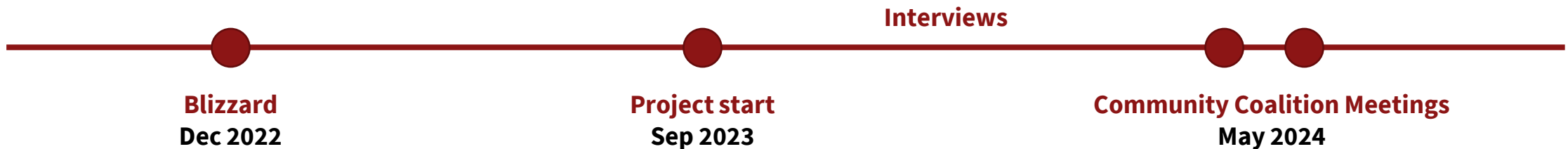
transformation and  
sustainability

# Education for disaster justice

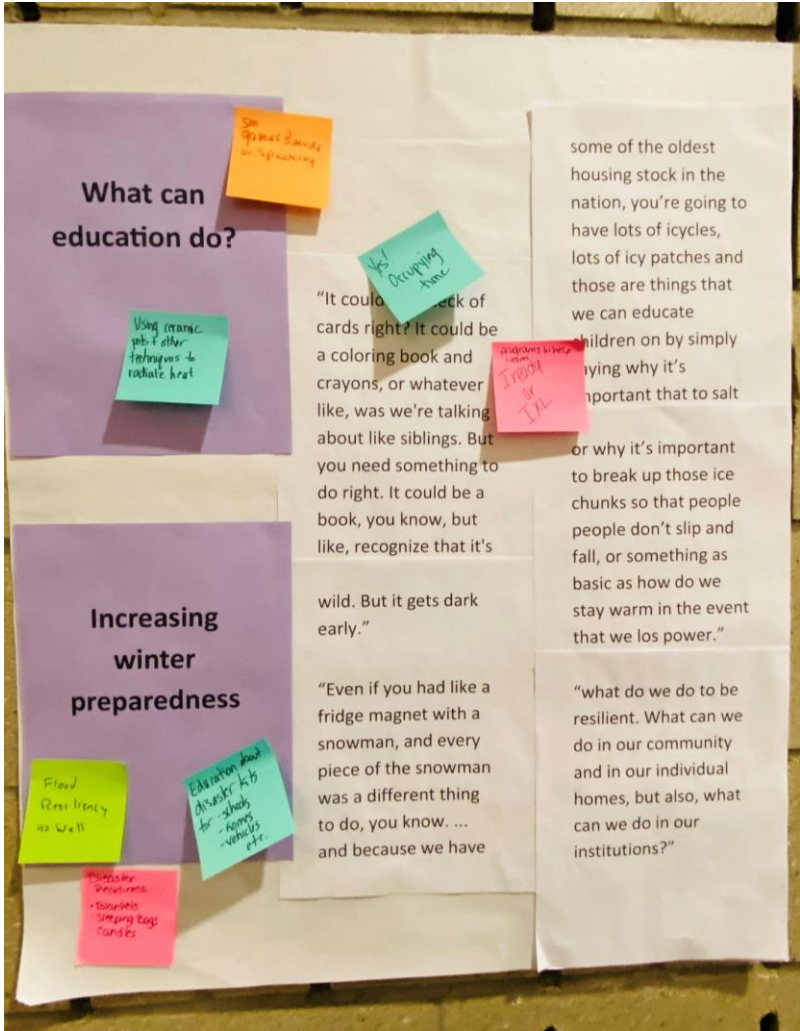
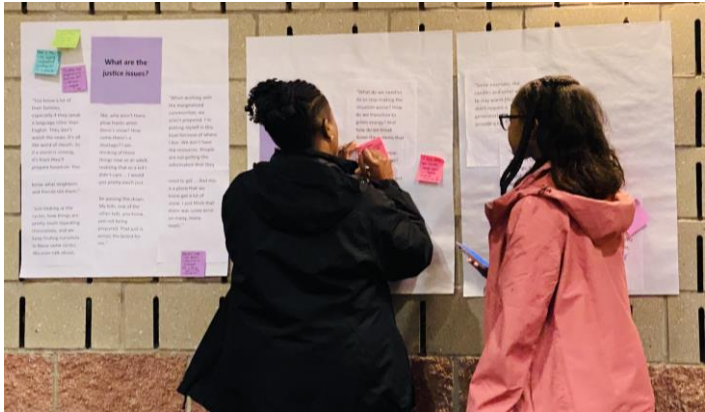
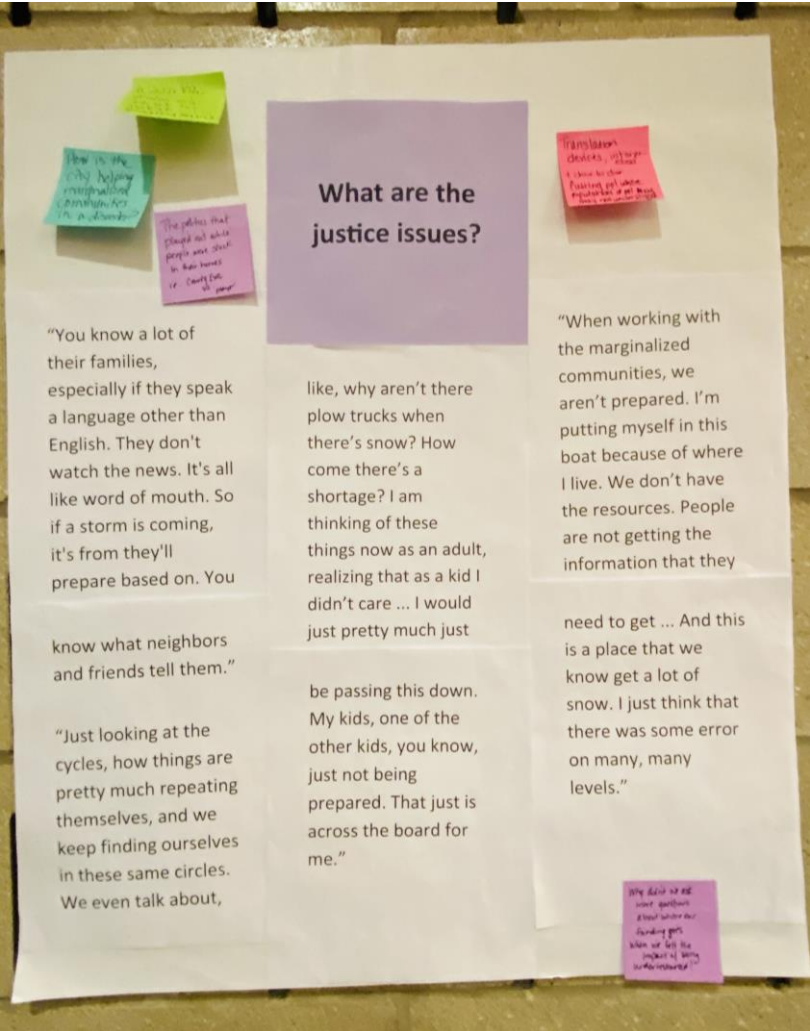


