CUNY Start Math:

An Innovative Developmental Education Program's Pedagogy, Curriculum, and Professional Development

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CUNY

CUNYSTART®

Agenda

1. Introduction to CUNY and CUNY Start
2. Students and outcomes
3. Developmental math students' views of math
4. Learning goals in CUNY Start Math
5. Sample lesson from CUNY Start curriculum
6. Core values and practices of CUNY Start Math
7. Questions

The City University of New York

The City University of New York (CUNY) is the largest urban university system in the US, with over 270,000 students enrolled.

CUNY includes 25 campuses located across all five boroughs of New York City, including 7 community colleges, 3 comprehensive colleges, and 8 senior colleges.

In the 2018-19 academic year, CUNY Start/Math Start programs are running at 10 CUNY colleges.

CUNY Start/ Math Start History

- 2007
  - College Transition Program (part of CUNY Adult Literacy/HSE program)

- 2009
  - College Transition Initiative piloted at two community colleges

- 2011
  - CUNY Start expanded to run at seven CUNY colleges

- 2014
  - Summer Start piloted at one community college

- 2016
  - Math Start expanded to Fall and Spring

- 2018
  - CUNY Start & Math Start served over 4,000 students at 10 colleges

CUNYSTART®

Program Design and Structure

➤ Intensity/Hours:

   ➤ <u>CUNY Start FT program (Math and R/W)</u>:
   25 hours per week (11 hours of math)

   ➤ <u>CUNY Start PT program (Math or R/W)</u>:
   12 hours per week (10.5 hours of math)

   ➤ <u>Math Start</u>:
   Up to 20 hours per week (18.5 hours of math)

➤ Advising & College Success Seminar

➤ Instructor/Advisor collaboration

➤ Built-in tutoring by trained alumni

➤ Same CUNY-wide proficiency standards

➤ Phase 1 and Phase 2

➤ $75 student fee, no financial aid used

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CUNY First-time Freshmen

Students with developmental requirements (N=20,260)		Students with no developmental requirements (N=16,643)	
Asian	13%	Asian	30%
Black	32%	Black	16%
Hispanic	42%	Hispanic	29%
White	12%	White	24%

Note: Includes Fall 2016 incoming first-time freshmen. Rates represent the proportion of students with and without remedial needs from each racial/ethnic group.
(Source: CUNY Institutional Research Database)

CU
NY

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How Does CUNY Start Compare?

Students with developmental requirements (N=20,260)		CUNY Start participants (N=3,123)	
Asian	13%	Asian	7%
Black	32%	Black	26%
Hispanic	42%	Hispanic	48%
White	12%	White	6%
		Other/Unknown	13%

Note: CUNY data includes Fall 2016 incoming first-time freshmen.
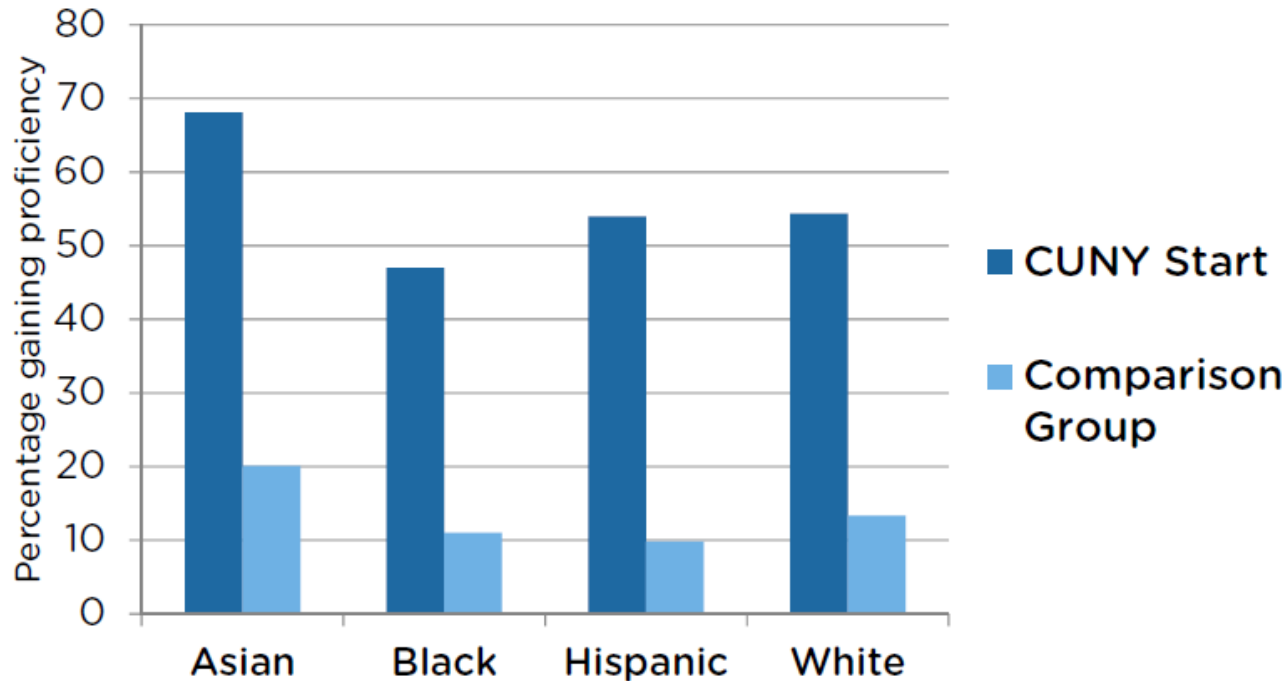   CUNY Start includes program participants from the Fall 2016 and Spring 2017 semesters.
(Source: CUNY Institutional Research Database; CUNY Start Program Database)

