About the WP (Working Paper) series on the Math Stagnation Nations (& what MMU1 can do about this quickly)

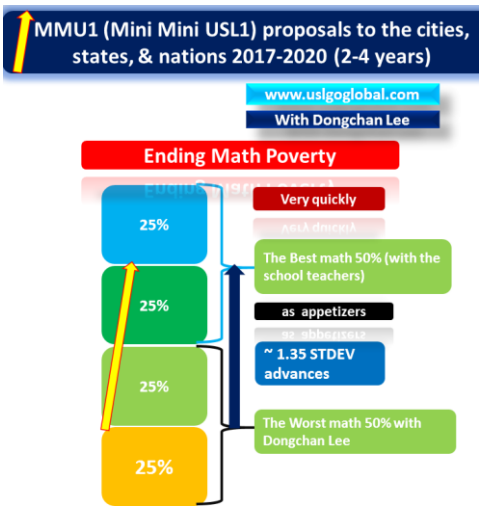
By Dongchan Lee

This paper is a part of the WP (Working Paper) series by Dongchan Lee about the math stagnations in the OECD, all the developed English-speaking or the majority of the Latin American countries.

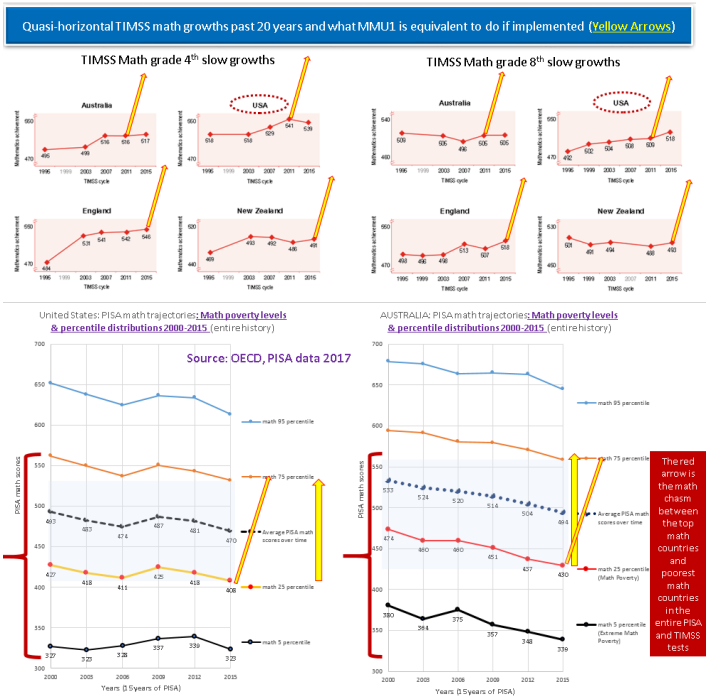
<u>In the WP series on the math stagnation nation series, for the USA</u>, we observed and analyzed the following in part 1-5 in the USA series:

1) the math stagnations of the OECD countries, including the USA internationally (from the PISA 2000-2015, TIMSS 1995-2015);
2) the math stagnations of the 50 USA states;
3) the math stagnations of at least 85-90% of the big cities (or school districts) that have participated in the TUDA program of NAEP;
4) the math stagnations vs. the Common Core math for the NAEP math dips in 2015. Regardless of the Common Core math, the math stagnations are here to stay.
5) They key summaries of this series and beyond.

NOTE: throughout the math stagnation nations series, we use the yellow arrows for the MMU1 impacts to easy visual comparisons to the traditional quasi-flat growth over 10-20 years.



To boost the math poverty (math poorest 25 percentile) to the math prosperity (math richest 25 percentile)



Math saturations of all English-speaking countries

Lee's online repository to get updates about the WP series on "Math Stagnation Nations"
http://uslgoglobal.com/wp-math-stagnation/

WP series: Mathematics Stagnation Nation series for the USA (Part 3)

The collective Math stagnations of the grades 4th and 8th in the big cities (or the School Districts based on TUDA of NAEP) of the USA over the 1 decade: their confirmations, time lags, math poverty shares, and the roles of the Common Core math

By Dongchan Lee (Date: February 7, 2017. Version 1.2)

Abstract

In this short paper whose charts were directly borrowed from the NAEP website on the National Report Cards, I noticed some very striking features about the national and state math stagnations in the USA, especially for 2005-2015 during which most of the citywide math stagnations seemed to have taken place. We examined the NAEP math data from 2003 to 2015 for the math grades 4 and 8 from 21 big cities (or districts). Although there are some variations with the time lags of perhaps 2-4 years (Los Angeles or Chicago) or even 6 years (for the case of District of Columbia), there were strikingly consistent, emerging patterns about the math stagnations. The overall math stagnations took their roots around 2005 for the math grade 4 and this was observed for the math grade 8 in about 4 years later and this was very consistent in almost all TUDA participating cities and districts. Thus the main outline for the stagnations were 2005-2009. The conclusion after examining the 21 cities is that 18 of them have confirmed the hypothesis of the math stagnations already by 2015. So the confirmation of the hypothesis of the math stagnations in all these cities is at least 86% and most likely 90-100% will be by 2017-2019 most likely. The math stagnations are here across the USA even in the city and district levels and very unlikely to go away. We discussed the implications of about 4 year time lags impacting the math stagnations to grade 8 with the implications of the Common Core math standards of the USA 2011-2015.

Critical Note: Throughout in this observational report with timelines from the NAEP math scores, all the data were gathered from NAEP's The National Report Card data. As such, all the data 1990-1996 had "Accommodations Not Permitted" while the data from 2000 on, I used the data with the Accommodations Permitted.

Author: Dongchan Lee

Email: dongchanlee11@uchicago.edu

Website: www.uslgoglobal.com

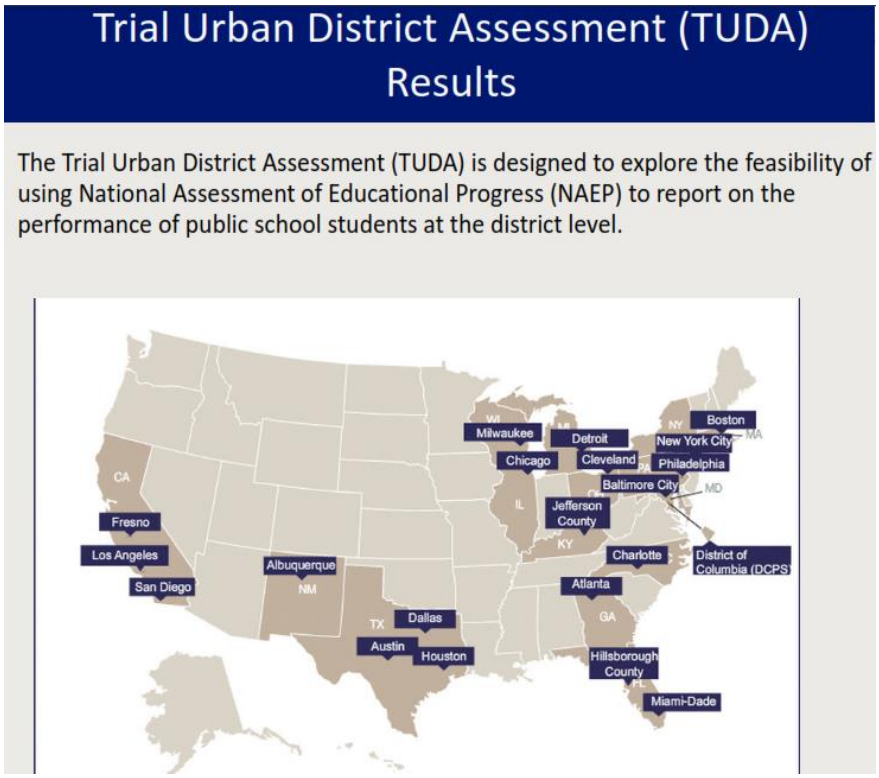
Key words: Math stagnations, math crisis, USL, MMU1, math education innovation. Education reforms, math crisis in the United States

Table of Contents

SOURCE (for all the charts in this paper): U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 2003–2015 Mathematics Assessment

Introduction

Districts gains and losses of NAEP math between 2013 and 2015 from the 21 cities or districts data for the TUDA.
https://www.nationsreportcard.gov/reading_math_2015/#mathematics/district?grade=8



Please note first of all that in 2013-2015 for the chart below, there was absolutely no city whose math grew for both grade 4 and 8. For the math grade 4, about half of them are stagnating and the other half are getting worse while only 3 cities are increasing still (although negligibly and most likely as a brief gains and not much more). For the math grade 8, they are all stagnating while 2 cities are getting worse and only 1 increasing still (although negligibly). What do these mean?

Change in average NAEP mathematics scores between 2013 and 2015 for public school students, by participating district

Grade 8 \ Grade 4	GRADE 4 ↑ Score increase	GRADE 4 ◆ No change in scores	GRADE 4 ↓ Score decrease
GRADE 8 ↑ Score increase		Chicago	
GRADE 8 ◆ No change in scores	District of Columbia (DCPS) Miami-Dade	**Large City** Austin Boston Charlotte Cleveland Detroit Fresno Jefferson County (KY)	Albuquerque Atlanta Baltimore City Los Angeles New York City Philadelphia San Diego
GRADE 8 ↓ Score decrease	Dallas	Hillsborough County (FL) Houston	**Nation (public)**

NOTE: A blank cell indicates that no district fell within that category.

As I have demonstrated immediately after this section, the time lag between the math grade 4 and math grade 8 is estimated to be about 4 years. Due to the math grade 4 pattern of half of them stagnating and the other half getting worse, we will see more tangible declines in the math grade 8, starting in 2017 and then to 2019 NAEP math results because the roughly even distributions of math stagnations vs. the math declining in the math grade 4 will spill over to the math grade 8 in 2 to 4 years obviously because this pattern has been confirmed in almost all 22 cities that have participated in NAEP's TUDA program.

Furthermore, few cities that happened to gain a bit from 2013-2015 time zone are very likely stagnate and start declining at least according to the overall overwhelming patterns of the past a decade as I present here.

Sources:

1) For the NAEP math grade 4: https://www.nationsreportcard.gov/reading_math_2015/#mathematics/district/trends/XQ?grade=4
2) For the NAEP math grade 8: https://www.nationsreportcard.gov/reading_math_2015/#mathematics/district/trends/XQ?grade=8

4th grade math (2003-2015), but pay attention to primarily to 2005-2015 because that is where the quasi-plateaus of the math growth stagnations are prominent in most of the participating districts and cities.

NOTE: the cities or districts are listed in the alphabetical order.

My presentation format for the 21 cities or districts of the USA for TUDA here:

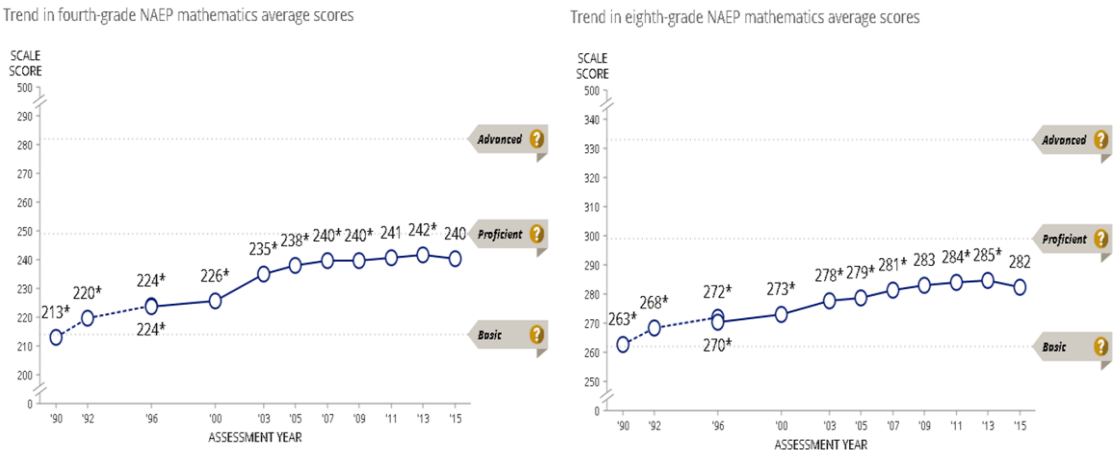
For each participating city (or districts), each page consists of 3 rows: on the top row, we put the timelines of the math growths of the 4th grade math. On the second row, we put the timelines of the math 8th grade. On the bottom 3rd row, we put the math percentile distribution growths: for the 4th grade to the left and for the 8th grade to the right.

As the NAEP measures the math growths of the grades 4 and 8, I expected some 4 years of math stagnations' time delays for the 8th grade math compared to the grade 4 math and this has been 86-95% confirmed in this observation paper.

A very critical note about the 2 types of the 4 year time lags: Since there are 4 years of gaps between the grade 4 and the grade 8, we found interesting pattern: 1) overall, the math growth saturations of the math average scores started around 2005-2007 for the grade 4. The math saturation for the grade 8 in each city seemed to kick in with about 4 years of time lag. You should carefully observe this pattern; 2) the math poverty 25 percentile closely mimics the 4 year time lags for about 90% of the time.

This is a more concrete indication that the math stagnations in the city or district levels are real, not just for the state or national level. So for the grade 4, the nationwide math stagnations kick in around 2005-2007 and subsequently the math stagnations of the grade 8 kicks in about 4 years later around 2009-2011 although there are variations of course.

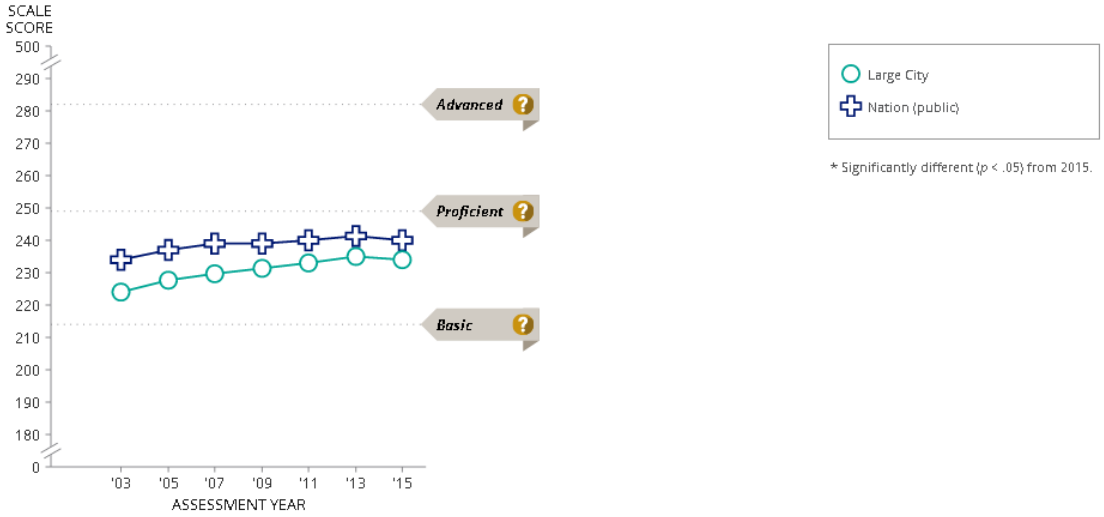
USA national NAEP math average stagnations with about 4 years of time lag between the grade 4 and the grade 8:



We can see clearly the stagnations kicks for the grade 4 by around 2005-2007 and for the grade 8 by around 2009-2011 about 4 years after the stagnation kicked in for the grade 4.[1]

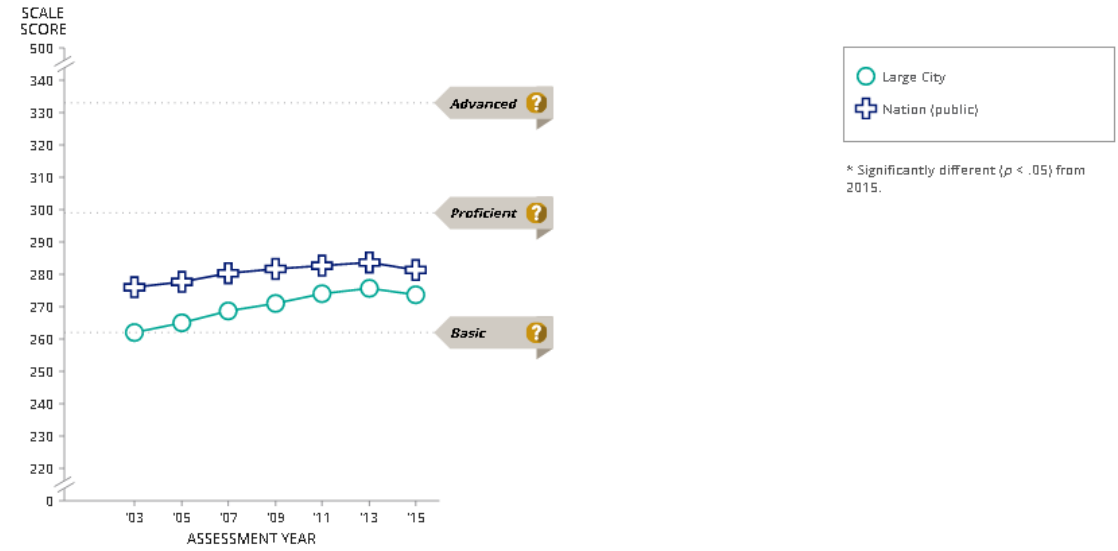
[1] We decided not to use a concrete definition for the math stagnations as it is obvious for anyone to see visually in the timeline charts that the stagnations are present without a doubt.

For the nationwide large city average, math Grade 4 timeline, the saturation may have arrived around 2013-2015; so the 4 year time lag cannot be observed yet in 2015.[2]



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

Click on a data point or key for more details. Click again to return to the overview for all categories.



