

# Academic Results Report

2014-15



2SigmaEducation

# Executive Summary

After a full year of implementing the 2 Sigma methodology at Hebrew Academy of Long Beach (HALB), the results are in. Students took the Measures of Academic Progress (MAP) test, which compares student growth to their peers across the country. By the spring, all HALB classes progressed significantly faster than the national average - in both reading and math. Next steps include additional grade levels and schools, with further improvement of the 2 Sigma methodology.

## Introduction

2 Sigma Education is a classroom model that maximizes one-on-one and small group learning in the classroom with the same staff and instructional time. Research has shown that one-on-one instruction is the best learning method for improving student outcomes, focus, and confidence. 2 Sigma is a breakthrough, in the sense that personal instruction previously required far more resources and staff.

Teachers using 2 Sigma spend as much of their time as possible teaching one-on-one. This is made possible by providing them with precise, real-time data on every student's progress and struggles. While teachers give individual attention to some students, others work with adaptive online learning software. 2 Sigma then provides teachers with detailed reports on what those students need when it is their turn to work one-on-one or in small groups with the teacher.

A significant piece of the 2 Sigma model involves evaluating student progress, both on an individual level and collectively as a program. This information is critical for demonstrating the success of 2 Sigma and identifying focus areas for future enhancements to the model.

This report analyzes the results of 385 K-3 students in the 2 Sigma program at Hebrew Academy of Long Beach (HALB), a Jewish day school in Long Beach, NY.

For more detailed information about the 2 Sigma model, including a virtual tour of a 2 Sigma classroom, visit [www.2sigmaeducation.com](http://www.2sigmaeducation.com).

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## Evaluating 2 Sigma

2 Sigma Education is assessed through a partnership with Northwest Evaluation Association (NWEA), a non-profit organization that supports over 7,000 schools and millions of students. Their well-known Measures of Academic Progress (MAP) test is a computerized, adaptive test that is conducted three times per year (fall, winter, spring) for each student.

**MAP tests measure not just a student's mastery and percentile, but his or her progress relative to students nationwide who began the year with the same score.**

The MAP test adapts its questions in real time based on whether or not a student answers earlier questions correctly. As a result, the test serves as an invaluable instructional tool due to its ability to precisely gauge which skills a student has mastered and which require more instruction.

MAP tests are particularly adept at measuring not just a student's mastery and percentile, but also his or her relative progress. MAP measures a student's growth over the school year relative to students nationwide who began the year with the same score. Strong students (those beginning the year way ahead of the class) are compared to the growth of other strong students in the country, and so on. The results allow each student to be compared to others across the country with the same profile - a controlled benchmark for growth.

This assessment model provides an objective lens through which to evaluate 2 Sigma Education. It is not enough to show high absolute achievement among students.; instead, 2 Sigma aims to produce high relative growth compared to students nationwide who were previously on the same level. The single most important criterion for success is not how much 2 Sigma students know, but rather how much faster they progressed than their peers across the country.

# Transparency

Academic measurement is admittedly rare in the world of Jewish day school education. Sharing results is even rarer. Open assessment of students' academic achievement is not expected, and is thus simply avoided.

This report not only measures educational effectiveness to an unprecedented degree for the world of Jewish education, it does so publicly. 2 Sigma hopes to challenge the tradition of opacity by sharing as much information about student achievement and growth as possible. Hopefully this will inspire Jewish communities elsewhere to demand more from their educational institutions.

By its nature, 2 Sigma collects far more individualized data than can be shared in a public report. However, it is absolutely used to continually improve the methodology. The insights from this report provide a small glimpse into the power of this data, both for individual teachers and for refining the methodology as a whole.

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**The success of the 2 Sigma methodology is measured by how much students in the program exceeded their "target" growth.**

## Data Collection

HALB's 385 students - from Kindergarten through 3rd grade - took the MAP test three times in the 2014-2015 academic year. Students took their first test a few weeks after school began, then once again in the winter, and finally at the close of the school year. In total, all 19 classes K-3 that used the 2 Sigma methodology were evaluated.