# Study participants

	Interviews	Coalition meeting 1	Coalition meeting 1
Families	9	5	5
Community Leaders	11	4	4
Science Teachers	7	4	4
Total	26	13	13



# Community coalition meetings



# Community narratives of injustice

“ Communities that are predominantly **black and brown like my parents, they talk about it all the time.** My stepdad in particular, he talks about how he doesn't see a snow plow ever. And that's what every older person on the east side of Buffalo says. So I don't know if it's true or not but that's what they all say and they hold true to that. (Family Interview) ”

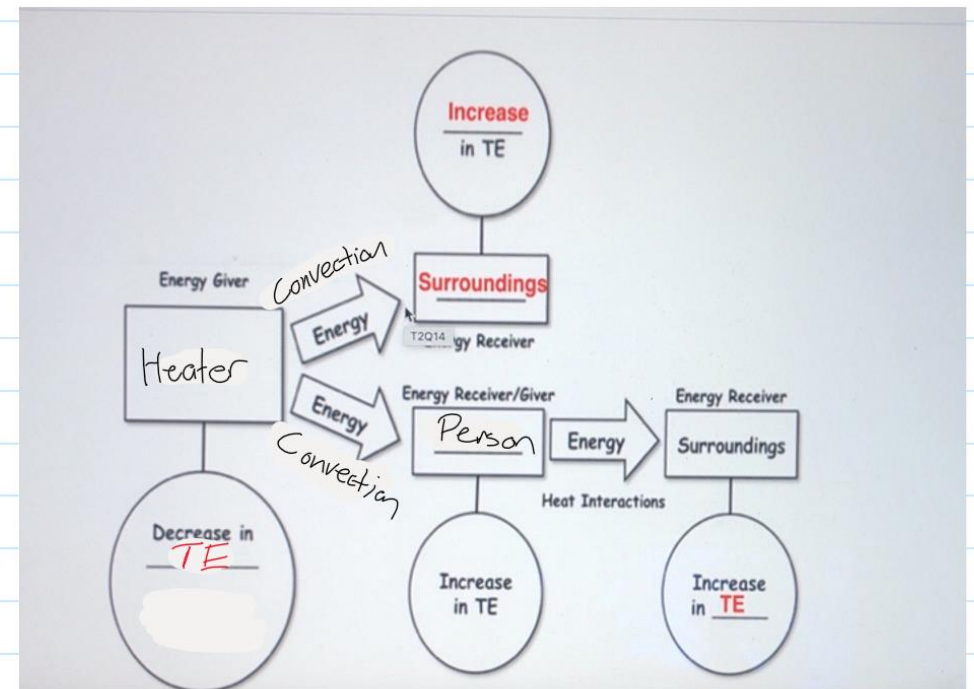
“ And especially as they get more digital ... If you don't have a cell phone, that poses a problem. **So for people that are economically disadvantaged, poor, low income, no income, that presents a huge barrier. The more our city grows and becomes more disconnected from it really bothers me.** (Family Interview) ”

“ But I think the big idea that I'm looking at from all around here is the inequities and this need and this preparedness issue. And then I have **so many students who don't speak English as their first language** so their parents are not even understanding what's going on ... **We sent kids home with solar eclipse glasses so they could look at an eclipse and we couldn't prepare for a blizzard?** Are you kidding me? (Science teacher, 1<sup>st</sup> Coalition Meeting) ”

# Need for educational response

“ And I remember when we came back to school, they were all talking about the blizzard and about how they did or how they experienced it or about their street not being ploughed or things like that. But I know that I specifically did not have a deep discussion about it in my biology class. We talked about it just briefly about like climate change. (Science Teacher Interview) ”

G/R Diagram for a heater heating a person and its surroundings





# Thank you!

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