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Large City

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	25	43	27	5	75
2013	25	42	27	6	75
2011	26	44	25	5	74
2009	28*	43	24*	5	72*
2007	30*	42	24*	4*	70*
2005	32*	43	21*	3*	68*
2003	37*	42	16*	2*	63*

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Large City

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	38	36	19	6	62
2013	35	38	21	6	65
2011	37	37	20	6	63
2009	40	36	18	5	60
2007	43*	35	17*	5*	57*
2005	47*	34	15*	4*	53*
2003	50*	34*	14*	3*	50*

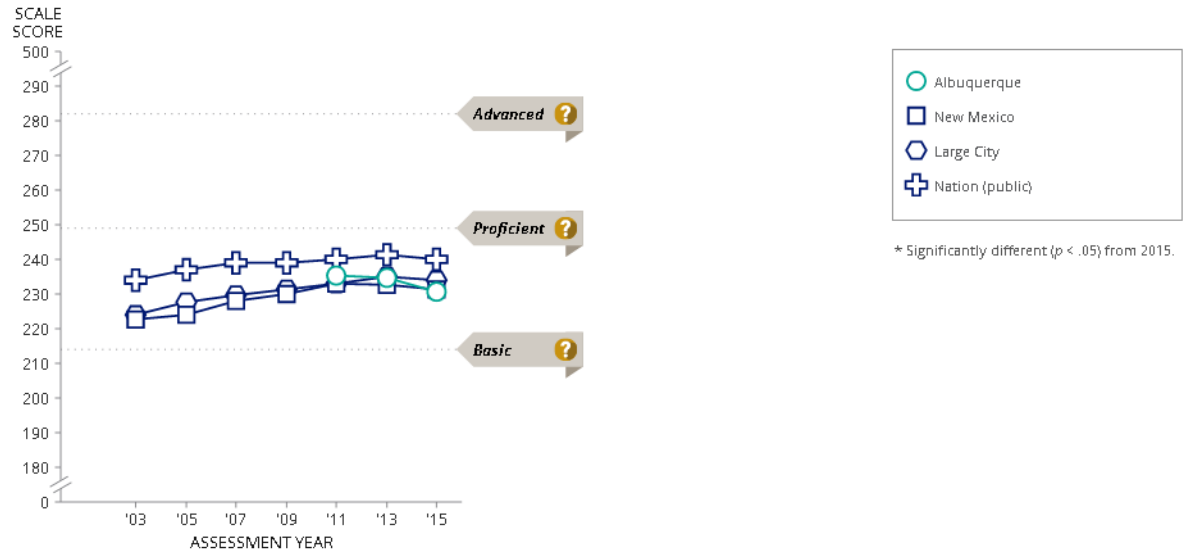
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

[2] As mentioned for the format of the presentation of this paper, from here on, the first row is for the math grade 4 and the second row is for the math grade 8.

20 big cities (or districts) of the USA to participaticate in TUDA of the NAEP: their math average stagnations for the grade 4 vs. grade 8 (confirmed 90-100% already by 2015)

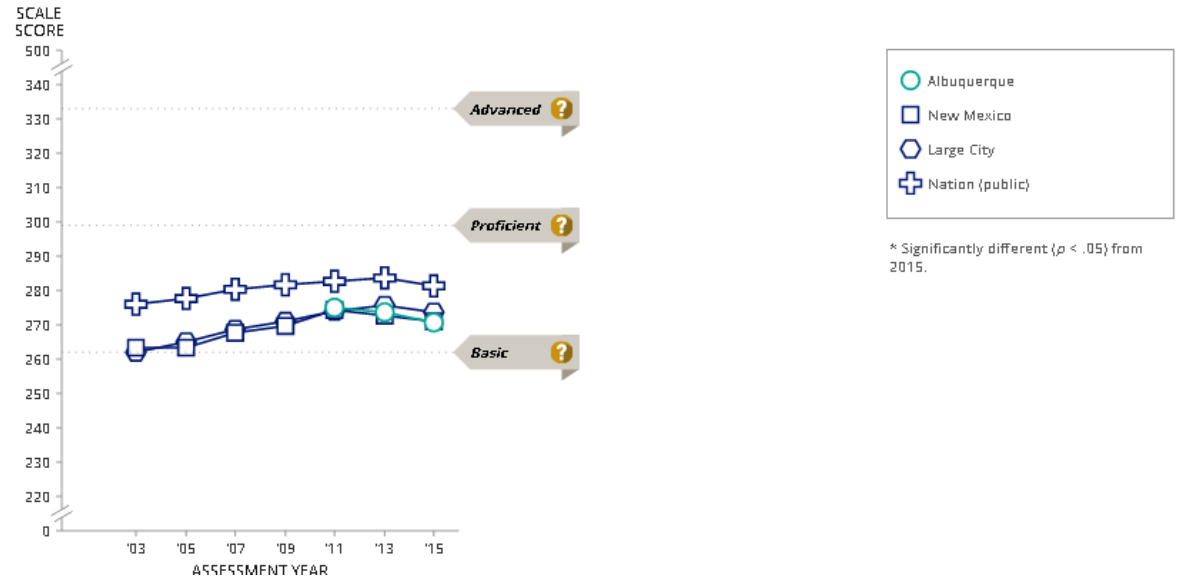
Albuquerque (confirming math saturation hypothesis; actually getting worse)

Albuquerque joined in 2011 and already have declined past 4 years as you can see clearly here.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

Click on a data point or key for more details. Click again to return to the overview for all categories.



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Albuquerque

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	28	44	25	4	72
2013	25	41	28	6	75
2011	24	42	28	6	76
2009	—				—
2007	—				—
2005	—				—
2003	—				—

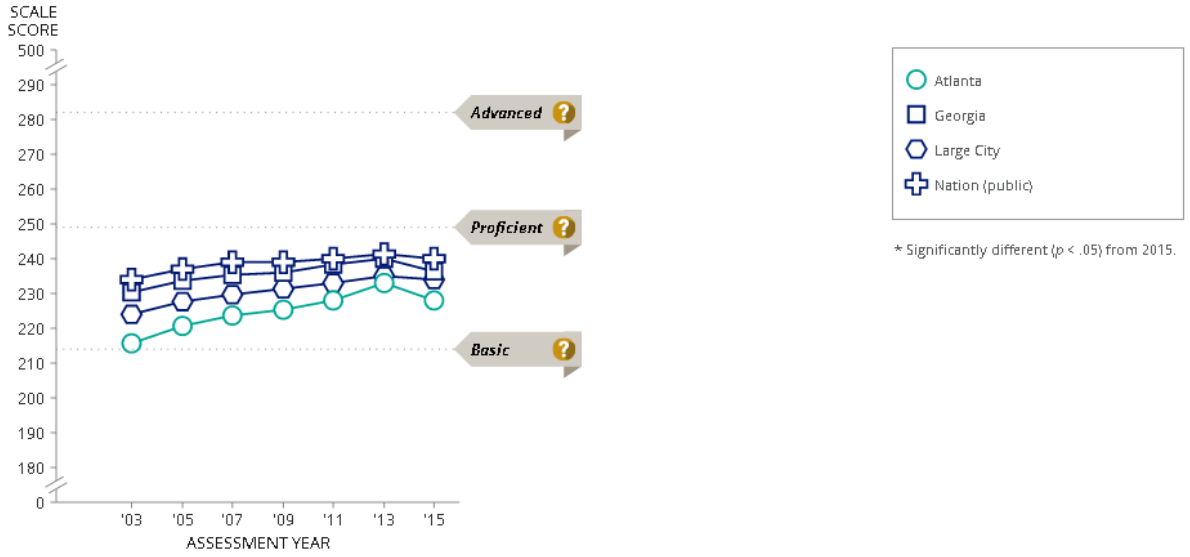
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Albuquerque

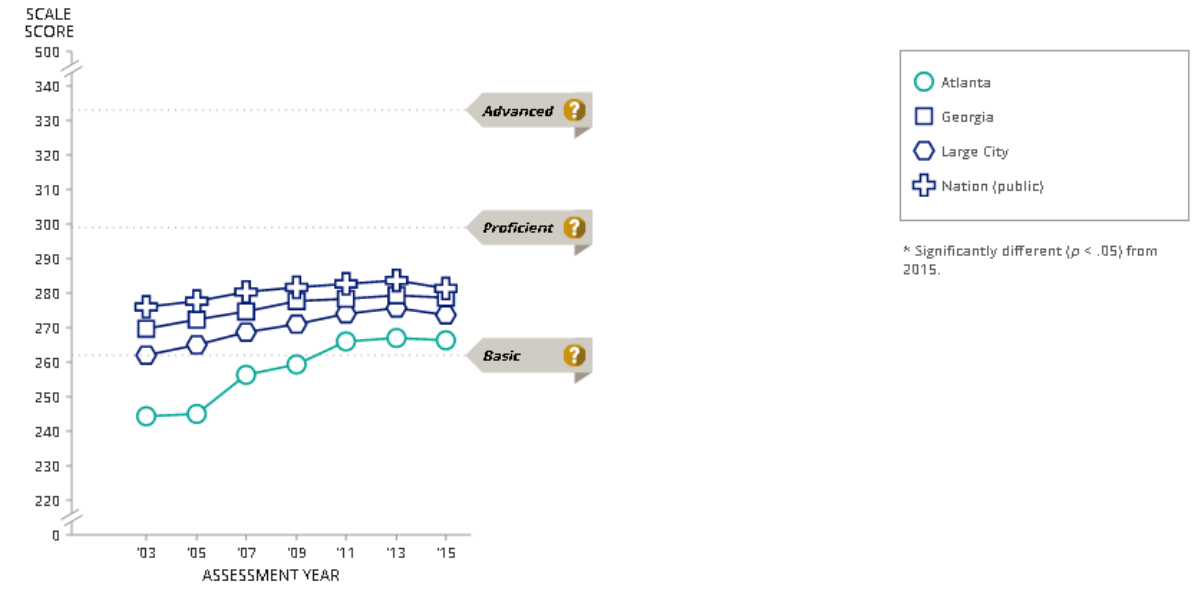
Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	39	40	17	4	61
2013	38	36	20	6	62
2011	37	37	21	5	63
2009	—				—
2007	—				—
2005	—				—
2003	—				—

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

Atlanta (confirming math saturation hypothesis), expecting decline in math grade 8 in 2017



Click on a data point or key for more details. Click again to return to the overview for all categories.



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Atlanta

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	35	39	21	5	65
2013	28*	41	24	7	72*
2011	34	41	19	5	66
2009	37	42	17	4	63
2007	39	41	17	3	61
2005	43*	40	14*	3	57*
2003	50*	37	11*	2*	50*

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

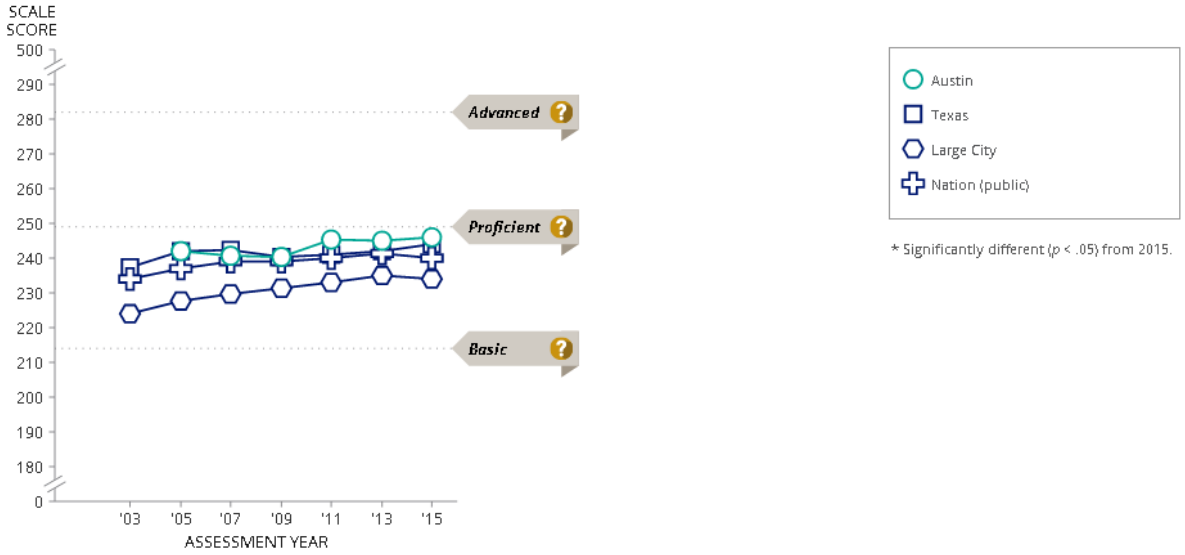
Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Atlanta

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	49	31	15	6	51
2013	46	37*	13	4	54
2011	46	38*	14	2*	54
2009	54	34	10*	1*	46
2007	59*	29	9*	2*	41*
2005	69*	24*	5*	1*	31*
2003	70*	24*	5*	1*	30*

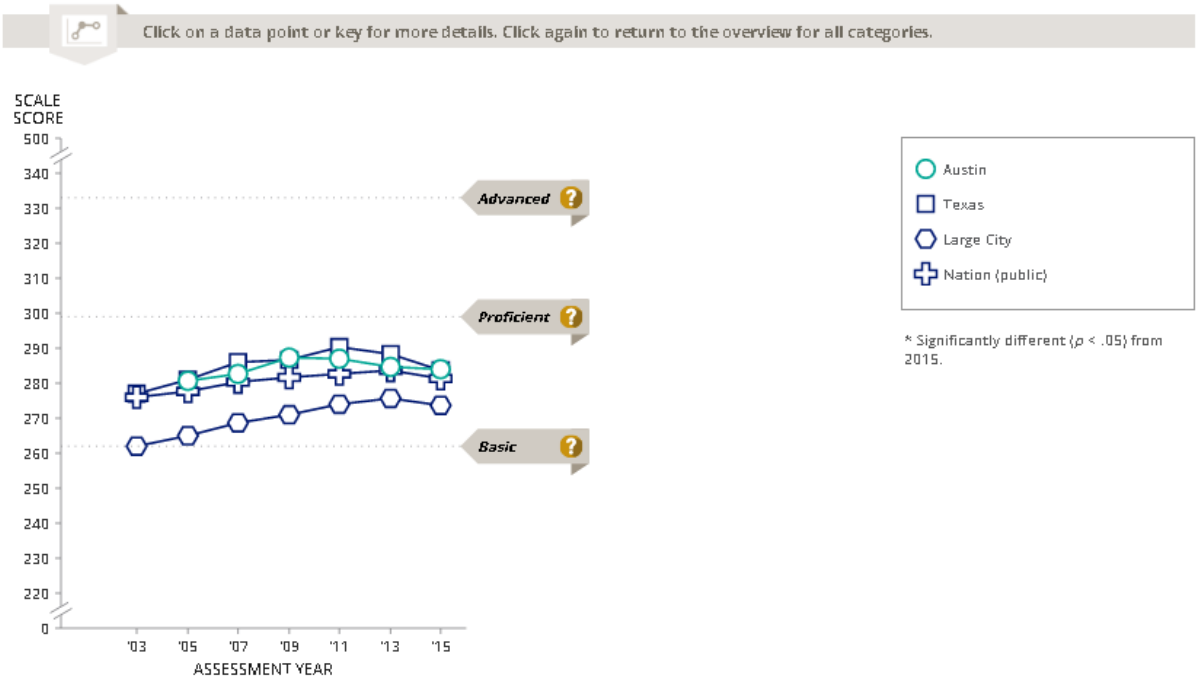
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

Austin (confirming math saturation hypothesis)

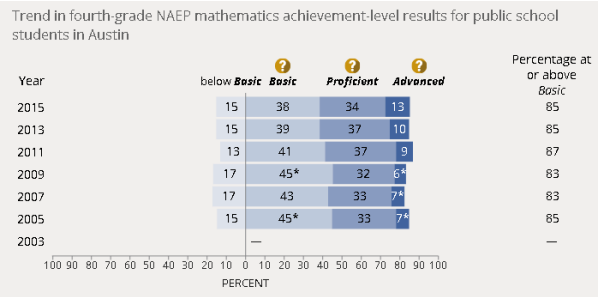
Austin's math grade 4 has been flat earlier since 2003 already and the grade 8 declining for 6 years already.