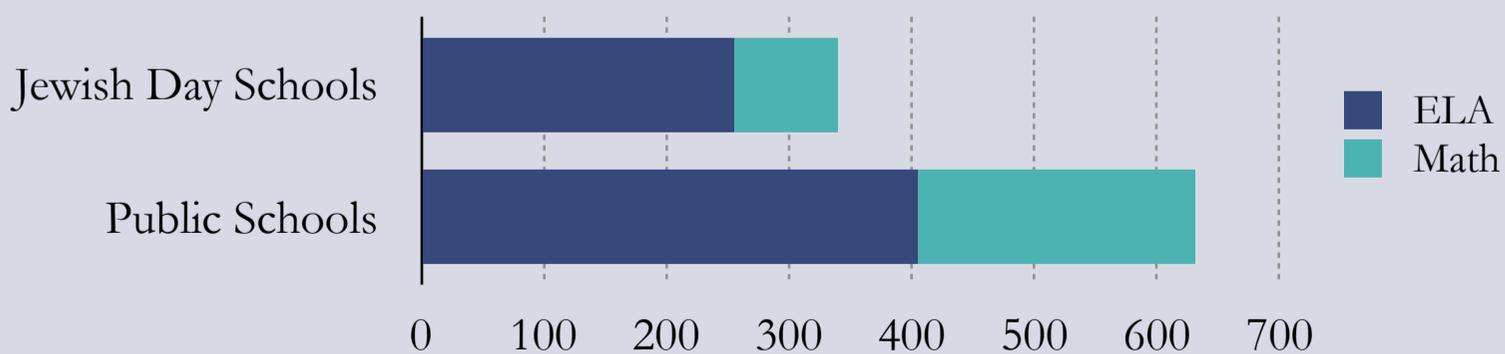
Once students take their first assessment in the fall, MAP calculates a target growth for each student and class. A "target" is simply the expected or average growth for a particular level of achievement. If 2 Sigma was to make no difference compared to the rest of the country, one would expect to have 50% of students at or above the target at the end of the year, and 50% below. The success of the 2 Sigma methodology is measured by how much students in the program exceeded this target growth.

## A Note about Instructional Time

Before diving into the results, it's worth noting that students at HALB, as in many Jewish day schools, devote significantly less class time to math and English language arts (ELA) instruction than the average US student. Most US schools dedicate between 15 and 20 hours per week for language arts and math. In contrast, K-3 students at HALB experience approximately 10 hours a week of language arts and math instruction. Jewish day schools also typically have 5-10 fewer days of school each year than their public school peers. In the face of these significant time constraints, it is important to evaluate whether the 2 Sigma model is able to help students perform well even relative to other students with far more instructional time.

**Jewish day schools devote 40-50% less class time to math and English language arts instruction than most schools.**

Hours of Math/ELA Instruction Per Year in K-3



# Understanding the Data

Results for both reading and math can be subdivided in many different ways, but this report highlights the two most prominent. On a basic level, the results are broken down by grade, namely Kindergarten, 1st, 2nd, and 3rd grade. Additionally, data is separated out for students who are at the strong or weak ends of the spectrum:

- “Weak Students” is defined as those students who began the year at or below the 25th percentile nationally
- “Strong Students” is defined as those students who began the year at or above the 90th percentile nationally

The results that are reported for each group and subgroup are as follows:

## Average RIT Scores

“RIT” stands for Rasch Unit, which is what MAP uses to calculate the scaled scores students receive on the MAP test. The difference in these scores between fall and spring is used to quantify “growth” over the course of the year.

## Percentile Change

This is directly related to the RIT scores, but provides a national percentile (by grade) for each score to better evaluate what it means. A 1st grade student who scores in the 85th percentile in the fall has performed better than 84% of all 1st grade fall test takers. If that same student scored in the 87th percentile in the spring, the percentile change is +2%, representing a relatively high growth rate.

## Average Actual Growth

The difference between a student’s RIT score on the fall MAP test and that student’s RIT score on the spring MAP test. This represents a student’s progress over the course of the year.

## Average Growth Target

Growth targets are established for each student as their expected growth in RIT score between the fall and spring MAP test. The target is calculated as the average growth of students at a particular grade level with a particular starting score. On average, one would expect 50% of students to meet or exceed their growth targets, and 50% to miss their targets.

## Actual Growth Compared to Target Growth

This is one of the most important metrics in evaluating progress by measuring how much faster students progressed compared to the national expectation.

## Percent of Students who Met their Target

Based on the definition of growth targets (averages), one would expect that in general 50% of students meet or exceed their growth target. If this number is greater than 50%, students are progressing at an above average rate.