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Math proficiency gains

Note: CUNY Start includes participants from Fall 2009 through Fall 2013. Comparison group includes a matched group of
CUNY first-time freshmen and transfer students in associate degree programs in Fall 2009 through Fall 2013.
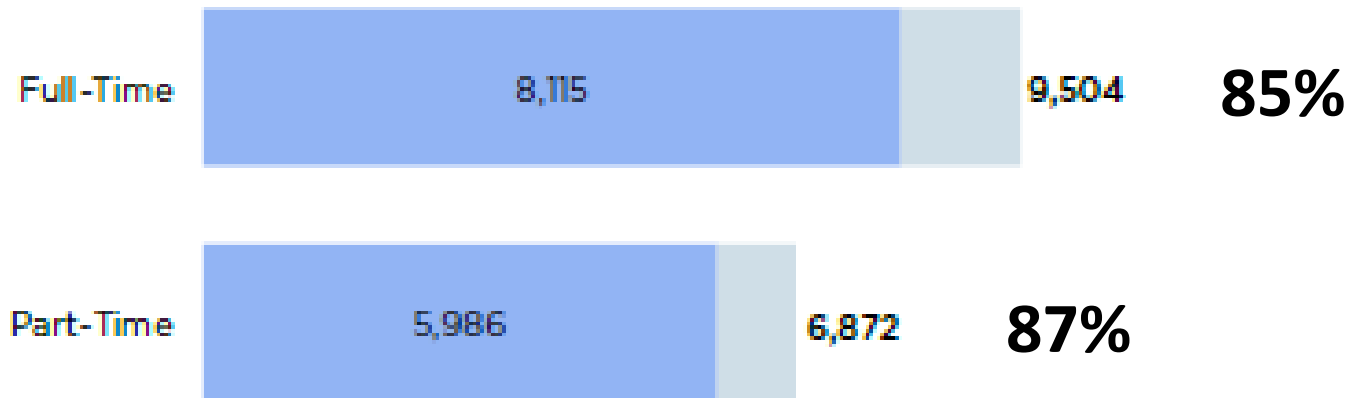Rates represent percentage achieving proficiency in math by the end of the first semester (in CUNY Start or CUNY).
Total sample size was 18,300 (4,575 CUNY Start and 13,725 non-CUNY Start students).
(Source: CUNY Institutional Research Database; CUNY Start Program Database)
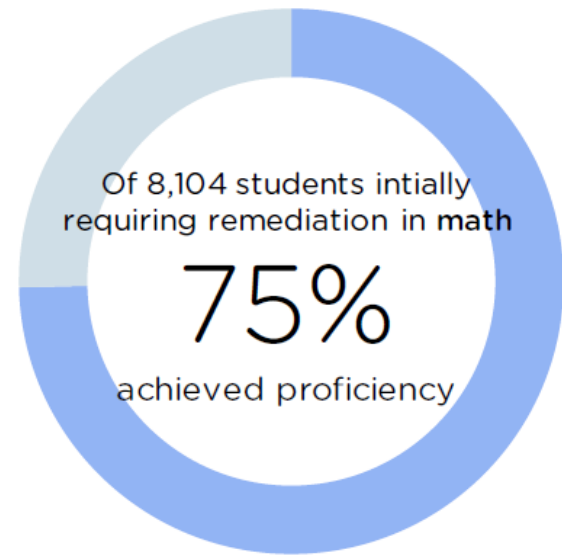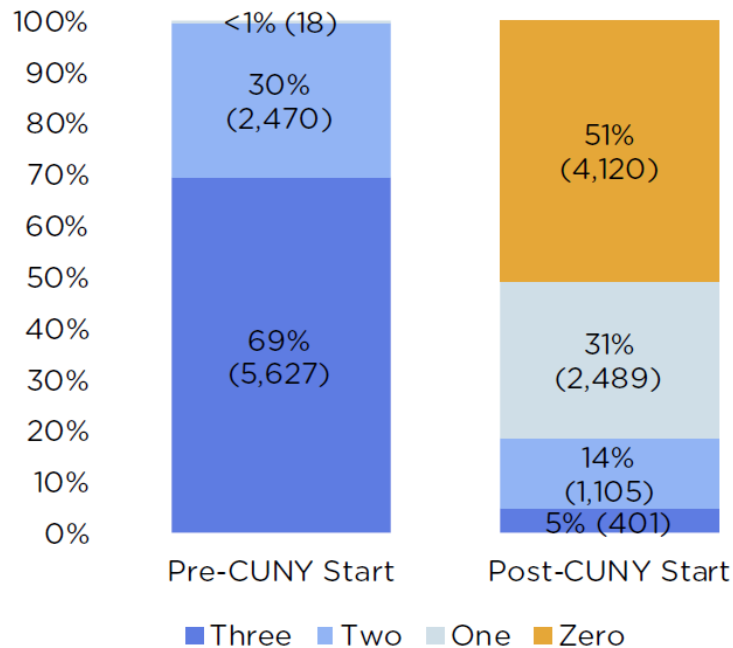
CUNY Start Outcomes