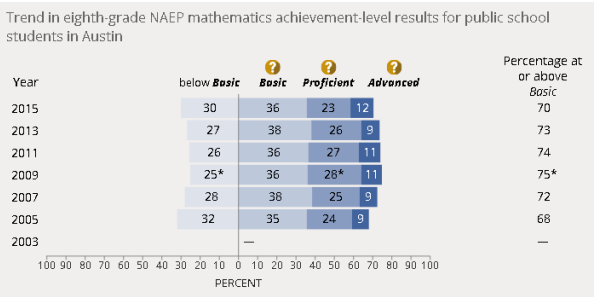
Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction



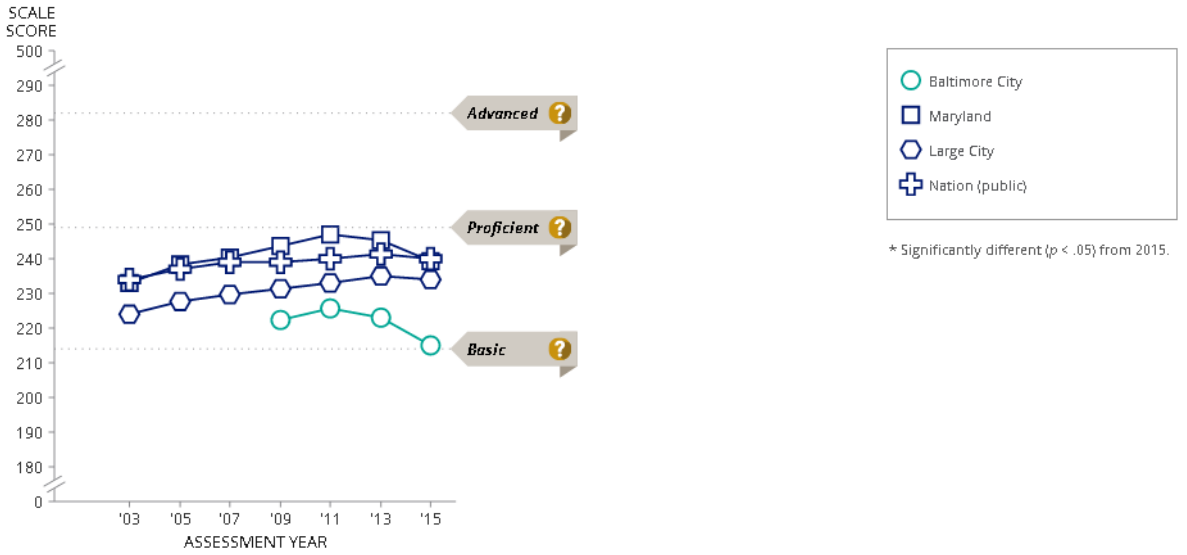
Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Austin



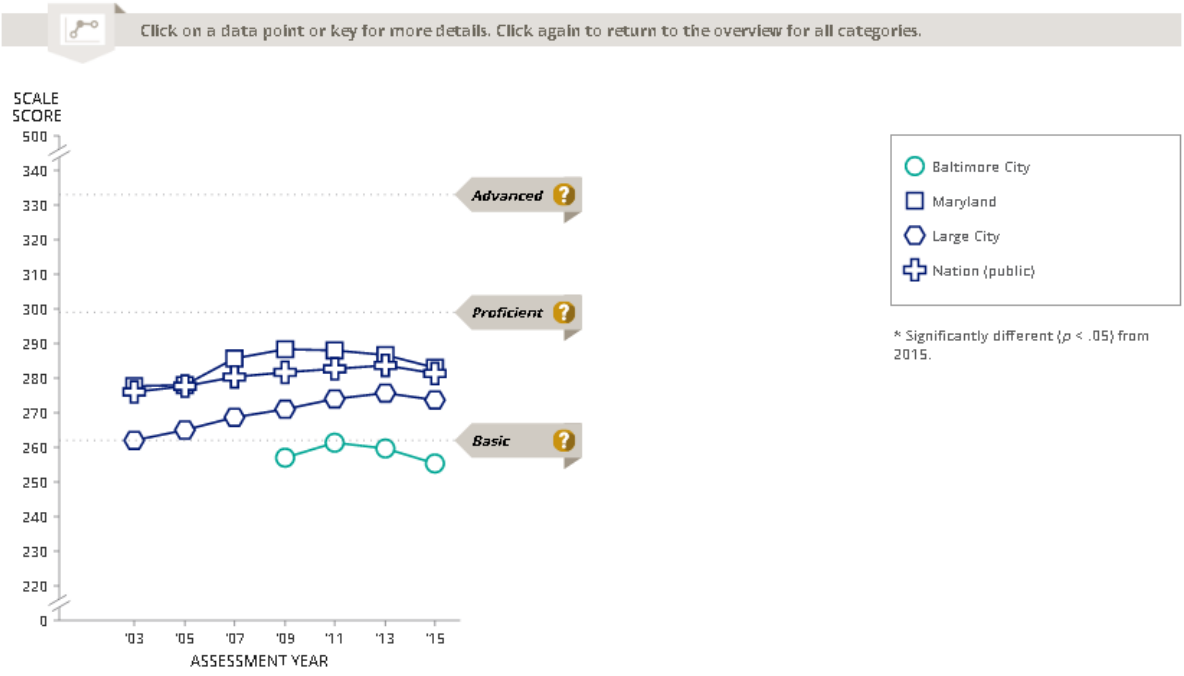
Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Austin



Baltimore City has been declining for both math grade 4 and 8 since 2011 already (confirming math saturation hypothesis), time lag (missing as both of the grade 4 and 8 are declining together).



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Baltimore City

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	49	39	11	1	51
2013	38*	43	17*	2	62*
2011	32*	51*	16*	1	68*
2009	36*	51*	12	1	64*
2007	—	—	—	—	—
2005	—	—	—	—	—
2003	—	—	—	—	—

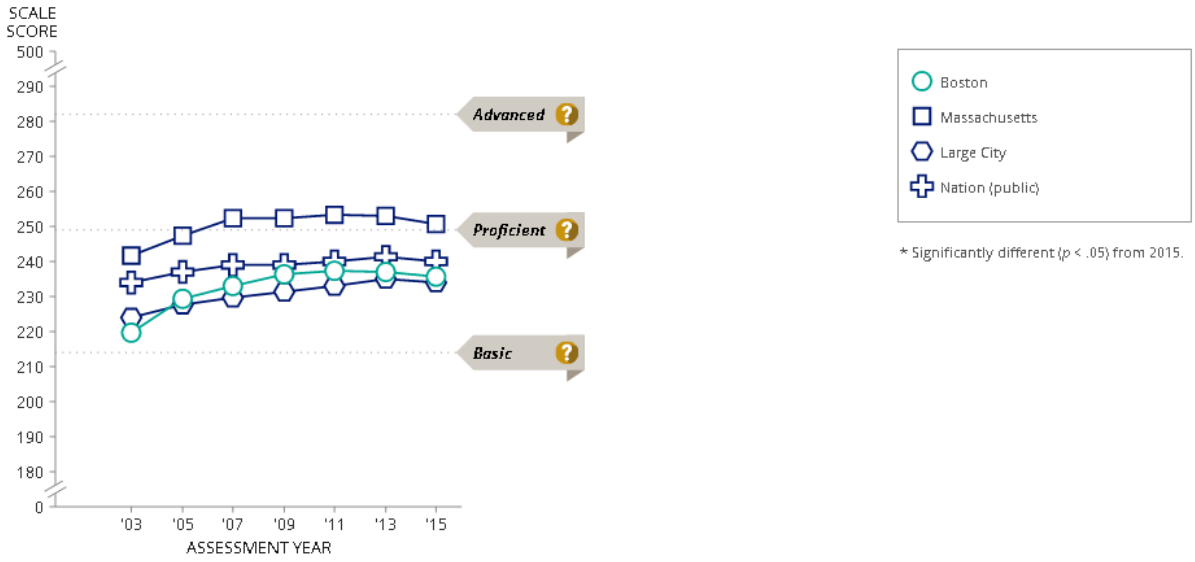
PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Baltimore City

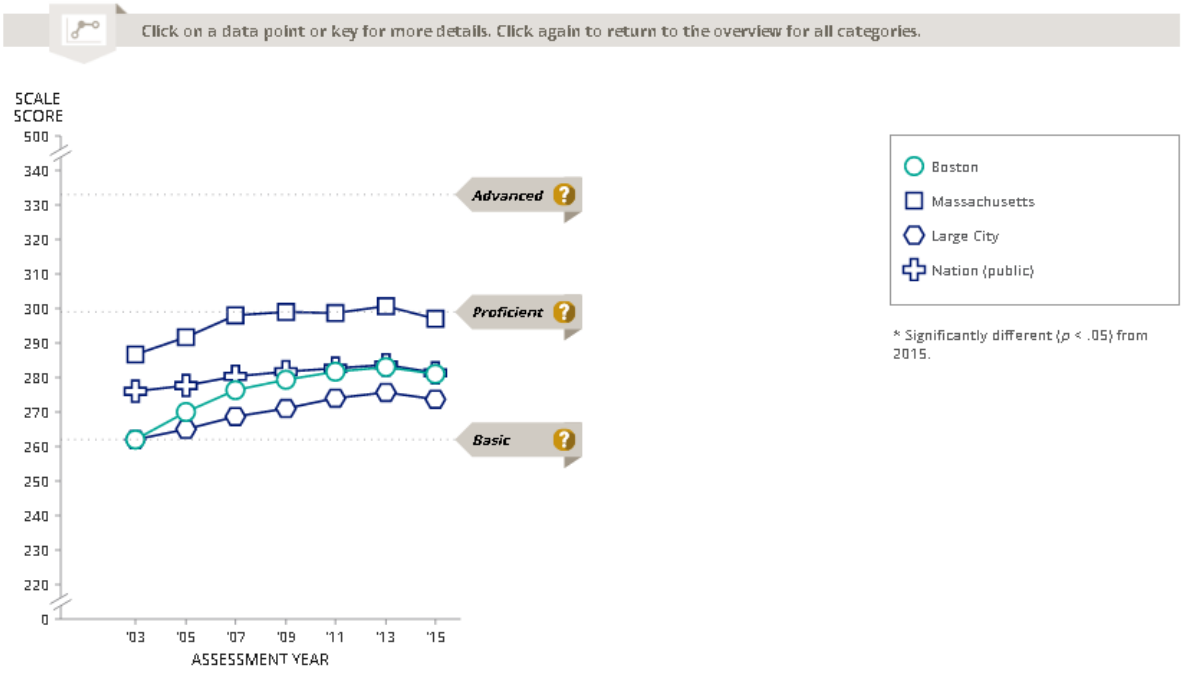
Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	59	29	9	3	41
2013	54	33	10	3	46
2011	52*	35	11	2	48*
2009	57	33	9	1*	43
2007	—	—	—	—	—
2005	—	—	—	—	—
2003	—	—	—	—	—

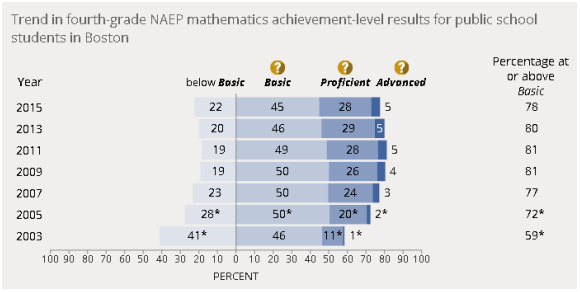
PERCENT

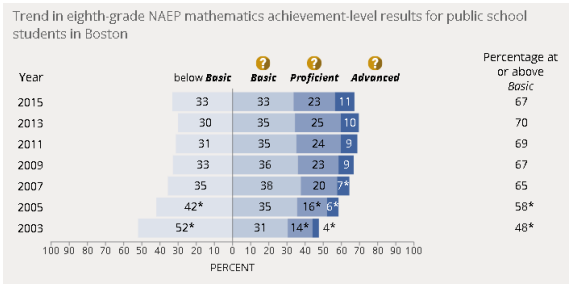
Boston (confirming math saturation hypothesis), time lag (confirmed): the grade 4 saturation around 09 and the grade 8 saturation around 11-13.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

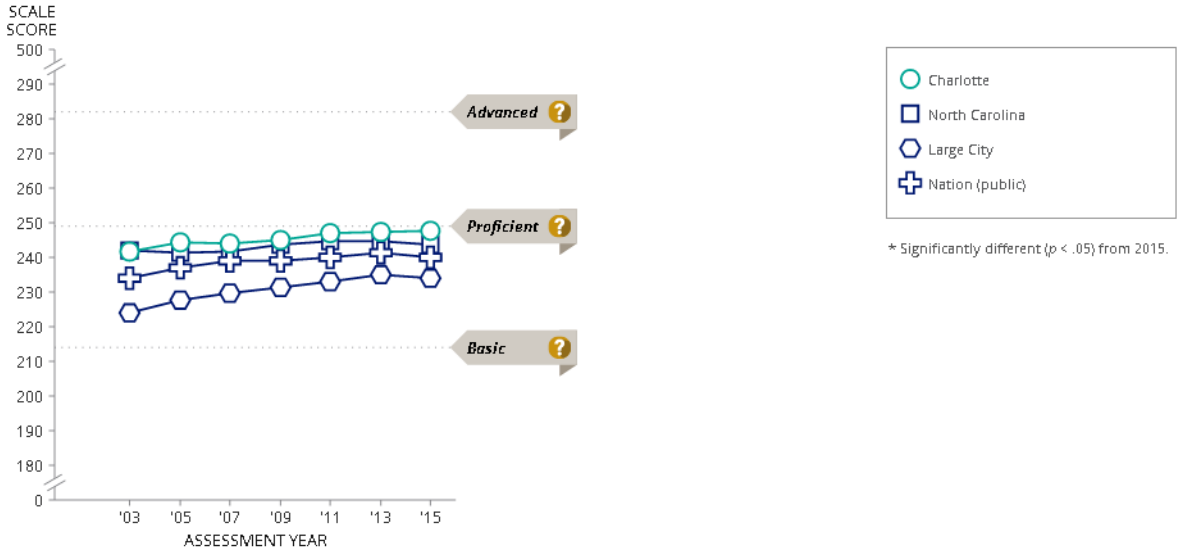




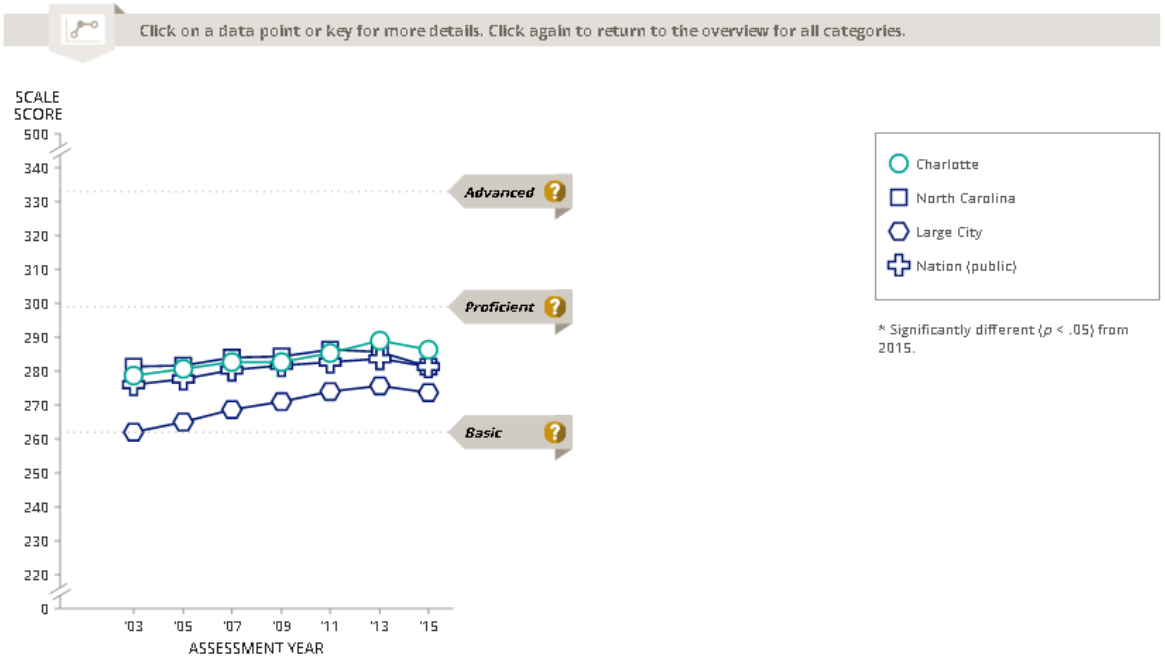


Charlotte (confirming math saturation hypothesis), 4 year time lag (confirmed): grade 4 saturation 09-11 and the grade 8 saturation 13-15.

NOTE: for Charlotte, the math stagnation kicked in earlier by 2003 for Gr 4 and by 2007 for Gr 8.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Charlotte

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	13	35	39	12	87
2013	13	37	39	11	87
2011	12	40	39	9	88
2009	14	41*	35	10	86
2007	15	41*	36	8*	85
2005	14	41	35	9	86
2003	16	43*	35	6*	84

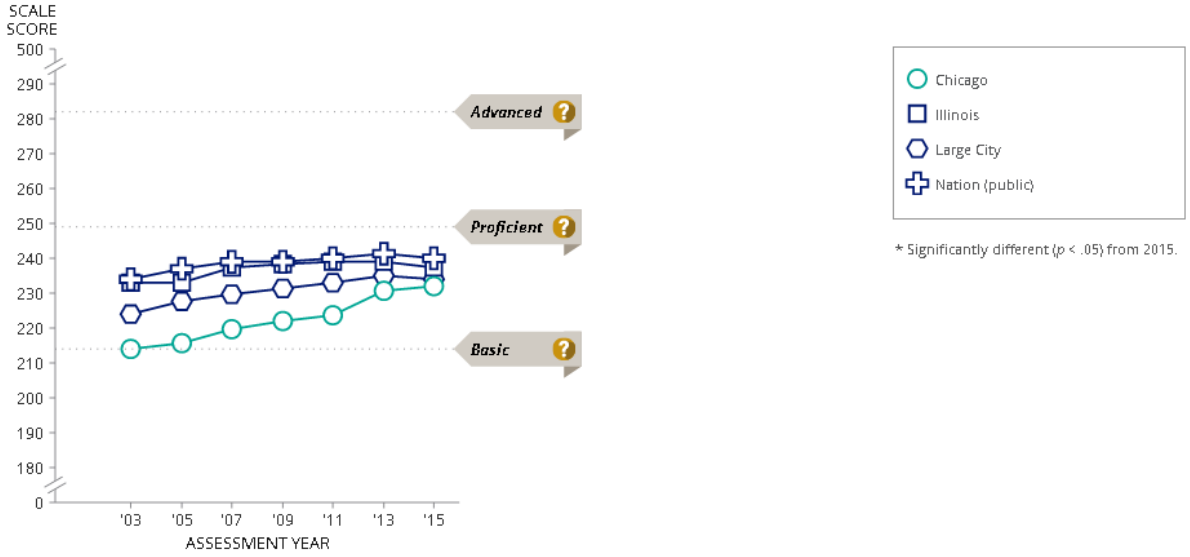
PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Charlotte

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	29	32	25	14	71
2013	25	35	26	14	75
2011	28	36	25	12	72
2009	28	39*	24	8*	72
2007	30	36	23	10*	70
2005	31	36	24	9*	69
2003	33	36	24	7*	67

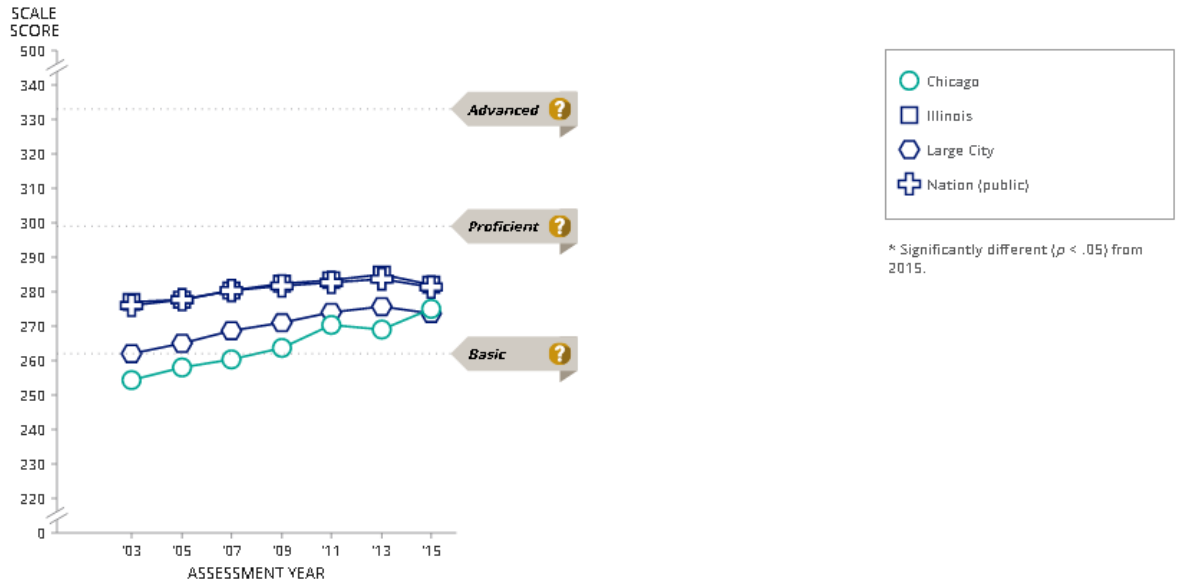
PERCENT

Chicago (not confirming yet as the math saturation hypothesis with a notable delay), for 4 year time lag, we may see the saturations of math grade 8 around 17-19 as the math grade 4 saturation seemed to start around 2015. NOTE: the math stagnations are kicking in several years later than the national average, starting about 2011-2013 instead of 2005-2009.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

Click on a data point or key for more details. Click again to return to the overview for all categories.