**Expected Fall to Spring growth targets are set for each student. On average, 50% of students should meet their growth targets.**

## Example

Rachel is a 1st grader who received a 160 RIT score in math at the start of the school year. This put her in the 45th percentile relative to other US 1st graders.

Based on other 1st grade students who scored a 160 on math in the fall, Rachel’s growth target is set at 10 points. This means that in the spring, there is a 50% chance that a 1st grader at Rachel’s level would score a 170 or higher in math - and a 50% chance she would score below 170.

Rachel takes the MAP test again in the spring. This time, she receives a RIT score of 175 in math. Rachel’s growth for the year is 15 points (since she began at 160). Not only has Rachel met her growth target, she has exceeded it by 50%!

<b>Name</b>	Rachel
<b>Grade</b>	1st
<b>Fall Math RIT</b>	160
<b>Growth Target</b>	+10
<b>Expected Spring Math RIT</b>	170
<b>Actual Spring Math RIT</b>	175
<b>Actual Growth</b>	+15
<b>Vs. Growth Target</b>	+50%

# Findings

The results of applying the 2 Sigma model at HALB were extremely strong across the board. This section will examine a few patterns that emerge from the data, and the full results can be accessed at the end of this report.

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## Each Class Beat its Targets

Each and every one of the 19 classes using 2 Sigma progressed significantly faster than the national average for their starting points, in both reading and math.

On average, 2 Sigma students beat their targets by 93% in math, nearly doubling the learning pace of the average American student. The weakest students outpaced their expected growth by 139% in math.

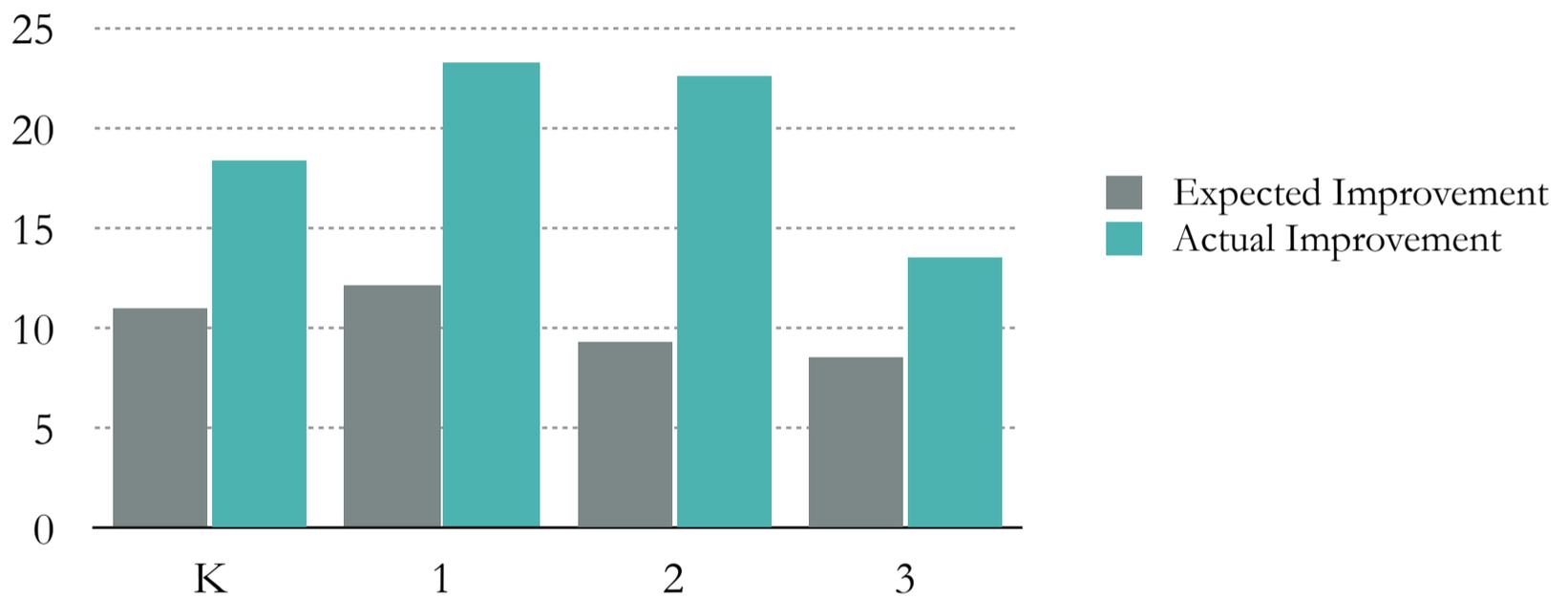
In reading, students exceeded their targets by an average of 43%, while the weakest students significantly beat their targets by 132%.

