

# Improving Urban Stormwater Policy Through Citizen Science and Community Engagement

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Session 23

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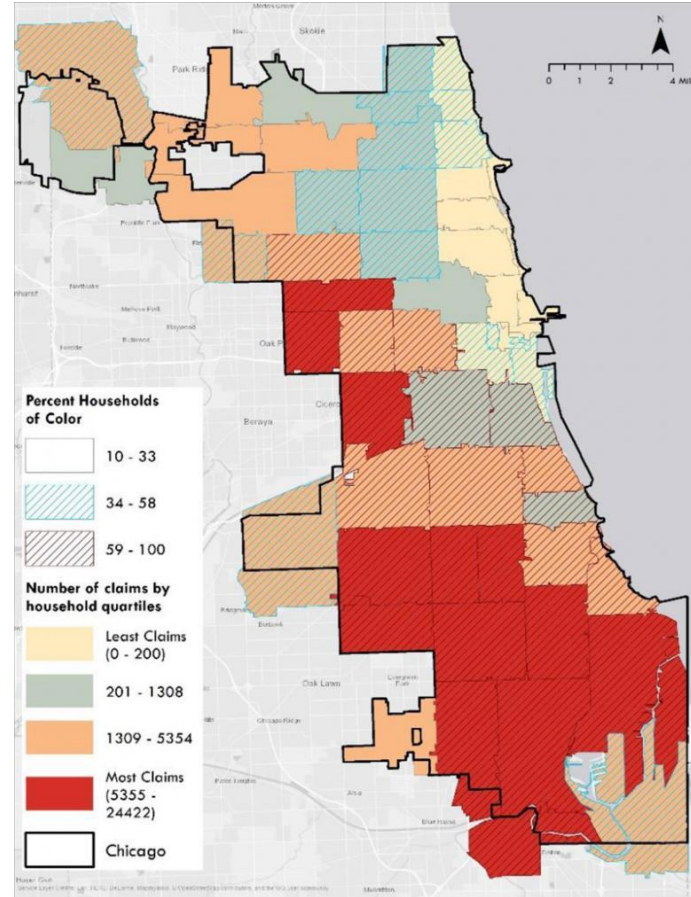
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# The Problem

Chicago has a storm water problem

Disadvantaged communities in the city have more flooding



Left:  
Flood insurance claim data from the Flood Equity Report (up to 2016)

# What Is Citizen Science?

## It's a lot of things

- ❖ Method of scientific data collection and processing
- ❖ Curriculum based teaching programs
- ❖ Community science

(Bonney, 2016)



# Transformative Potential of Citizen Science

- ❖ Provides insight into the complexity of learning
- ❖ Gives scientists a new, shared perspective on science
- ❖ Creates long lasting partnerships
- ❖ Helps citizens understand scientific processes
- ❖ Engages citizens with pressing topics
- ❖ Invites citizens to ask their own questions

(Bela, 2016)

**Empowered citizens engage in policy making practices**



# Our Goals

1. Community Engagement
2. Development of Teaching Methods
3. Teaching and Empowerment
4. Data Collection



# Our Methods

## Teaching

Curriculum based model with community science elements

Four modules:

Coliform testing (I, II)

Turbidity and Dissolved Oxygen (I, II)

pH and Conductivity (I, II)

Environmental Justice (II)