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Chicago

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	29	41	24	6	71
2013	30	42	22	5	70
2011	36*	44	16*	2*	64*
2009	38*	44	16*	2*	62*
2007	42*	41	15*	1*	58*
2005	48*	38	12*	1*	52*
2003	50*	40	9*	1*	50*

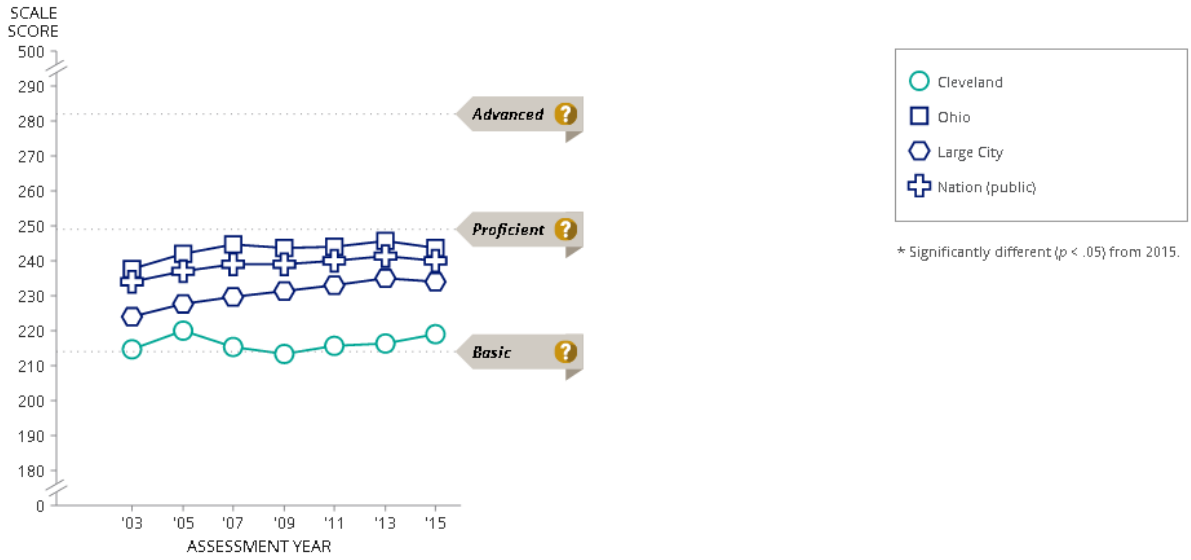
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Chicago

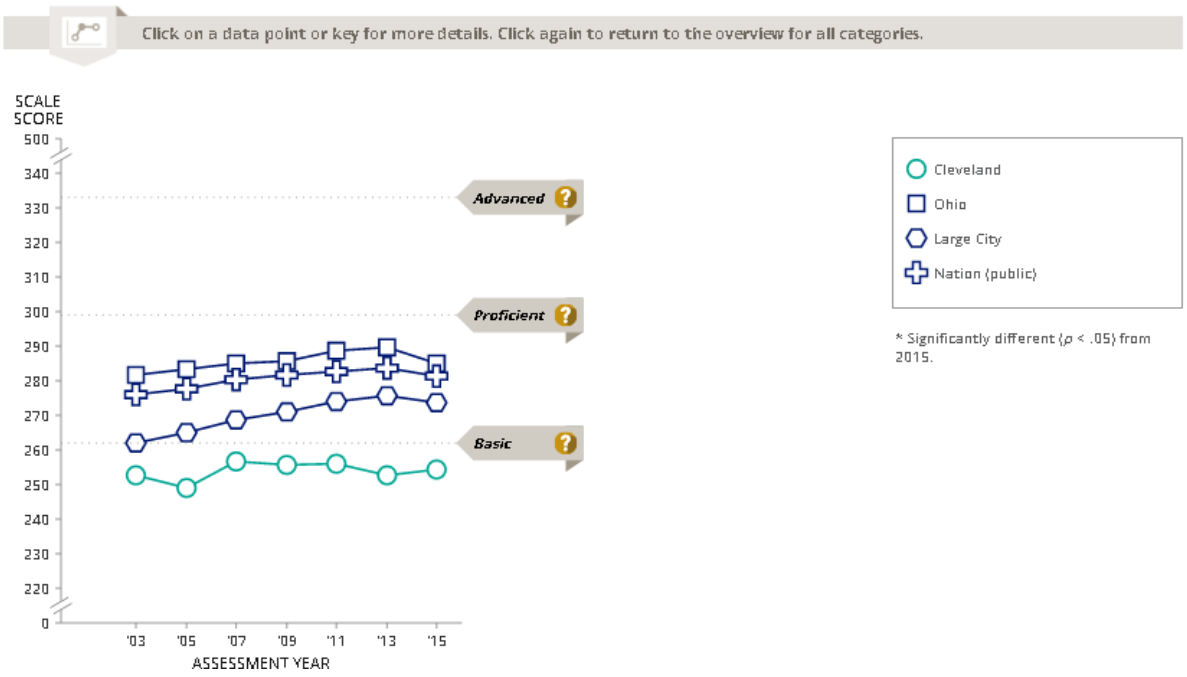
Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	38	37	19	7	62
2013	43	37	16	4	57
2011	40	40	17	3	60
2009	49*	36	13*	2*	51*
2007	51*	36	11*	2*	49*
2005	55*	34	9*	2*	45*
2003	58*	33	8*	1*	42*

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

Cleveland (confirming math saturation hypothesis), 4 year time lag: grade 4 saturation by 07 and the grade 8 saturation 09-11.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Cleveland

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	42	45	13	1	58
2013	46	41	12	1	54
2011	47	42	10	#	53
2009	49*	43	8*	#	51*
2007	47	43	10	#	53
2005	40	47	12	#	60
2003	49*	41	9	#	51*

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

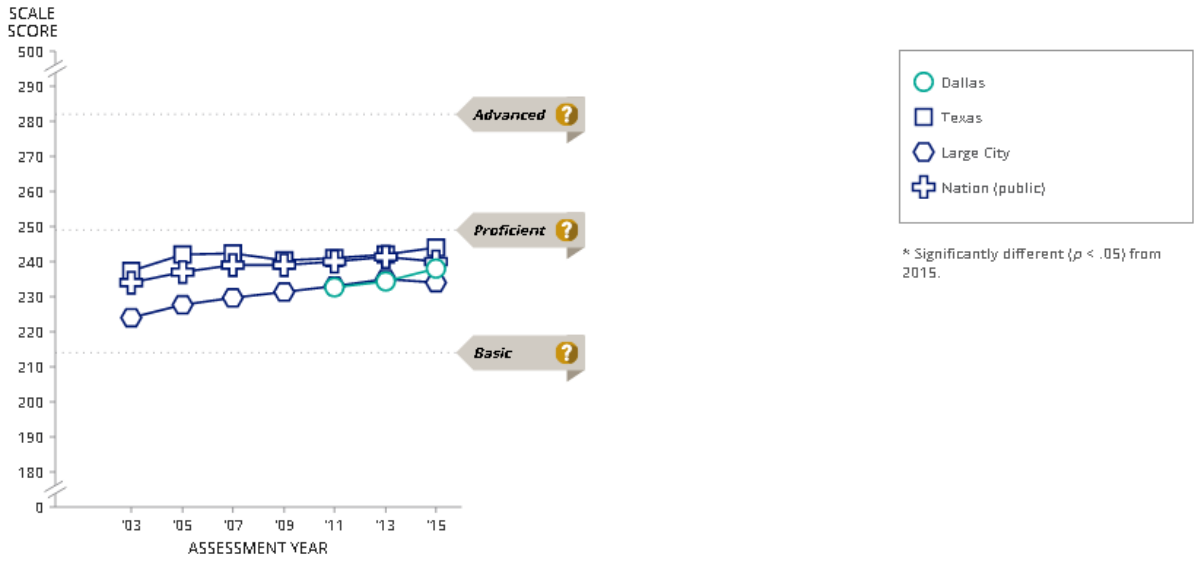
Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Cleveland

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	60	31	8	1	40
2013	61	29	8	1	39
2011	59	30	9	1	41
2009	58	35	7	1	42
2007	55	38*	7	#	45
2005	66	28	6	#	34
2003	62	31	6*	#	38

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

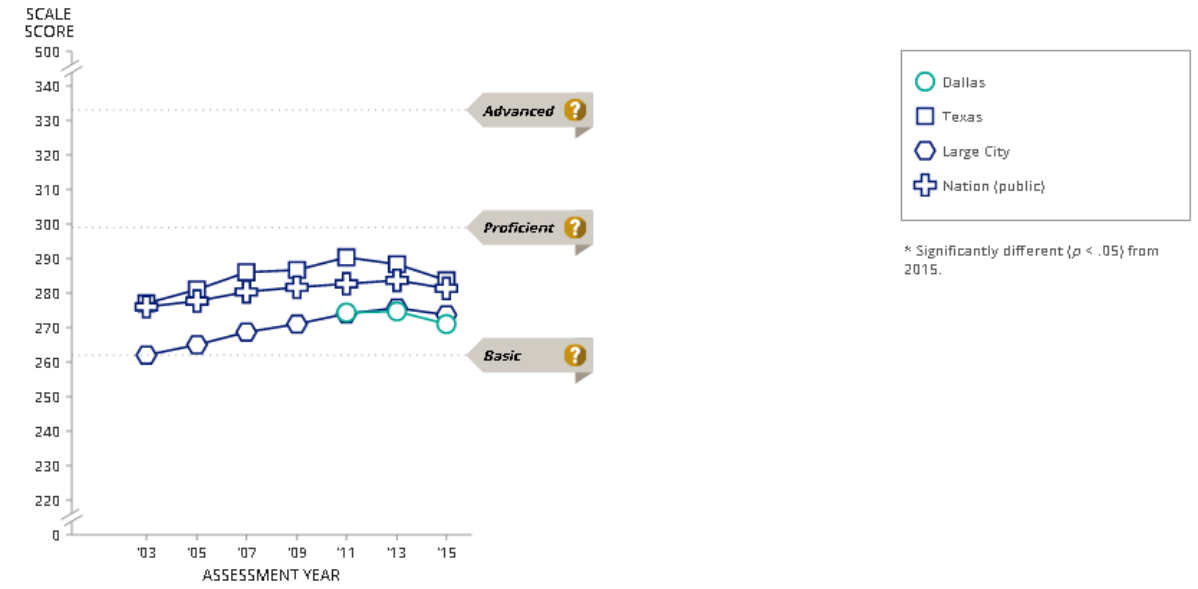
Dallas (not quite confirming math saturation hypothesis), 4 year time lag: for the grade 4, the 2015 had a bit of growth, but for the Below Basic, both grades 4 and 8 have reached the saturations.

Dallas joined in 2011 and by 2011 the math stagnation had taken place already.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

Click on a data point or key for more details. Click again to return to the overview for all categories.



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Dallas

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	18	47	30	5	82
2013	22	47	28	3	78
2011	21	54*	23*	2*	79
2009	—				—
2007	—				—
2005	—				—
2003	—				—

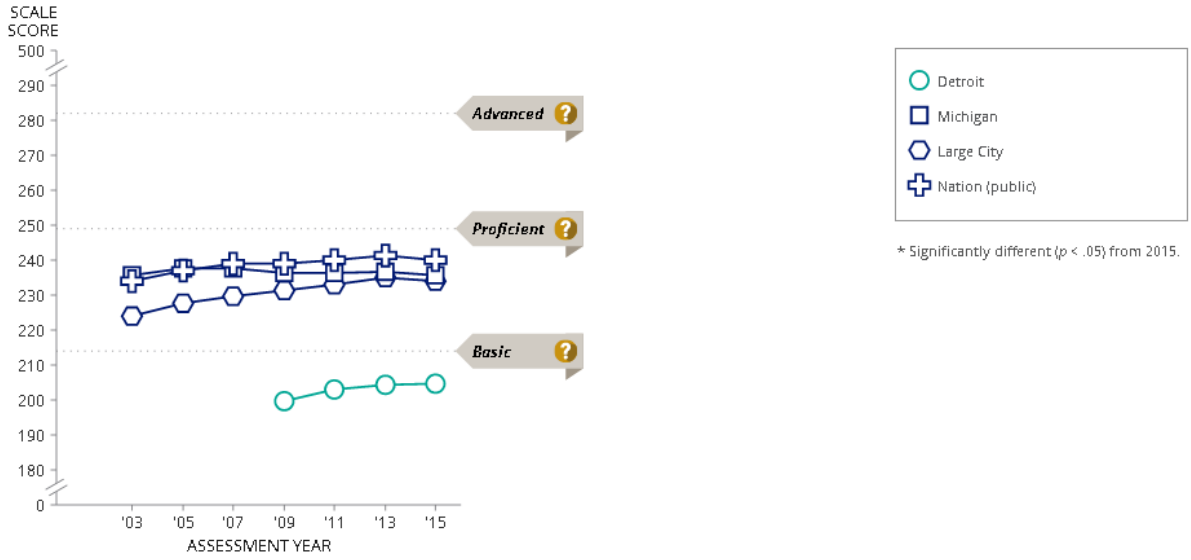
PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Dallas

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	40	40	17	3	60
2013	33*	44	20	3	67*
2011	36	42	19	3	64
2009	—				—
2007	—				—
2005	—				—
2003	—				—

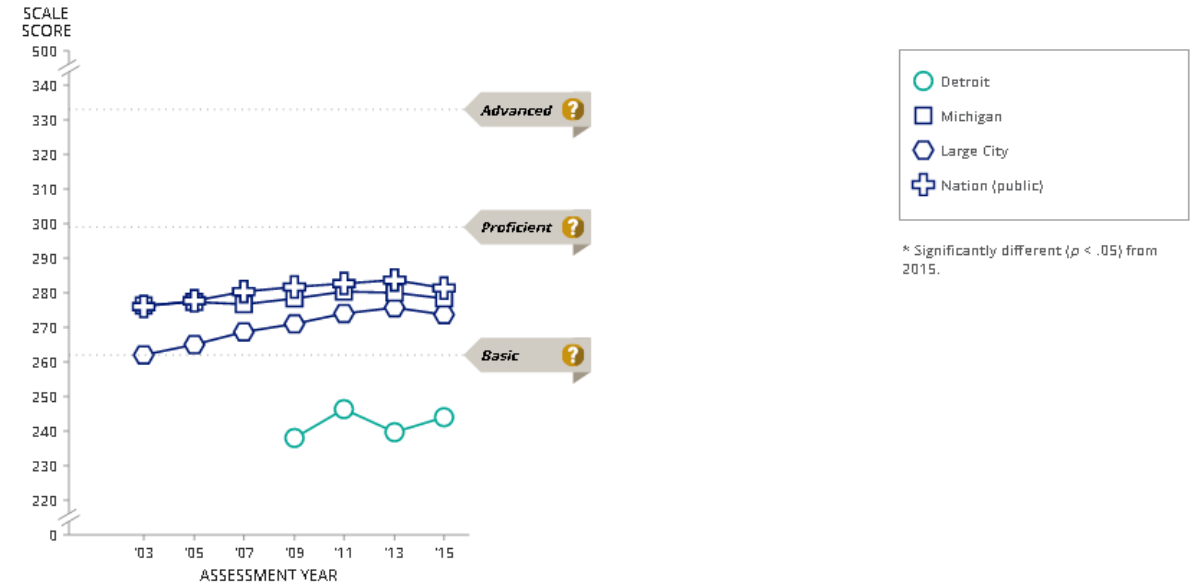
PERCENT

Detroit (confirming math saturation hypothesis), time lag: for the grade 4, the saturation around 11 started and for the grade 8, there have been fluctuations since 2009 with the seeming simultaneously without time delays. Note: Detroit joined a bit later in 2009 and by 2009-2011, their math stagnation seemed to have taken place.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

Click on a data point or key for more details. Click again to return to the overview for all categories.