Although one would expect only 50% of students to meet or exceed their growth targets, 86% of 2 Sigma students beat their growth targets in math and 76% beat their targets in reading.

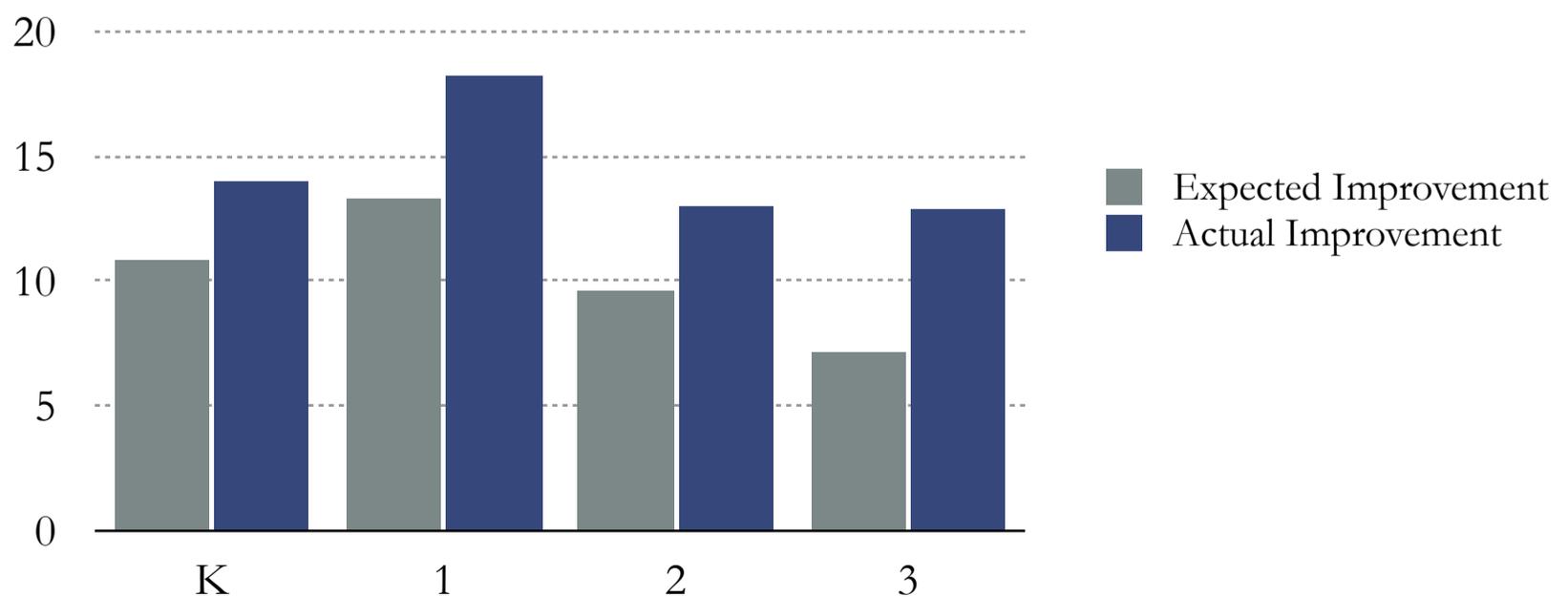
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### Math Fall to Spring Growth by Grade