Iterative Process

## Benchmarking

Pre- and post- tests given to student

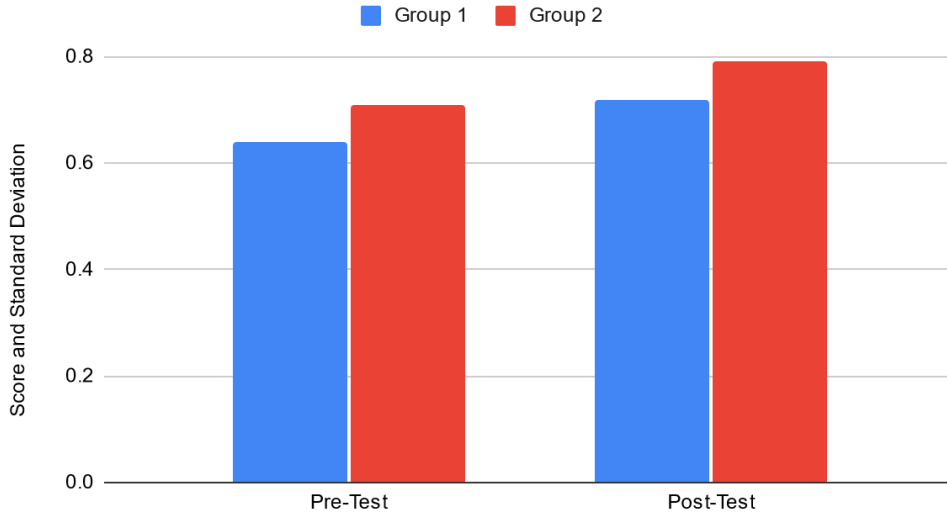
Surveys measuring student engagement and collecting feedback



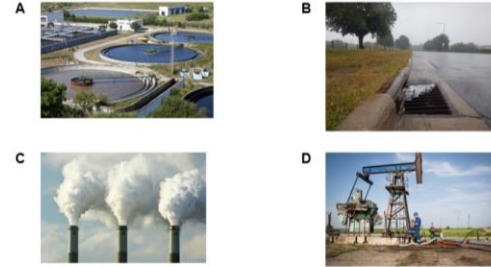


# First Set of Trainings- Results

Scores as Percentages for the First Set of Trainings



1. Point-sources of pollution generate pollution that can be traced back to a single location. In your view, which of these is a non-point source of pollution?

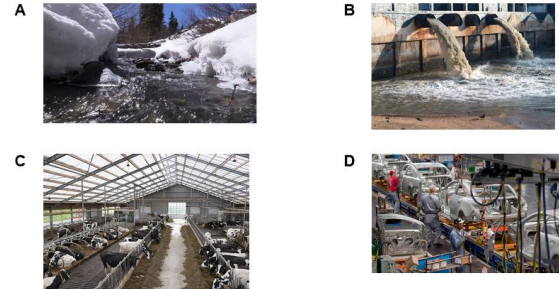


2. In your view, which of these is a common nonpoint source pollutant found in stormwater? Circle all that apply.

- a. Pesticides
- b. Particulate Matter
- c. Sediment
- d. Heavy metal from factories

## Example questions from Pre-test

1. Which of these is a non-point source of pollution?



## Example question from Post-test

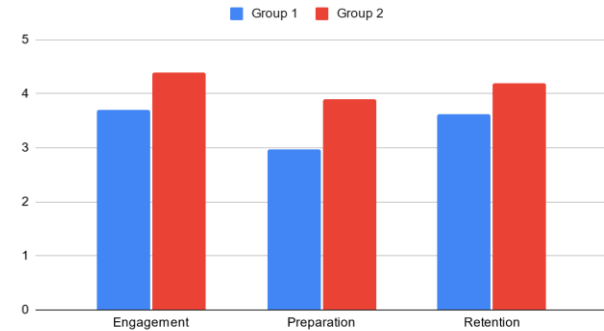


# Initial Survey Results

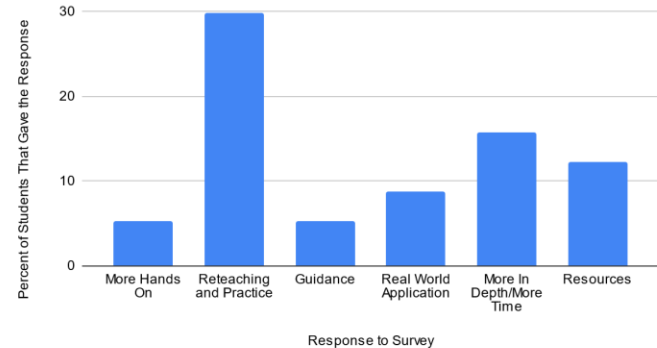
- ❖ Information Retention
- ❖ Engagement
- ❖ Preparation to Conduct their own experiments

What can we change to improve these aspects?