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Detroit

Year	below Basic	Basic	Proficient	Advanced		Percentage at or above Basic
2015	64	31	4	#		36
2013	65	31	4	#		35
2011	66	31	3	#		34
2009	69	28	3	#		31
2007	—	—	—	—		—
2005	—	—	—	—		—
2003	—	—	—	—		—

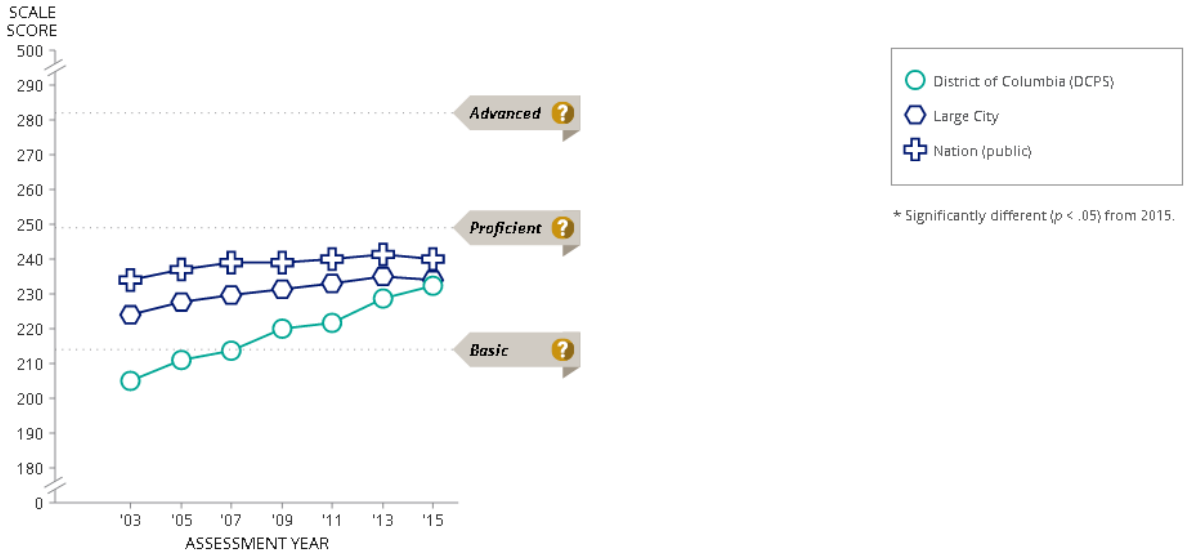
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Detroit

Year	below Basic	Basic	Proficient	Advanced		Percentage at or above Basic
2015	73	23	4	#		27
2013	76	21	3	#		24
2011	71	25	4	#		29
2009	77	18	4	#		23
2007	—	—	—	—		—
2005	—	—	—	—		—
2003	—	—	—	—		—

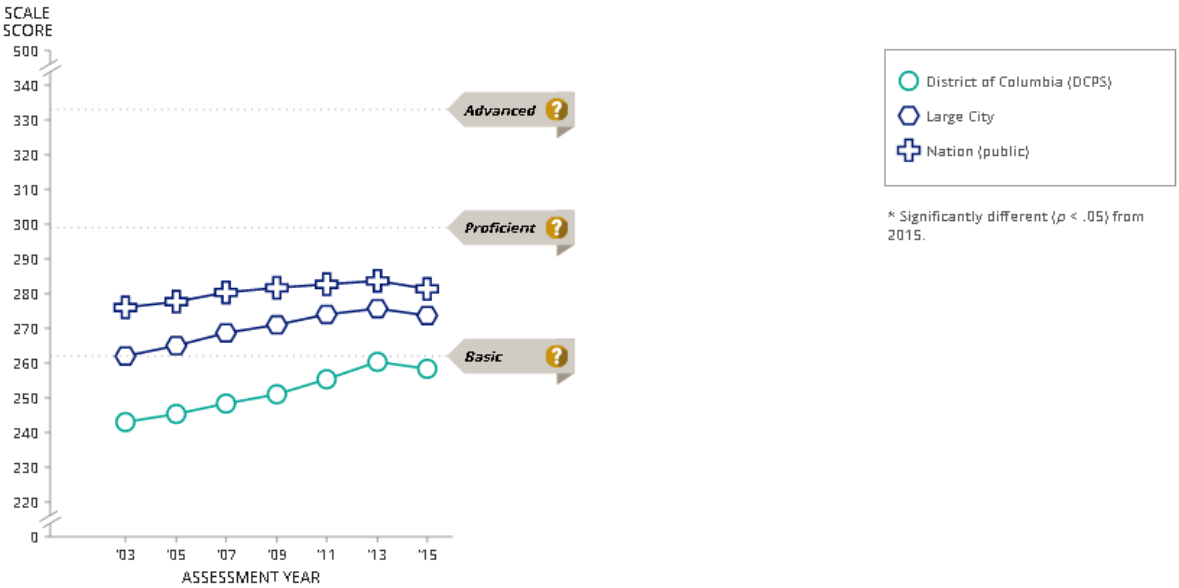
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

District of Columbia (DCPS) (NOT EXACTLY confirming math saturation hypothesis, but by 2013-2015, it has significantly slowed down its math growth, but the grade 8 had a dip actually earlier than the grade 4; as the grade 4 had been growing still till 2015, we cannot deal with the 4 year time lag yet.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

Click on a data point or key for more details. Click again to return to the overview for all categories.



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in District of Columbia (DCPS)

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	32	35	24	9	68
2013	36	35	22	8	64
2011	41*	35	18*	5*	59*
2009	43*	38	15*	4*	57*
2007	51*	36	11*	3*	49*
2005	55*	35	8*	1*	45*
2003	64*	29*	6*	1*	36*

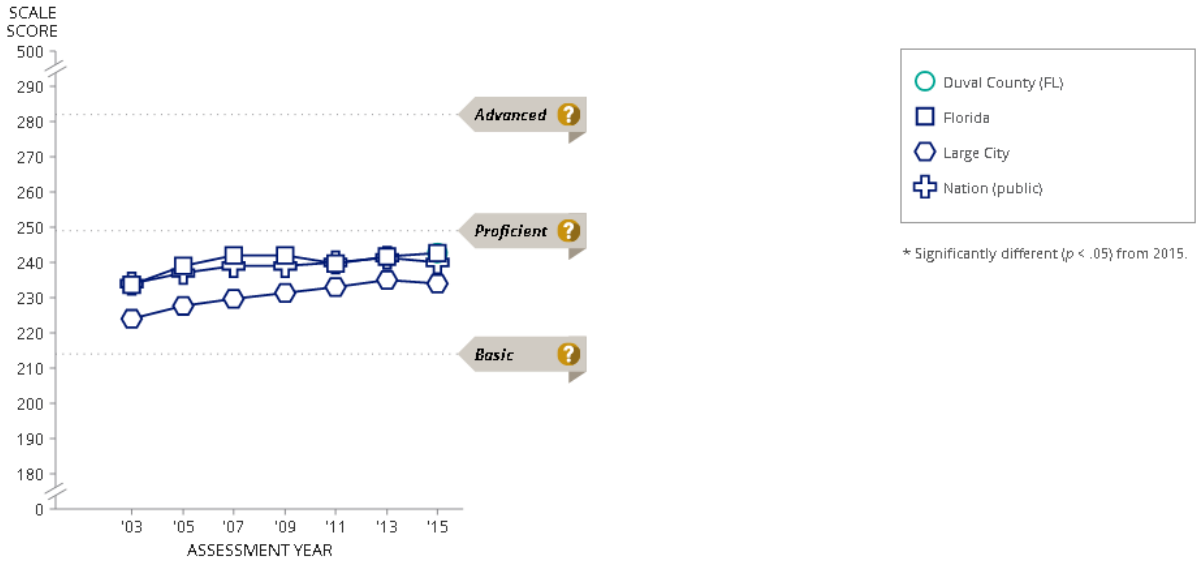
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in District of Columbia (DCPS)

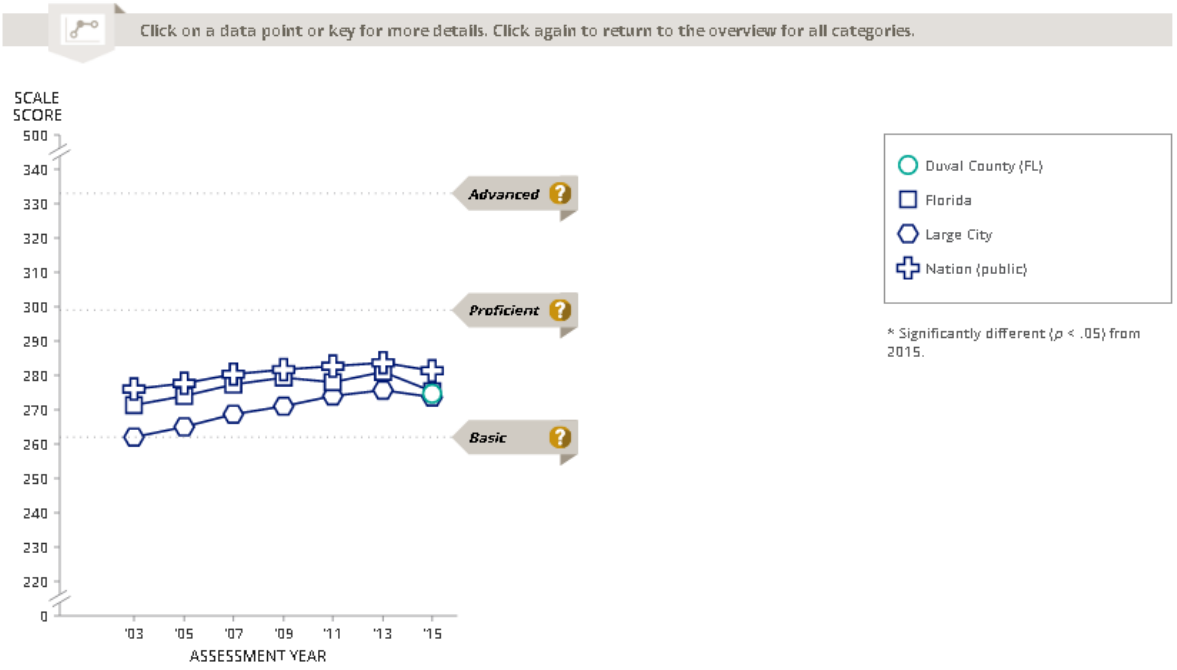
Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	54	28	13	5	46
2013	53	30	12	4	47
2011	58	27	11	4	42
2009	62*	26	9*	3	38*
2007	66*	26	7*	1*	34*
2005	69*	24	5*	2*	31*
2003	71*	23*	5*	1*	29*

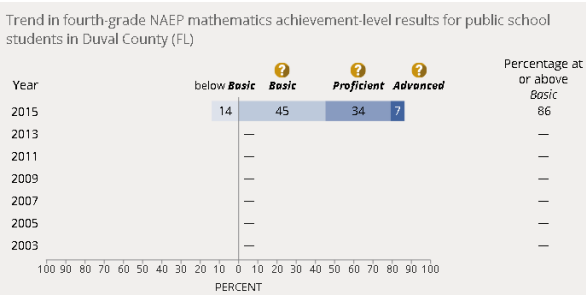
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

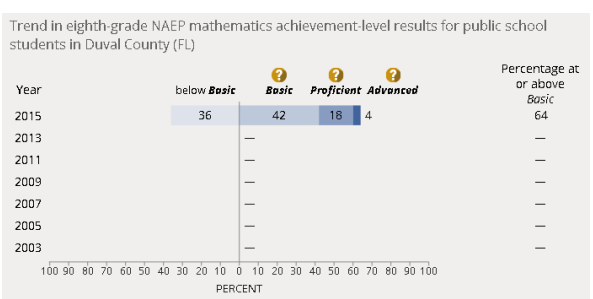
Duval (cannot either confirm or deny the math saturation hypothesis because it joined in 2015)
Note: Duval average is basically aligned with Florida average, which had been stagnating for a decade or so. So the chances are that it had been stagnating similar to the Florida average.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

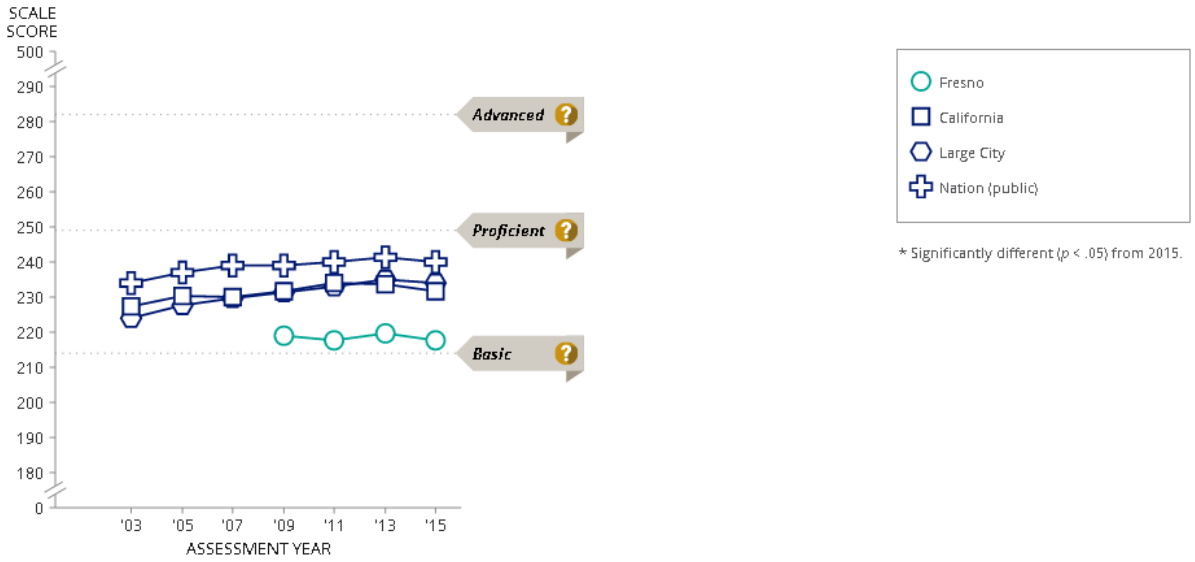






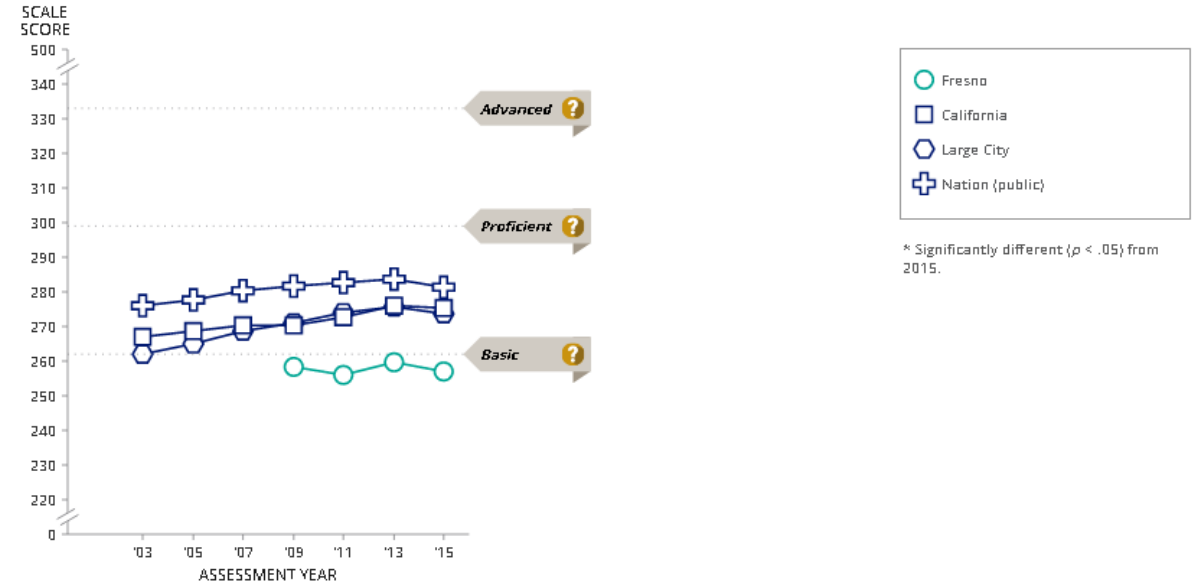
Fresno (confirming math saturation hypothesis), time lag is hard to confirm as the saturation had been in pace in 2009 when it joined.

Note: Fresno joined in 2009, but by then its math stagnations had taken place already.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

Click on a data point or key for more details. Click again to return to the overview for all categories.