### Reading Fall to Spring Growth by Grade



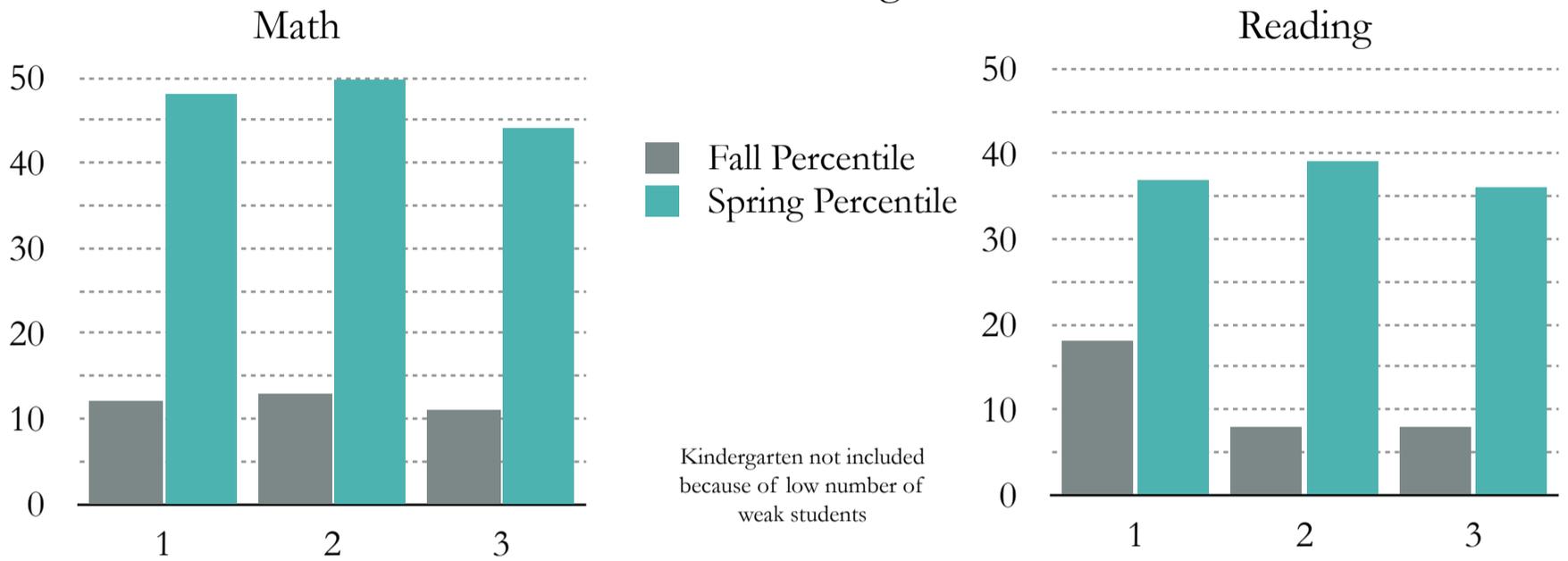
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**Weak Students Narrowed the Gap**

Weak students - students who began the year at or below the 25th percentile nationally - found in 2 Sigma an opportunity to raise their national standing. In reading, the average weak student jumped from the 11th to 30th percentile. In math, the average weak student jumped from the 12th to 51st percentile. In both math and reading, strong and average students saw massive benefits from personal attention - and weak students narrowed the gap.

**The weakest students experienced massive gains in reading and math.**

**Weak Students Average Percentile**



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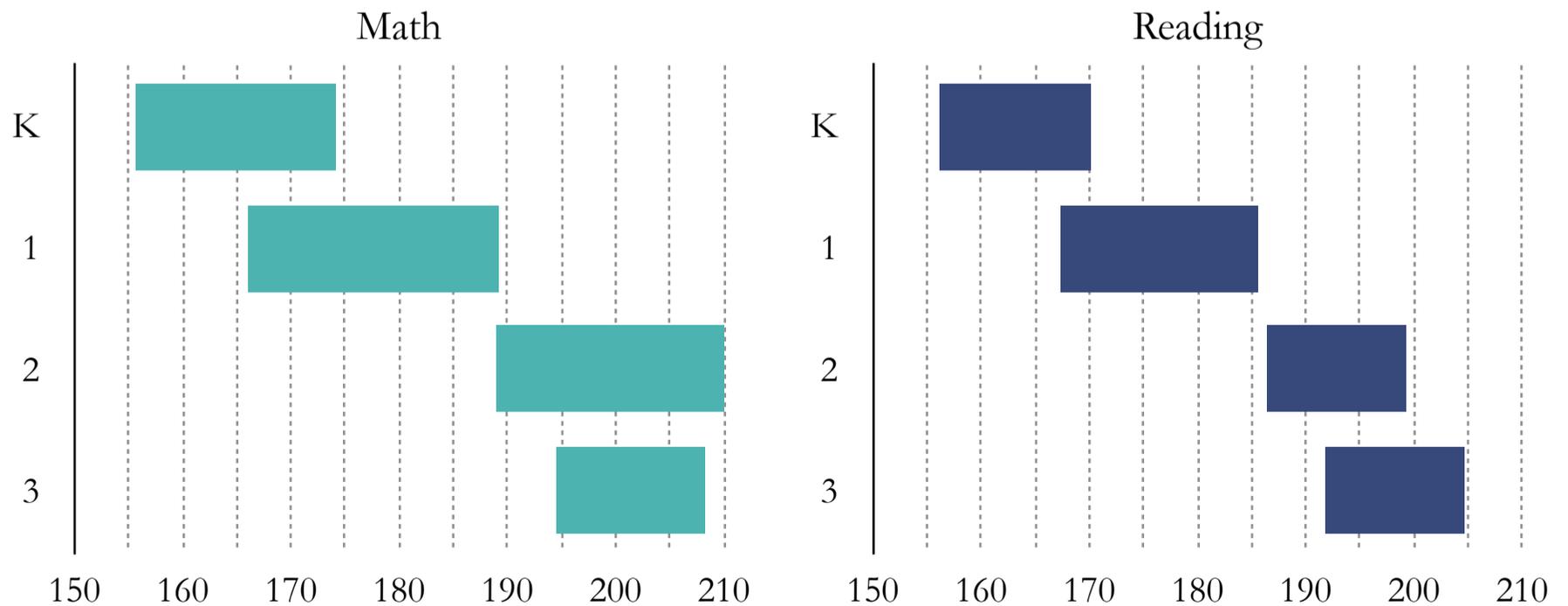
**Students are Ahead of their Predecessors**