Program Completion

Full-Time	8,115 — 9,504	**85%**
Part-Time	5,986 — 6,872	**87%**

Note: Data includes CUNY Start program participants from
Fall 2009 through Spring 2017.
(Source: CUNY Start program database)

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CUNY Start Outcomes

Full-Time (N=8,115)

Pre-CUNY Start:
- <1% (18)
- 30% (2,470)
- 69% (5,627)

Post-CUNY Start:
- 51% (4,120)
- 31% (2,489)
- 14% (1,105)
- 5% (401)

Legend: ■ Three ■ Two ■ One ■ Zero

Of 8,104 students initially requiring remediation in **math**
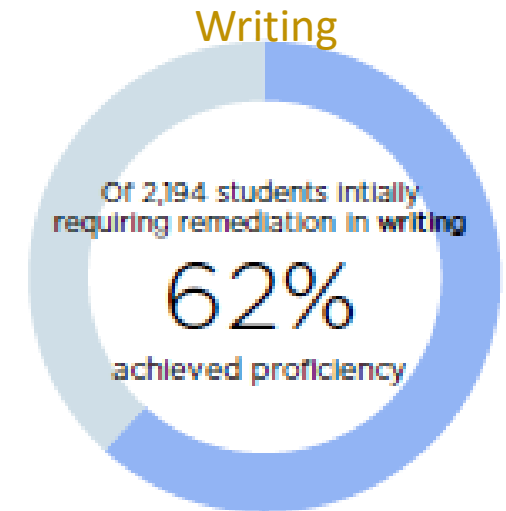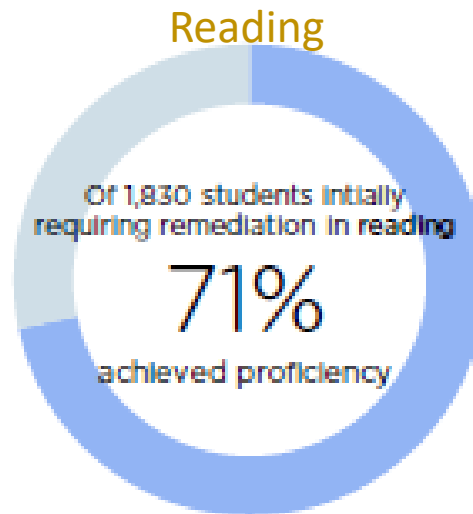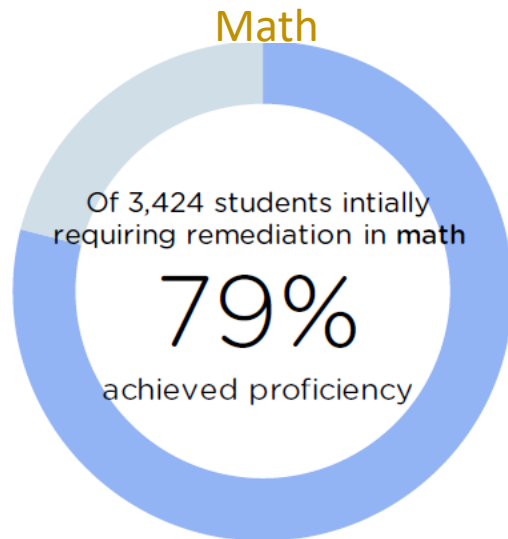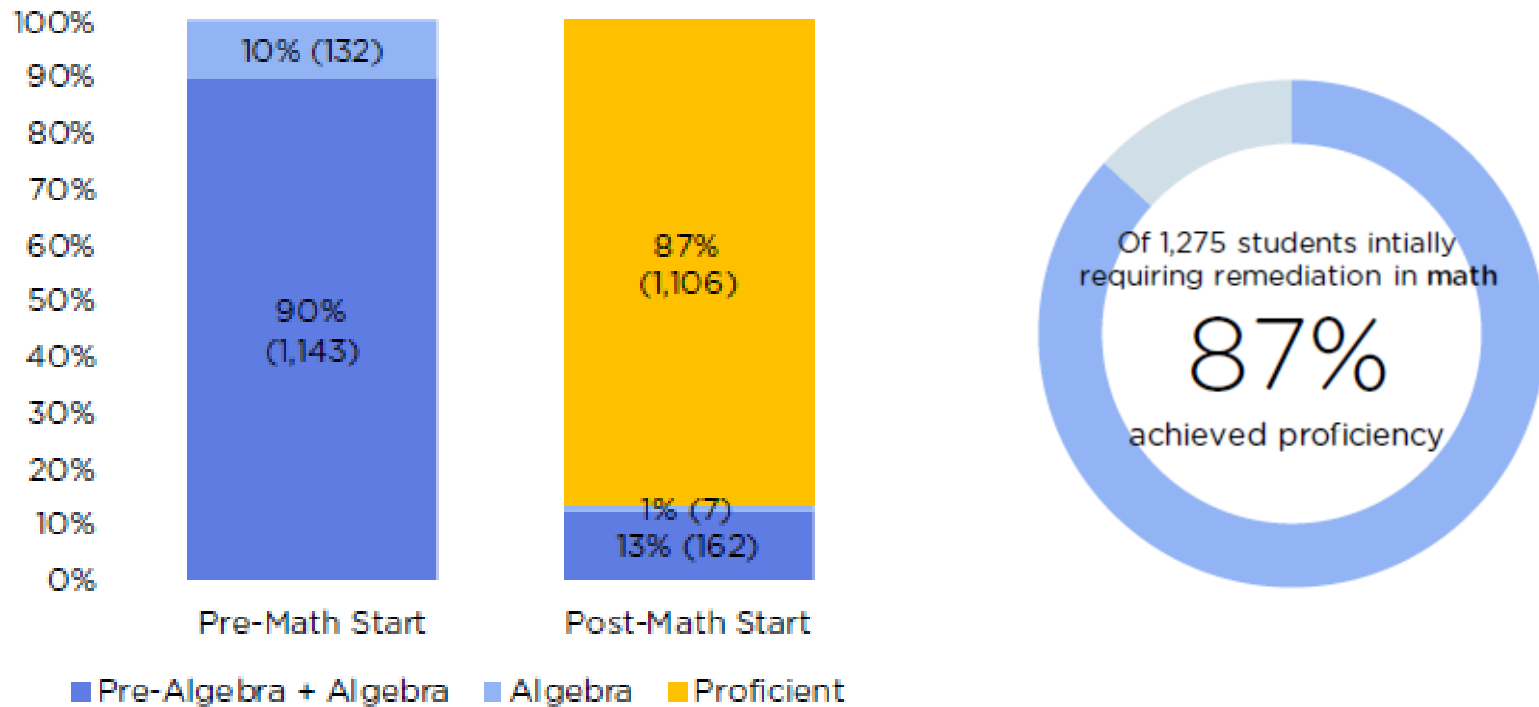
75%

achieved proficiency

Note: Data includes CUNY Start program participants from Fall 2009 through Spring 2017. Outcomes data shown for program completers only. Proficiency gains are based on course performance and exit test scores.

