



Understanding the  
implementation of an indoor  
agricultural program on the  
student achievement of girls in  
Middle School

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## *Problem Statement*

- Equity challenges within STEM have precipitated Next Generation Science (NGS, 2013)
  - Real-World problem solving; 21st century STEM education (National Research Council, 2012)
- Relevance of Science leads to increased engagement, long-term interest, and pursuit of STEM-related fields (Brickhouse et al., 2000)





# Problem Statement

Performance identified as one of three key constructs for science identity construction, along with competence and self-recognition (Carlone & Johnson, 2007)

Middle school is early adolescent stage critical for identity development (Erickson, 1968)



# Research Purpose

Examine the effect of the implementation of an NGS-aligned indoor agriculture program, New York Sun Works (NYSW), and the achievement of middle school students

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# Research Question

- What effect does implementing an NYSW program have on middle school girls' 8th-grade standardized test scores?
  - Is this relationship moderated by the student's demographic characteristics and school-level variables?





# Conceptual Framework

- Science Identity Construction(Carlone & Johnson, 2007)
  - Competence
  - Performance
  - Self-Recognition
- Program Implementation
  - Examining fidelity of implementation



# Methodology: Research Design

- Quasi-experimental
  - School achievement prior/during and post implementation



# Methodology: Research Design

## Longitudinal

- Students who started at public middle schools in Brooklyn and Manhattan boroughs during 2015-2016 and 2016-2017 academic years.

## Secondary data set: New York City Department of Education.

- Their pre-enrollment characteristics
- Their data throughout middle schools
- Standardized test scores during 8<sup>th</sup> grade.





# Methodology: Data Collection

- List of participating middle schools provided by NYSW program office
- Secondary data from the New York City Department of Education
  - Application through online IRB manager tool

# NY Sun Works Program

Borough	#Code	Year Classroom Built (Calendar Quarter)	Year Curriculum Implemented
Manhattan	M245	2012	SY 2012/2013
Brooklyn	Q010	2017-III	SY 2017/2018
Brooklyn	K211	2017-III	SY 2017/2018
Manhattan	M407	2016-I	SY 2016/2017
Brooklyn	K050	2015	SY 2015/2016
Brooklyn	K292	2016-III	SY 2016/2017
Brooklyn	K383	2016-III	SY 2016/2017
Manhattan	M539	2014	SY 2014/2015
Brooklyn	K084	2016-III	SY 2016/2017
Manhattan	M180	2017-III	SY 2017/2018
Manhattan	M333	2010	SY 2010/2011
Brooklyn	K157	2017-III	SY 2018/2019
Brooklyn	K582	2017-III	SY 2018/2019
Manhattan	M322	2017-III	SY 2018/2019

# Methodology: Variables

- Dependent variables (DVs): Continuous
  - 8<sup>th</sup> grade New York State test scores
    - Math
    - ELA
    - ~~Science~~

# Descriptive Statistics

- 5,242 students
  - 49.4% girls
  - 30.5% Black
  - 44.4% Hispanic
  - 15.2% White
  - 9% ELL
  - 65% Free/Reduced lunch

# English Language

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	All students	Girls	Black Girls
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2015-2016	2.29	2.46	2.52
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2016-2017	2.38	2.53	2.56
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2017-2018	2.46	2.66	2.59
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2018-2019	2.47	2.63	2.57
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# Mathematics

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	<b>All students</b>	<b>Girls</b>	<b>Black Girls</b>
2015-2016	2.06	2.11	2.13
2016-2017	2.05	2.08	1.96
2017-2018	2.17	2.24	2.10
2018-2019	2.26	2.33	2.21

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# Future Work

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- Entire Brooklyn and Manhattan middle school Universe
- Use Propensity score matching to establish a control group