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Fresno

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	45	41	13	1	55
2013	41	43	14	1	59
2011	44	41	13	1	56
2009	42	44	14	1	58
2007	—				—
2005	—				—
2003	—				—

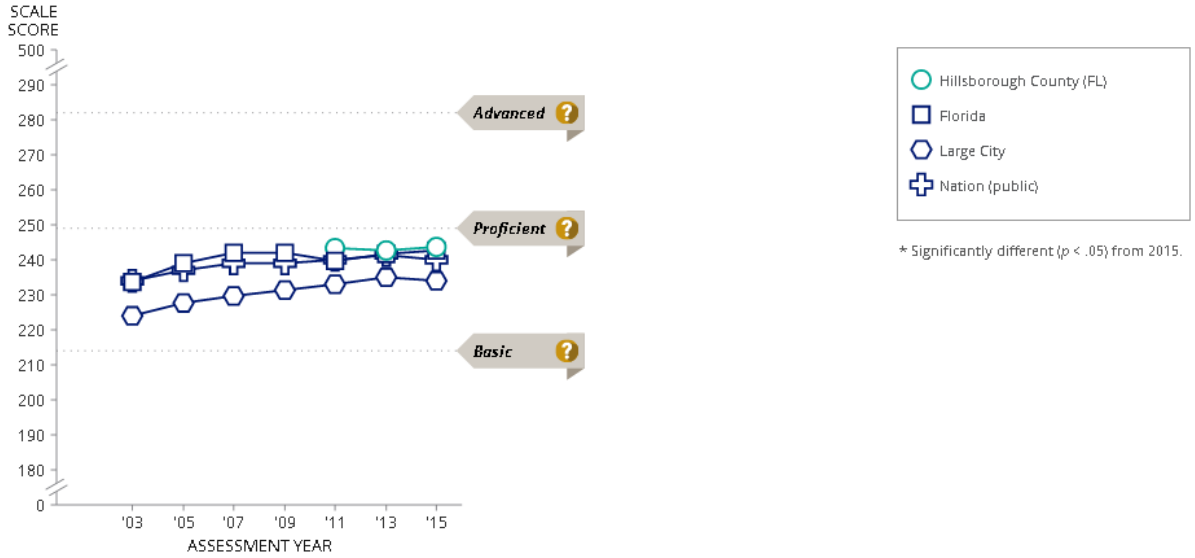
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Fresno

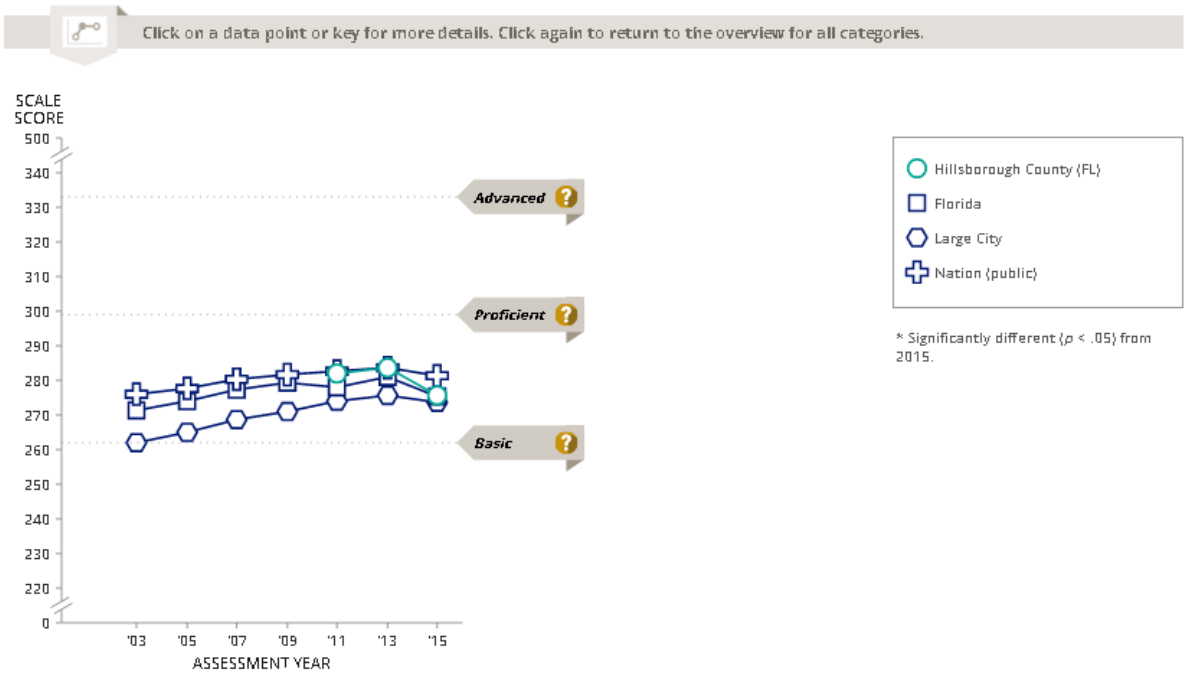
Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	56	31	11	1	44
2013	52	36	11	1	48
2011	57	29	11	2	43
2009	54	31	12	3*	46
2007	—				—
2005	—				—
2003	—				—

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

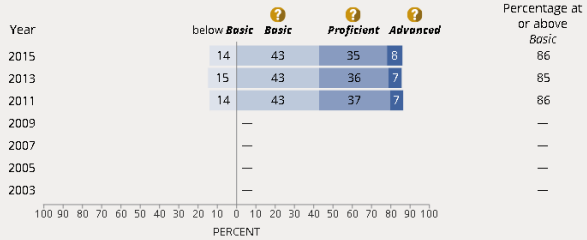
Hillsborough (FL) (confirming math saturation hypothesis by the year 2011 it joined), 4 year time lag (irrelevant as the grade 8 dipped in 2015 before the dip of the grade 4).



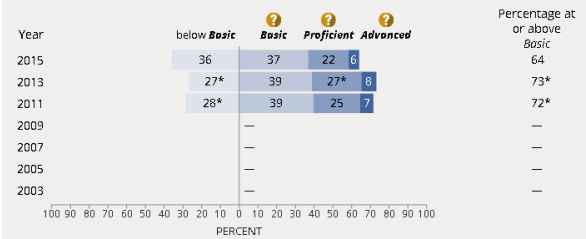
Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Hillsborough County (FL)

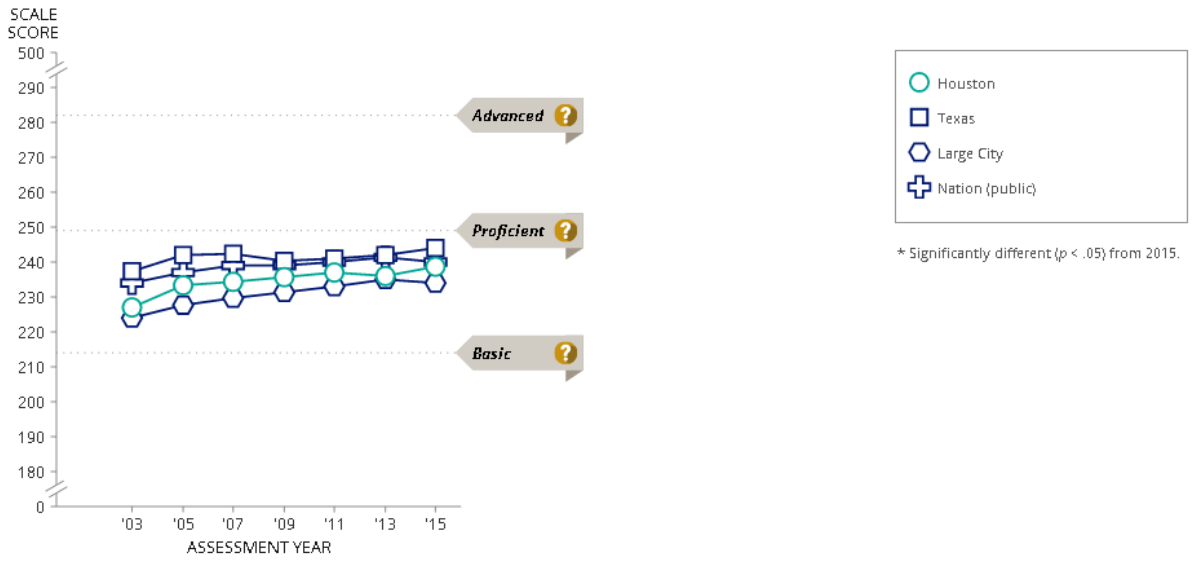


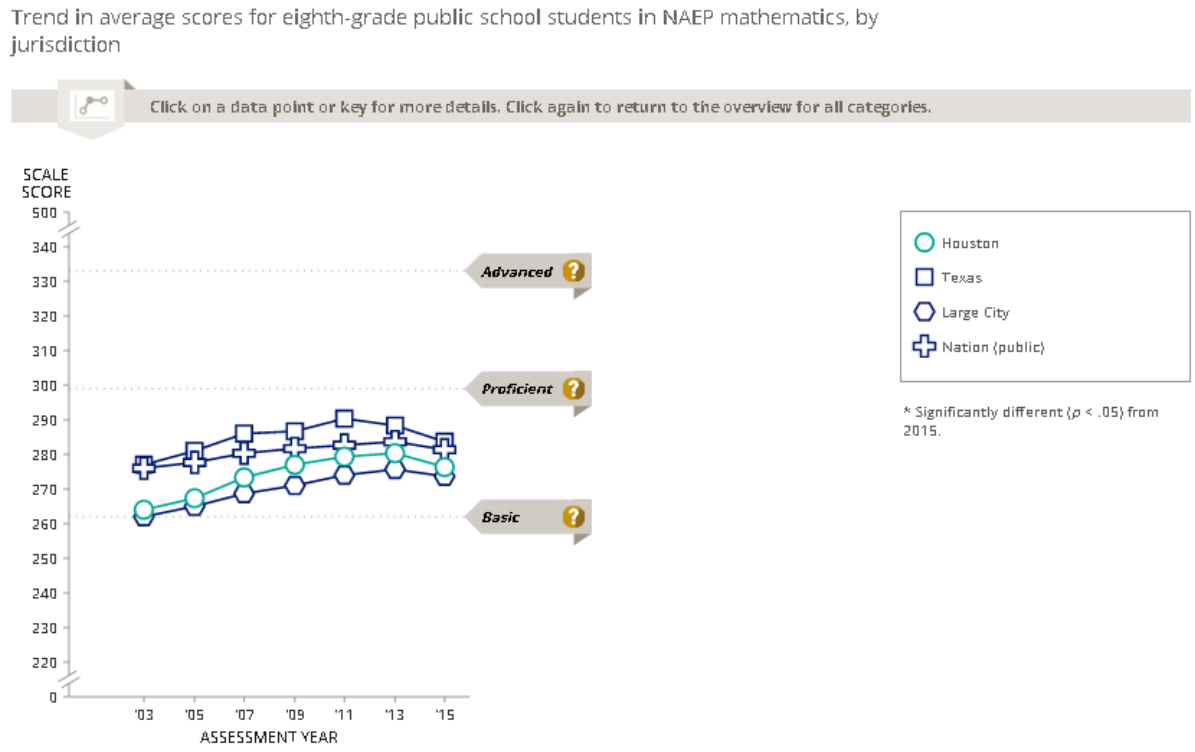
Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Hillsborough County (FL)

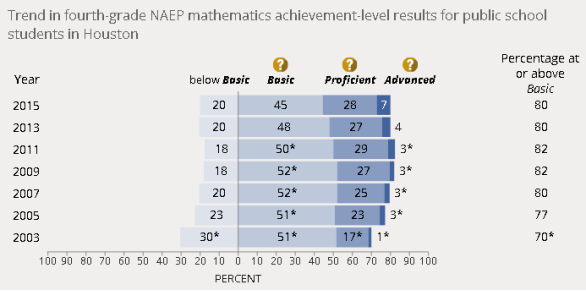


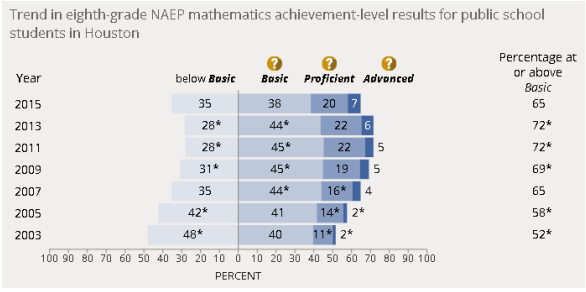
Houston (confirming math saturation hypothesis), 4 year time lag (confirmed as the grade 4 saturation starting 09-11 and the grade 8 had 13-15 saturation and even the dip in 2015).

Note: by 2005-2007, the math saturation became real.

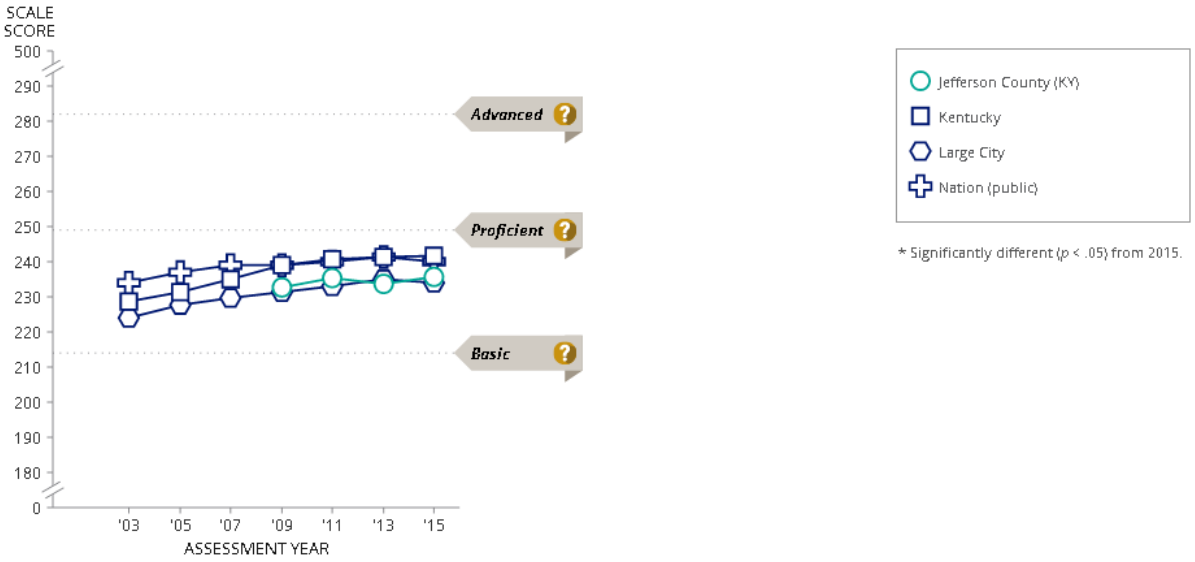




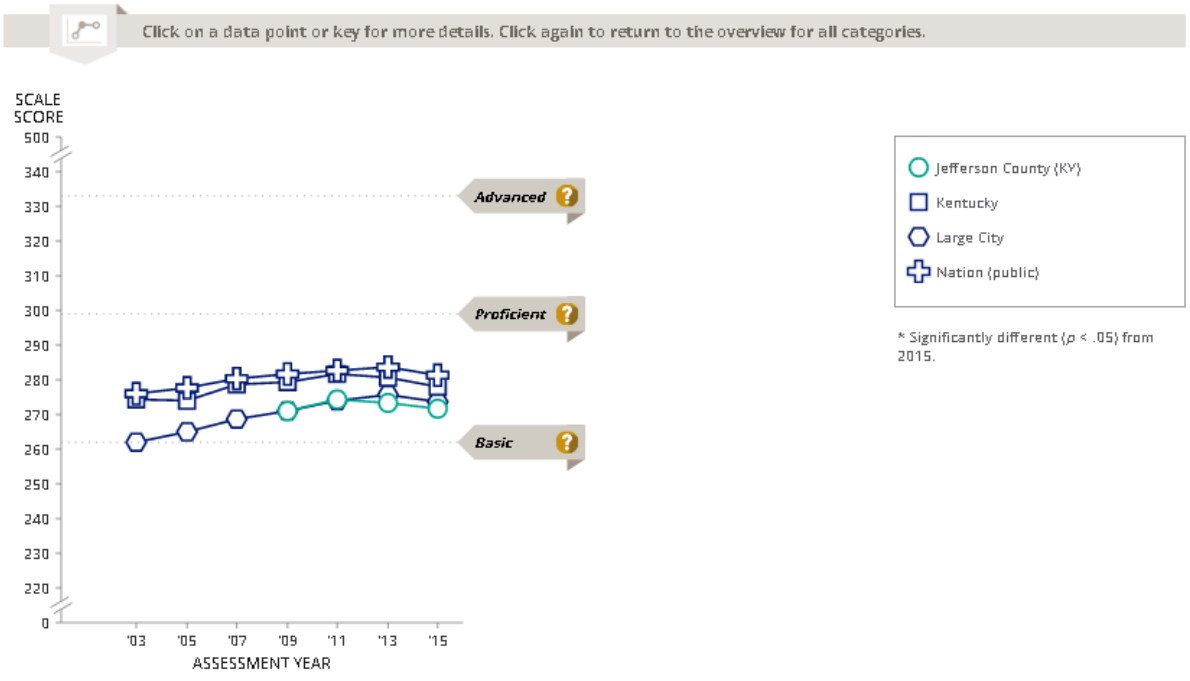


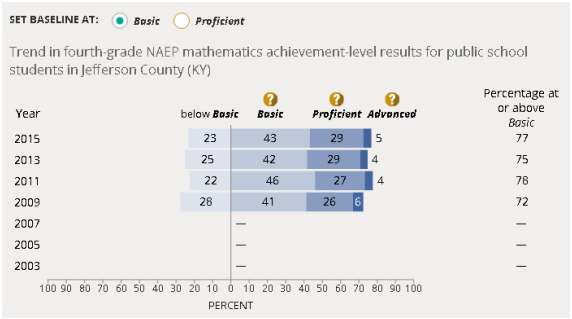


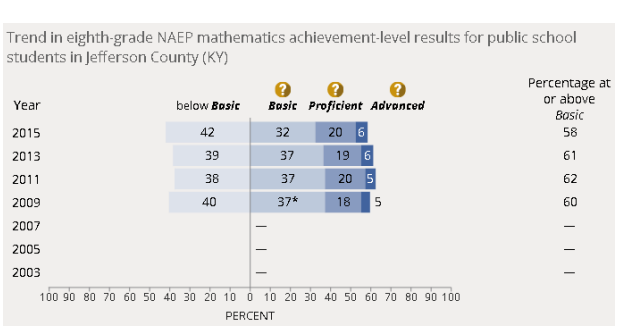
Jefferson country (confirming math saturation hypothesis) when Jefferson county (KY) joined a bit later in 2009 and by then the math stagnations had taken place already, time lag (irrelevant as both grades 4 and 8 had been saturation by 2009).