Learning Metrics (Ranked 1-5) For Multiple Student Groups



What Would Help Students Most?



The first two groups had a total of 57 students who responded. The first graph shows a comparison, and the second aggregates feedback





# The Next Generation

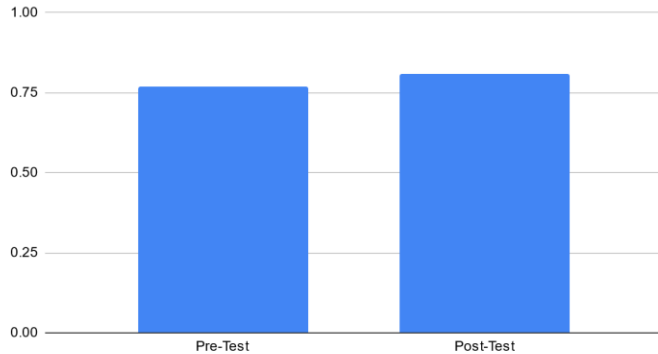
- ❖ Clarifying pre and post test questions
- ❖ Repeated experiments
- ❖ Maximizing interactivity
- ❖ Adding Environmental Justice module



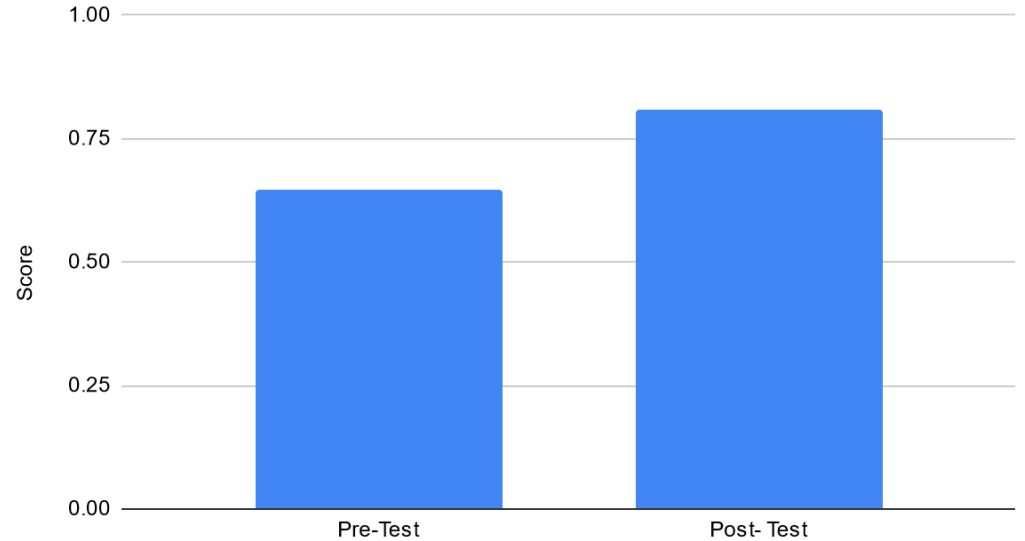
Teaching about environmental justice and stormwater patterns in Chicago

# Second Set of Trainings- Results

Mean Score for Experimental Check



Pre and Post Test Scores as Decimal Percentages



# New Survey Questions

How capable do you feel of doing your own water quality tests? (Scale of 1 to 5)

	1	2	3	4	5	
Not at All Capable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Capable

← Capability

Was the content relevant to you?

	1	2	3	4	5	
Not at All	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Much

← Connection

Will you be able to make an impact on your community as a result of this experience?

	1	2	3	4	5	
Not at All	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Much

← Empowerment

## Going Forward

- ❖ Maintain communication with communities
- ❖ Students performing repeated testing
- ❖ Create and share resources  
i.e. Videos, handouts
- ❖ Analyze Feedback and results to continue  
iterating our process
- ❖ App for water data reporting



# Acknowledgements

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# THANK YOU FOR PARTICIPATING!

Contact us with questions:

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