In nearly all cases, for both math and reading, each grade ended the year ahead of where the grade above them began the school year. For example, the second graders ended the school year scoring a 211.7 in math, while the third graders had started the year at only 194.6 on average.

**In nearly all cases for both math and reading, each grade has outpaced the grade above them.**

This pattern was consistent across the board. This observation suggests that students are growing not just faster than the national average, but faster than they would have at HALB without 2 Sigma in the classroom.

**Average RIT Score Growth Fall to Spring**



## Next Steps

In the wake of promising pilot results, 2 Sigma Education is already working to expand its impact, including:

- ◆ Replicating positive results over multiple school years
- ◆ Reproducing results at higher grade levels and across multiple schools
- ◆ Refining and testing improvements to the model to achieve even better results

**In the wake of promising pilot results, 2 Sigma Education is already working to expand its impact.**

In the 2015-2016 school year, 2 Sigma will be implemented at additional schools, and the HALB implementation will expand to include the fourth grade. The program will continue to be monitored and assessed throughout the year using the MAP test.

The 2 Sigma methodology results in a high granularity of data, which enables rapid experimentation and improvement. The HALB implementation included experimental variations and produced clear best-practices, which will be incorporated and verified in the coming school year across schools and grade levels.

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Areas of inquiry include:

- ◆ Further segmentation by student level: how can 2 Sigma be better optimized for students across the achievement spectrum (from strong to weak)?
- ◆ Feedback mechanism: how can 2 Sigma improve the data provided to teachers on a daily basis, including what is reported and how it's delivered?
- ◆ Scalability: how can 2 Sigma be rolled out in a school as efficiently as possible in order to enable more rapid scaling of the program?

As an educational methodology, 2 Sigma has shown extremely promising early results. There is still much to both confirm and tweak, and future reports will continue to provide transparency around results and progress. Through the implementation, measurement, improvement, and growth of 2 Sigma, the full power of one-on-one instruction will hopefully be able to reach many more students for years to come.

## Appendix - MAP Data

### Math

Grade	Students	Fall RIT	Spring RIT	Change	Target	Vs. Target	Met/Beat Target	Percentile Change
K	75	155.8	174.2	+18.4	11	168%	85%	+2
1	104	165.9	189.2	+23.3	12.1	192%	94%	+23
2	104	189.0	211.7	+22.7	9.3	245%	96%	+19
3	96	194.6	208.36	+13.6	8.6	159%	66%	+11
Total	379	177.5	197.2	+19.7	10.2	193%	86%	

### Reading

Grade	Students	Fall RIT	Spring RIT	Change	Target	Vs. Target	Met/Beat Target	Percentile Change
K	74	156.1	170.1	+14.0	10.8	130%	72%	-4%
1	103	167.4	185.6	+18.2	13.3	136%	78%	+9
2	104	186.4	199.4	+13.0	9.6	136%	78%	+1
3	96	191.8	204.7	+12.9	7.1	180%	77%	+13
Total	377	176.6	191.2	+14.6	10.2	143%	76%	