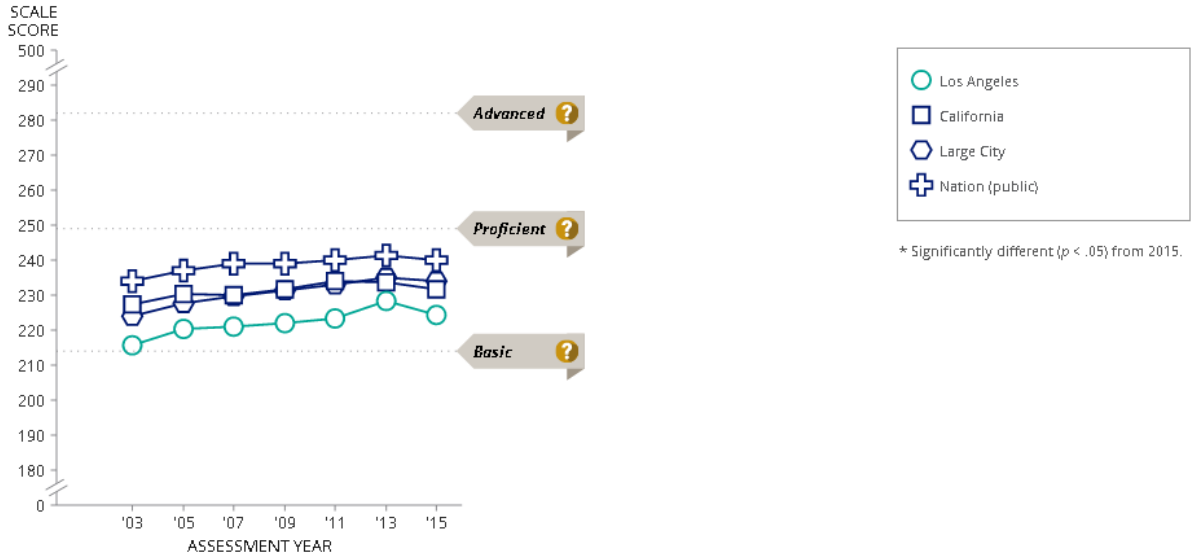
Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction





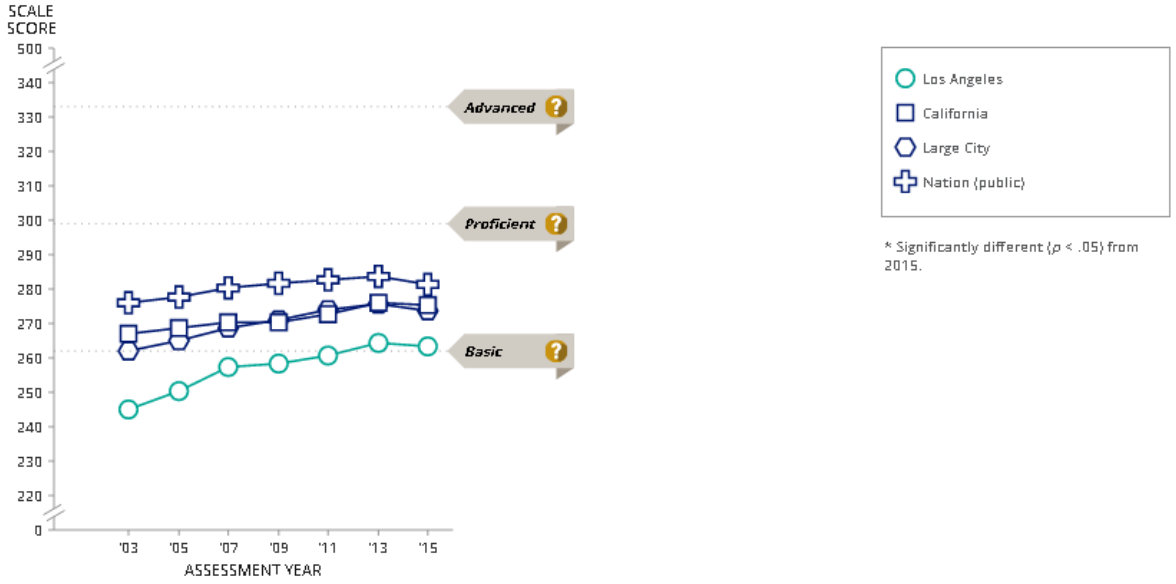


Los Angeles (confirming math saturation hypothesis with about 4 years of time delay), the math stagnations seem to have taken place by 2007-2011 for the grade 4, and for the grade 2-4 years by 2013.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

Click on a data point or key for more details. Click again to return to the overview for all categories.



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Los Angeles

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	36	43	19	2	64
2013	31*	44	22	3	69*
2011	37	43	18	2	63
2009	39	42	17	2	61
2007	40	41	17	2	60
2005	42*	39	16	2	58*
2003	48*	39	12*	1*	52*

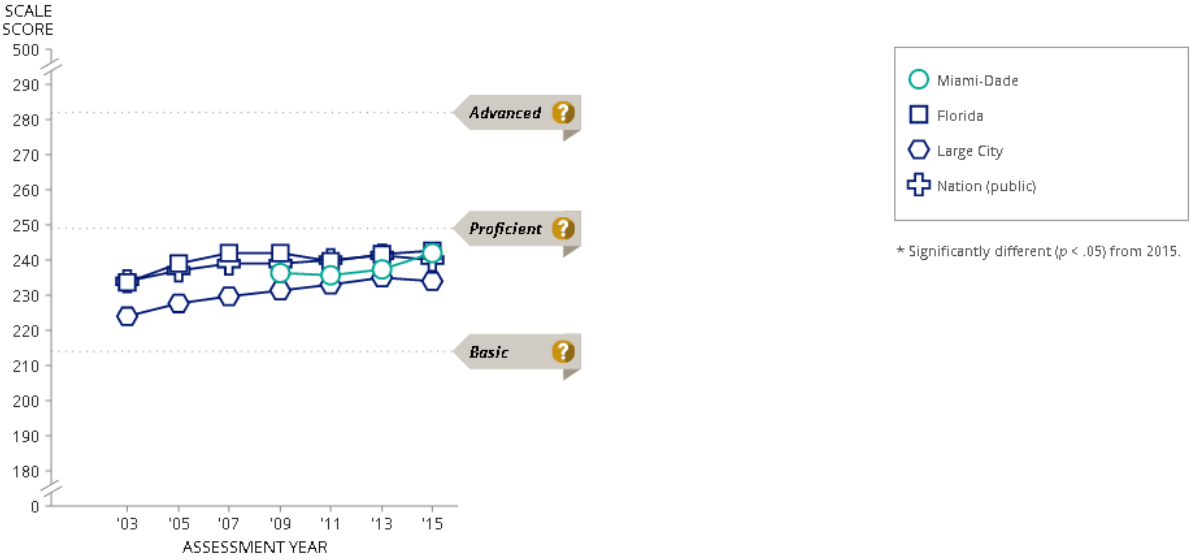
PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Los Angeles

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	48	36	12	3	52
2013	46	36	15	3	54
2011	51	33	13	3	49
2009	54*	32*	11	2	46*
2007	55*	31*	12	2	45*
2005	62*	27*	9*	2	38*
2003	68*	25*	6*	1*	32*

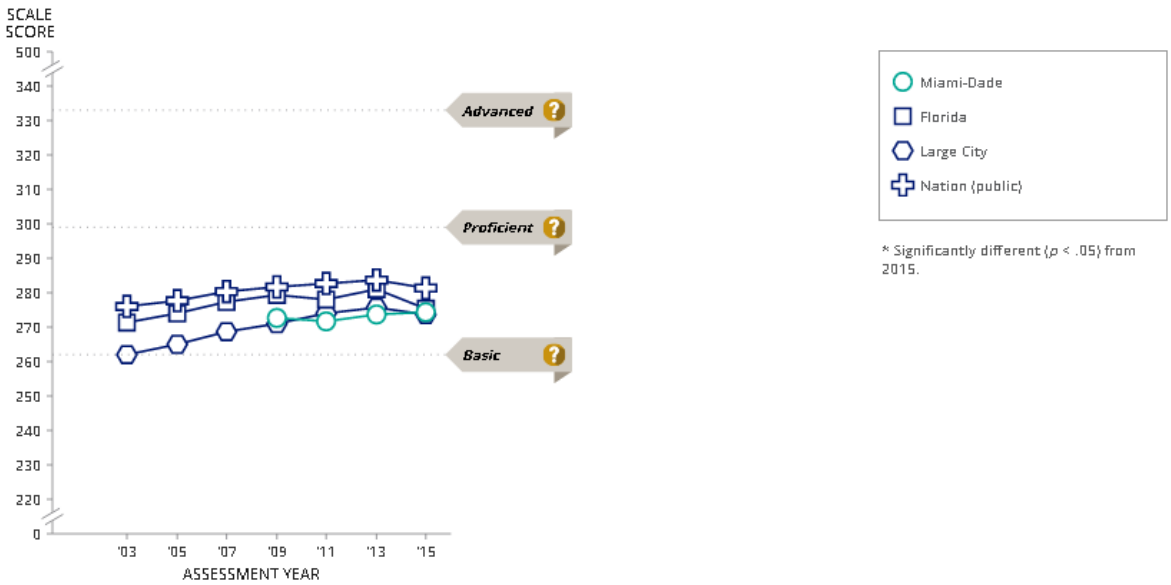
PERCENT

Miami-Dade (confirming math saturation hypothesis), by the time Miami-Dade joined in 2009, the math stagnation had taken root without the need for the 4 year time lag issue.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

Click on a data point or key for more details. Click again to return to the overview for all categories.



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in Miami-Dade

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	14	44	36	5	86
2013	19*	47	30*	5	81*
2011	21*	46	29*	4	79*
2009	19*	48	29*	3*	81*
2007	—	—	—	—	—
2005	—	—	—	—	—
2003	—	—	—	—	—

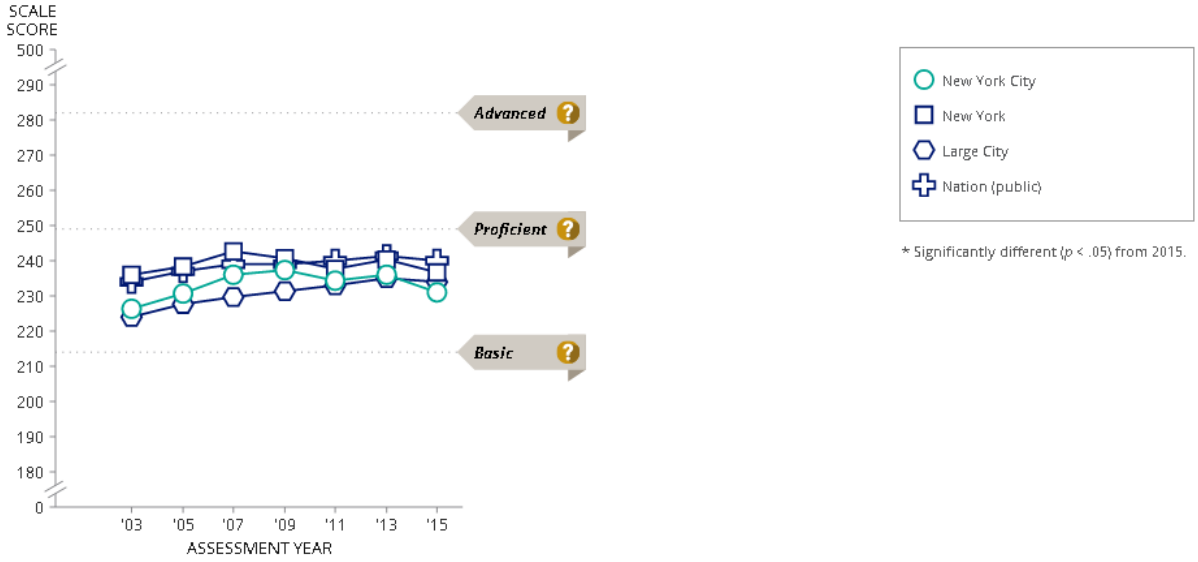
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in Miami-Dade

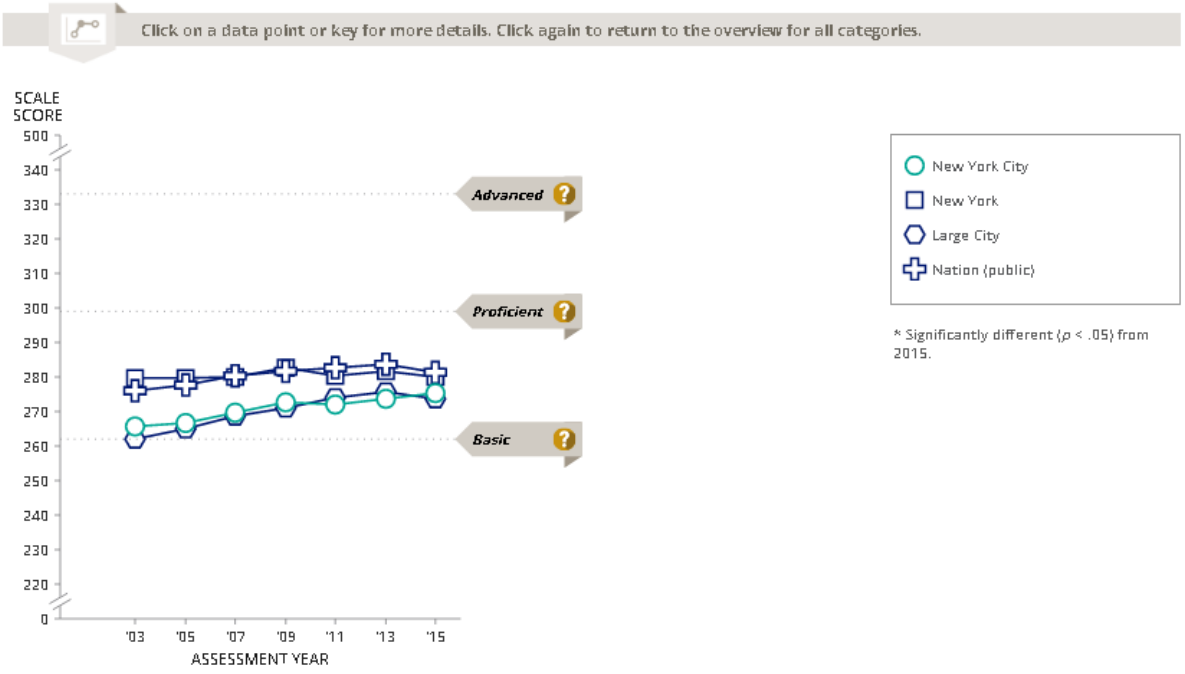
Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	36	38	21	5	64
2013	37	39	20	4	63
2011	39	39	19	4	61
2009	36	41	19	3	64
2007	—	—	—	—	—
2005	—	—	—	—	—
2003	—	—	—	—	—

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

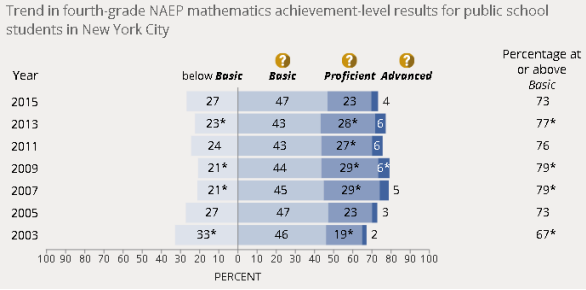
New York City (confirming math saturation hypothesis), 4 year time lag was confirmed to, following the typical 2005-2009 route as the grade 4 saturation around 2007-2009 and the grade 8 in 2009-11.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction



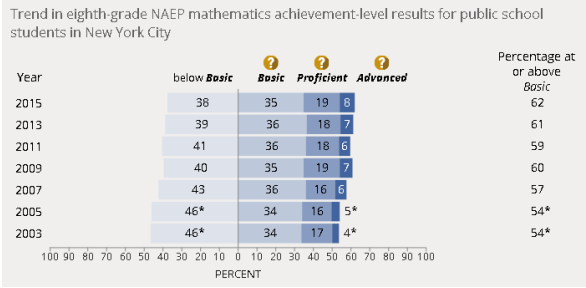
Trend in fourth-grade NAEP mathematics achievement-level results for public school students in New York City



Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	27	47	23	4	73
2013	23*	43	28*	6	77*
2011	24	43	27*	6	76
2009	21*	44	29*	6*	79*
2007	21*	45	29*	5	79*
2005	27	47	23	3	73
2003	33*	46	19*	2	67*

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

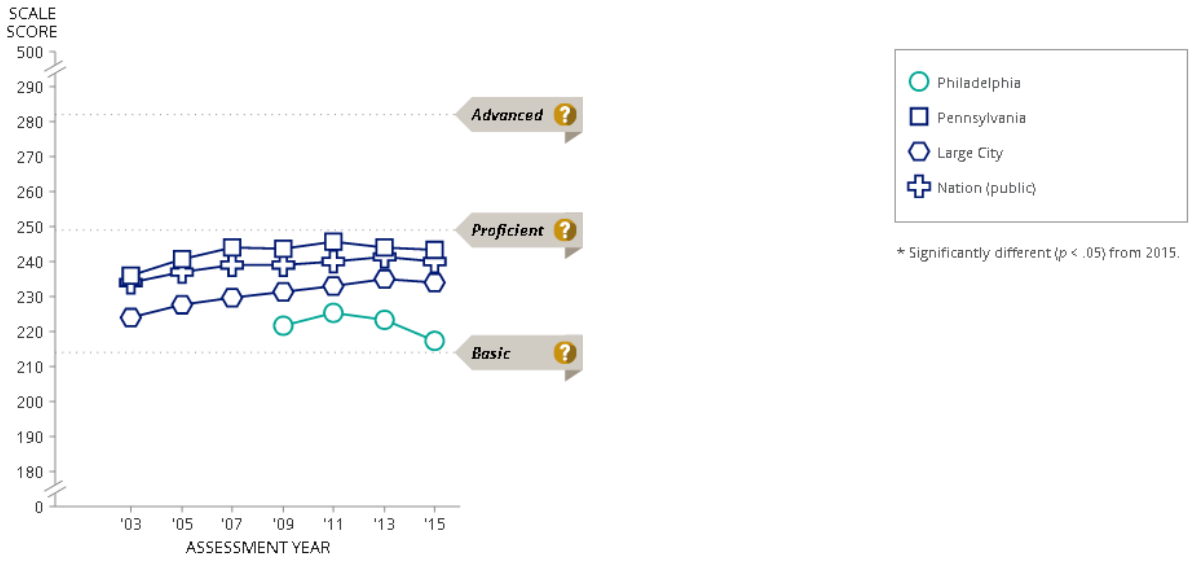
Trend in eighth-grade NAEP mathematics achievement-level results for public school students in New York City