(Source: CUNY Start program database)

CUNY Start Outcomes

Part-Time (N=5,986)

Math

Of 3,424 students intially requiring remediation in **math**

79%

achieved proficiency

Reading

Of 1,830 students intially requiring remediation in reading

71%

achieved proficiency

Writing

Of 2,194 students intially requiring remediation in writing

62%

achieved proficiency

Note: Data includes CUNY Start program participants from Fall 2010 through Spring 2017. Outcomes data shown for program completers only. Proficiency gains are based on course performance and exit test scores.

(Source: CUNY Start program database)

Summary Math Start Outcomes

Summer Math Start (N=1,275)

Note: Data includes Summer Math Start program participants from 2014 through 2017. Outcomes data shown for program completers only. Proficiency gains are based on course performance and exit test scores.

(Source: CUNY Start program database)

Solve mentally:

10 x 3 =

10 x 13 =

20 x 13 =

30 x 13 =

31 x 13 =

29 x 13 =

22 x 13 =

Example of student work:

10 x 3 = 30

10 x 13 = 130

20 x 13 = 86

30 x 13 = 120

31 x 13 = 123

29 x 13 = 116

22 x 13 = 92

Student Views

- "Math is just all these steps."

- "In math, sometimes you have to just accept that that's the way it is and there's no reason behind it."

- "I don't think [being good at math] has anything to do with reasoning. It's all memorization."

Learning Goals in CUNY Start Math

- Transform students' views of math and of themselves as math learners

- Deepen students' math learning

  Conceptual understanding and procedural fluency
  Adaptive reasoning
  Cognitive autonomy

- Improve academic habits

- Reduce or eliminate developmental needs

- Prepare students to do well in classes after CUNY Start

Curriculum Sample

A Moment for Mental Math

Attempt the following problem <u>only</u> by using mental math. That means <u>without</u> a pencil and paper, a calculator, or a cell phone.

A teacher buys binders for 8 students. The binders cost $3.10 each. What is the total cost of the binders before any taxes are added?
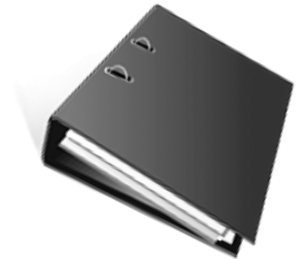
(Remember — think about how to do this in your head!)

Curriculum Sample

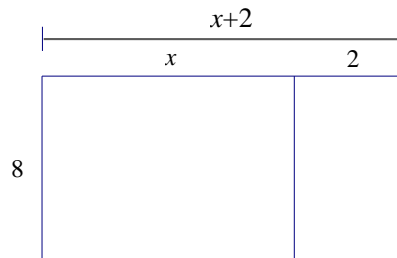## 3 Scenarios and the Distributive Property

<u>Scenario #1</u> — Multiplication "in parts": $15(1.03)$

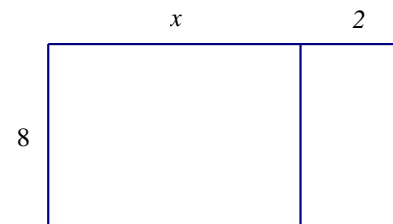$$15(1.00 + .03) = 15 \cdot 1.00 + 15 \cdot .03$$

<u>Scenario #2</u> — Writing out groups: $5(x+2)$

$$5(x+2) = (x+2) + (x+2) + (x+2) + (x+2) + (x+2)$$
$$= x + 2 + x + 2 + x + 2 + x + 2 + x + 2$$
$$= 5x + 10$$

<u>Scenario #3</u> — Rectangle area:

Total Area $= 8(x+2)$ *Total Area* $= 8x + 16$

Some underlying pedagogical values

- Students learn most effectively when they are active in the classroom.

- Student talk is the most important talk.

- Rules can be the pedagogical endpoint, not the starting point.

- Number and realistic contexts can be entry points into more abstract ideas and formal representations.

- Multiple solution methods that students use can be encouraged and explored.

More underlying pedagogical values

- Students can learn to think and communicate like scientists.

- "Relentless" questioning to develop new ideas and for assessment

- Expecting and respecting errors

- Some student struggle is important – teachers should resist being "too helpful".

Professional Development

➢ Apprenticeship Semester as Cooperating Teacher

  ❖ Observing, circulating, and tutoring

  ❖ Participating in "preview" and "reflection" PD meetings

  ❖ Teaching lessons and receiving feedback

➢ Ongoing Professional Development

  ❖ Observations & coaching

  ❖ Participating in regular PD meetings

Questions

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