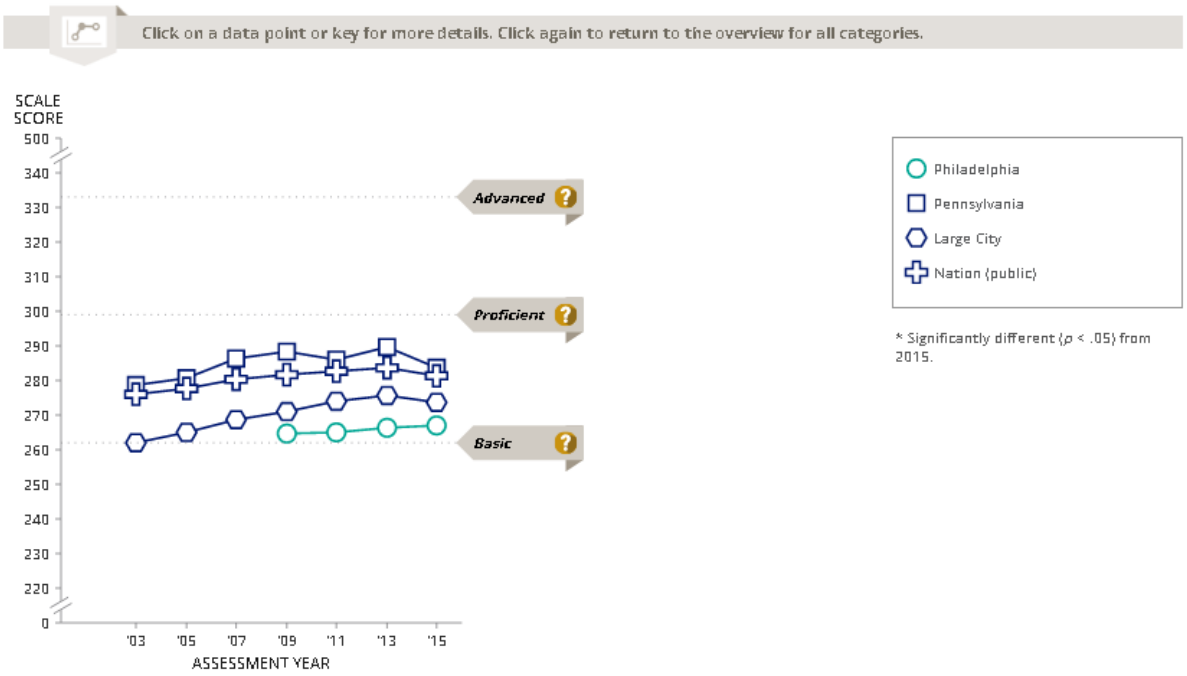
Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	38	35	19	8	62
2013	39	36	18	7	61
2011	41	36	18	6	59
2009	40	35	19	7	60
2007	43	36	16	6	57
2005	46*	34	16	5*	54*
2003	46*	34	17	4*	54*

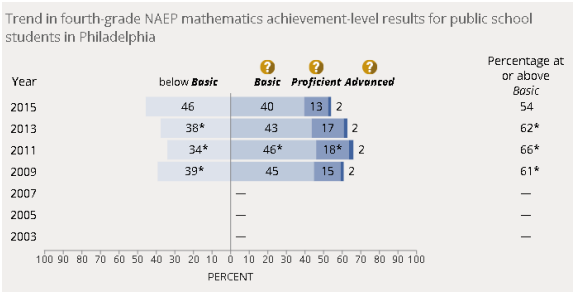
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100
PERCENT

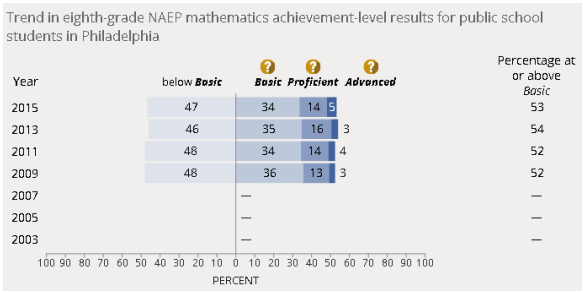
Philadelphia (confirming math saturation hypothesis), 4 year time lag is here tricky because the 4th grade started declining in 2013 and this may be reflected in the grade 8 declining in 2017 later. Philadelphia joined in 2009 and by then the math stagnations had taken place and declining noticeably past 4 years, not just stagnating.



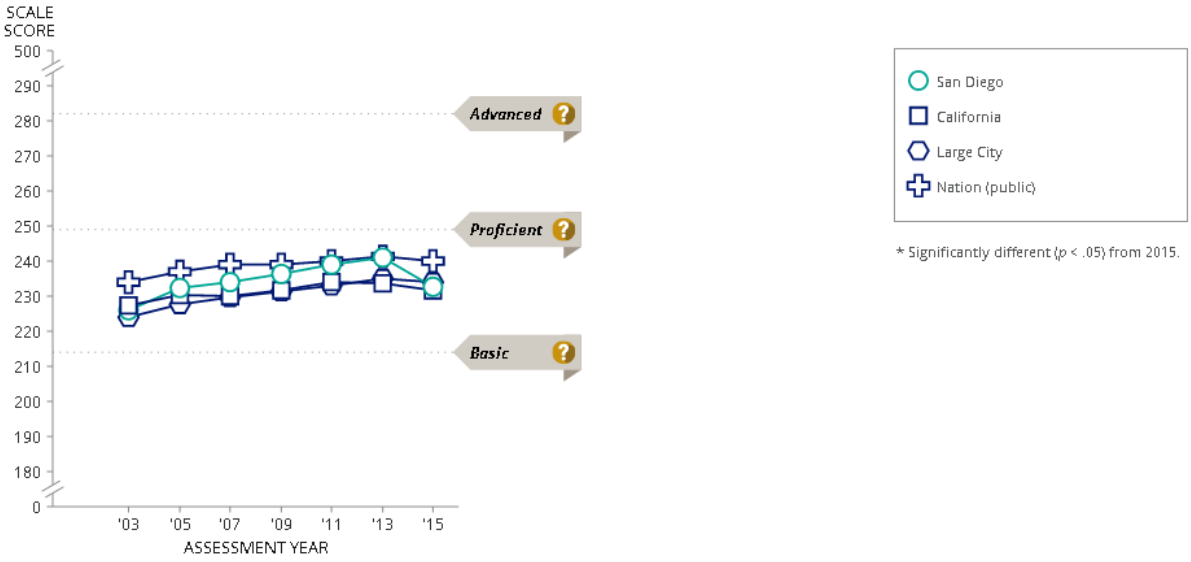
Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction





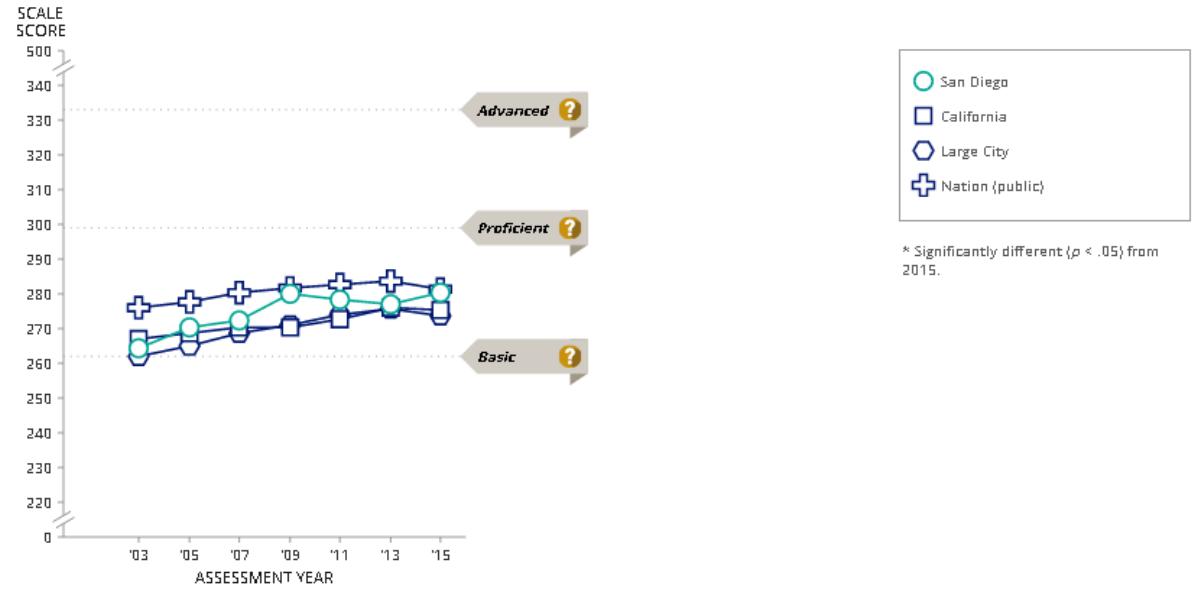


San Diego (confirming math saturation hypothesis), the time lag for the grade 8 saturation may come around 2017-2019 as the saturation for the grade 8 seemed 2013-2015.



Trend in average scores for eighth-grade public school students in NAEP mathematics, by jurisdiction

Click on a data point or key for more details. Click again to return to the overview for all categories.



Trend in fourth-grade NAEP mathematics achievement-level results for public school students in San Diego

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	27	42	25	6	73
2013	19*	39	35*	8	81*
2011	20*	40	32*	7	80*
2009	23	41	30*	6	77
2007	26	39	30*	5	74
2005	26	45	25	4	74
2003	34*	46	18*	2*	66*

PERCENT

Trend in eighth-grade NAEP mathematics achievement-level results for public school students in San Diego

Year	below Basic	Basic	Proficient	Advanced	Percentage at or above Basic
2015	30	38	24	8	70
2013	35	34	24	7	65
2011	34	35	24	8	66
2009	32	36	26	7	68
2007	38*	37	19*	5*	62*
2005	39*	39	18*	4*	61*
2003	47*	35	16*	2*	53*

PERCENT

Table for the confirmations or denials of the Math stagnations and about 4 year time lags

Math stagnations typically starting around 2005 in the grade 4 and 2009 for the grade 8

	Alphabetical order for the cities that have participated since 2003	the math saturation of the grade 8 with the 4 year time lag after the grade 4 (excluding the irrelevance of those that joined 2009 on)	Cities that joined TUDA later
Concrete Confirmations from 16 cities with the stagnations or even declines	Albuquerque, Atlanta, Austin, Boston, Charlotte, Cleveland, Dallas, Detroit, Hillsborough (FL) , Houston, Jefferson country (KY), Miami-Dade, New York City, Philadelphia, San Diego	Austin, Boston, Charlotte, Cleveland, Houston, Los Angeles, New York City.	(those joined later and saturations already: Albuquerque, Baltimore City, Jefferson Country, Miami-Dade)
2 Partial confirmations with several years of delays	Chicago (since around 2011), Los Angeles (with 4 years delay than usual)		
Expecting the 8 grade saturations or declines 2017-2019		Atlanta, San Diego	
Twilight zones		Chicago, Dallas, District of Columbia, Fresno, Hillsborough, Philadelphia	Duval (joined in 2015; so cannot decide), Dallas and Hillsborough joined in 2011, *Philadelphia joined in 2009*
Denials (but the signs are up)	District of Columbia (DCPS),	Detroit	

NOTE: For some cities where the math stagnations kicked in earlier, e.g. Charlotte, the timeline was 2003-2007. For a few cities that had the math stagnations later by 2-4-6 years were those that had been in near the math bottom of the USA, e.g. DC, Los Angeles, and Chicago. This was because they had more time to have math growths till they have reached their saturation levels.

Implications:

What do all these mean?

1) Out of 21 cities in analysis, 18 cities have confirmed the math growth saturations and the 3 unconfirmed may well be other way for the confirmations as these 3 have slowed down their growths in the final 2013-2015 time frame.
2) 4 years of the time lag of saturations between the grade 4 and 8 of math at the big city levels seemed to have 6 in twilight zone still for the observations, 2 cities to expect to confirm in a few years, and only Detroit alone seems to be against this pattern concretely. As of now, the rule of thumb confirmation of the 4 year delay rule seems about 60-70% by 2015 while there are some pending ones.

3) If the 4 year time lag of saturations between the math grade 4 and 8 becomes real, what does this mean? This means that mathematics as a cumulative subject, the math growths of the earlier years (e.g. grade 4) will really add up to the later grades quasi-inevitably. This also means that the math poverty of the earlier grades will haunt the rest of the upper grades. This means that the education policymakers should assure that the math poverty reductions take place as early as possible without delays because the math poverty add up like snow balls as year go by.
4) By 2015, the majority of these cities have experimented with the Common Core standards earlier, but 90-100% of them slowing down with nothing fundamentally gaining means that the Common Core standards at least by mid-2015 had miserably failed.
5) The overall math stagnations between the math averages vs. the math 25 percentiles have had very tightly mimicking growth patterns, which is similar to the patterns observed in PISA math. This means all put together that to radically reduce the math poverty should be prioritized.

Conclusion

We have shown that the math stagnations in the 21 TUDA participating cities (or districts) have been at least 86% confirmed already and may be 95-100% confirmation by 2017-2019 most likely. As such the math education policymakers should take some radically new approaches to overcome the current math stagnations of their nations (although the author focused only on the USA math stagnations in this paper) because the traditional approaches simply fail to overcome the juggernauts of the math stagnation nation phenomenon. Furthermore, the 4 year time lag implies that the math is a cumulative subject and earlier grade math materials should be mastered because the lack of the mastery earlier will have the snowball effects to impact the later grades' math growths as evidenced by the 4 year time lag rule of thumb for the NAEP math grade 8 scores.

References

National or state or city or district level math assessment timelines

1) U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 1992–2015 Mathematics Assessments.
2) NAEP's National Report Card (accessed on January 5th, 2017) U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), various years, 1990–2015 Mathematics Assessments. https://www.nationsreportcard.gov/reading_math_2015/#mathematics/scores?grade=4
3) For the NAEP math grade 4 (accessed on January 5th, 2017): https://www.nationsreportcard.gov/reading_math_2015/#mathematics/district/trends/XQ?grade=4

4) For the NAEP math grade 8 (accessed on January 5th, 2017): https://www.nationsreportcard.gov/reading_math_2015/#mathematics/district/trends/XQ?grade=8

International level math assessment timelines

1) PISA, OECD (accessed on January 5th, 2017) https://data.oecd.org/pisa/mathematics-performance-pisa.htm
2) TIMSS mathematics results (accessed on January 5th, 2017) http://timss2015.org/timss-2015/mathematics/student-achievement/trends-in-mathematics-achievement/

WP (Working Paper) series of "Math Stagnation Nations" series by Lee

1) Lee, Dongchan. 2017 February. WP series of "Mathematics Stagnation Nations" for the USA, Australia, New Zealand, UK, and Ireland and most Latin American countries (Part 1). "Math stagnation nations of all 5 developed, English-speaking countries according to PISA and TIMSS for the past 15-20 years of the math growth history: what this means for education and economy"
2) Lee, Dongchan. 2017 February. WP series of "Mathematics Stagnation Nations" for the USA (Part 2). "NAEP (National Report Cards) Math Grade 4 & 8 stagnations 1992-2015 of the 50 states of the United States: national, regional, and the past growth compared to the projected MMU1 impacts on math growths if fully implemented in 3-4 years" (http://vixra.org/pdf/1702.0101v1.pdf for the version 1)
3) Lee, Dongchan. 2017 February. WP series of "Mathematics Stagnation Nations" for the USA (Part 3). The collective Math stagnations of the grades 4th and 8th in the big cities (or the School Districts based on TUDA of NAEP) of the USA over the 1 decade: their confirmations, time lags, math poverty shares, and the roles of the Common Core math (http://vixra.org/abs/1702.0101)
4) Lee, Dongchan. 2017 February. WP series of "Mathematics Stagnation Nations" for the USA (Part 4). Math Education Stagnations in the USA played more roles than the Common Core Math Standards impacts for the stagnations on the NAEP math 2015, but the Math dipping were most likely due to CCSS Math (http://vixra.org/abs/1702.0097)
5) Lee, Dongchan. 2017 February. WP series of "Mathematics Stagnation Nations" for the USA (Part 5). The quasi-universal math stagnations in almost all developed countries are real and won't go away. How to transcend them with MMU1 or at least 1/3 of its full version in just 2-4 years

Some preparation materials for the WP (Working Paper) series of "Math Stagnation Nations" series by Dongchan Lee

1) Lee, Dongchan. 2017 February. "What Pisa & Timss 2015 Show: the global Math Edu Crisis and Its Economic Impacts" http://vixra.org/abs/1701.0485
2) Lee, Dongchan. 2017 February. Math Stagnations in the Mega Cities and School Districts of the Usa According to Tuda of Naep http://vixra.org/abs/1701.0693
3) Lee, Dongchan. 2017 February. Math Stagnations in Most of the USA States According to the NAEP Math 2000-2015 http://vixra.org/abs/1701.0692
4) Lee, Dongchan. 2017 February. 8 point executive summary: math stagnations and the Economic impacts of MMU1: To end the math poverty multiple times faster with MMU1 than without it (then to

achieve the POST-2015 goals of the UN multiple time faster than without MMU1) (http://rxiv.org/abs/1702.0056)
5) Lee, Dongchan. 2017 January. "What PISA 2015 and TIMSS 2015 show: global math EDU crisis and its economic impacts" (http://vixra.org/abs/1701.0485)

Some Youtube versions by Dongchan Lee

1) Lee, Dongchan. 2017. "Math edu crisis in most of the USA states and what MMU1 can do" https://www.youtube.com/watch?v=qiZW2GnNLXQ
2) Lee, Dongchan. 2017. "Math EDU crisis in most of the USA states Part 2 and what MMU1 can do" https://www.youtube.com/watch?v=vB7LcMLVWs4

Lee's online repository to get updates about the WP series on "Math Stagnation Nations"
http://uslgoglobal.com/wp-math-stagnation/