

# Getting Small to Get Big Results

## An Introduction to Data-Driven Inquiry

For more than a decade, the Boston Public Schools (BPS) community — teachers, school administrators, district leaders, and partners like the Boston Plan for Excellence — have been working to improve instruction to meet the needs of all students. Guided by the Essentials of Whole-School Improvement, we've learned about the instructional strategies, professional learning cultures, and leadership practices it takes to raise student achievement. We've made progress. Still, the impressive gains made in some schools and with some students hasn't translated to the across-the-board acceleration of student learning that is needed. Too many Boston students leave high school each year unprepared for college and life.

Recently, Superintendent Carol Johnson laid out eight goals to dramatically increase student performance in the BPS Acceleration Agenda. Meeting them will demand sustained, concentrated, whole-school effort, a commitment to continuous learning, and a relentless focus on data. An important effort that is building momentum across the BPS — data-driven inquiry — helps schools to meet this challenge.

The power of data-driven inquiry is that it builds on the knowledge and skills that teachers and school leaders already possess, integrating existing BPS efforts to achieve a single purpose: increasing the number of students who are on-track for promotion, graduation, and success.

Inquiry focuses everyone's attention on the students we know we aren't reaching now. When done well and at multiple levels throughout schools and the district, data-driven inquiry does what other school reform programs and isolated improvements have not: it makes the important aspirations of "accelerating student learning" and "closing achievement gaps" attainable.

### Promising Results from Data-Driven Inquiry in BPS Schools

Over the past two years, a small group of schools piloted a data-driven inquiry approach known as SAM (Students Achieve More) with support from the Boston Plan for Excellence. Each identified a group of struggling "target students" whose prior performance was in the bottom quartile of their grade level; through successive cycles of data-driven inquiry, many made substantial learning gains.

**Elementary school ELA:** 15 of 17 3rd- and 4th-grade target students improved their reading comprehension from pre- to post-assessment. 9 improved by more than 25 points! In 2008, for the first time ever, not a single 3rd grade student scored at L1/Warning on MCAS.

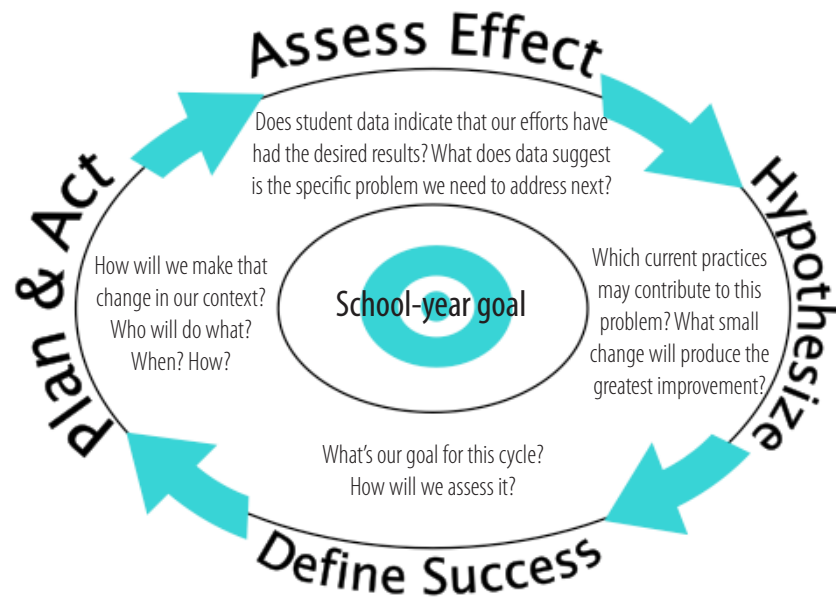
**Middle school mathematics:** 21 out of 25 6th- and 7th-grade target students improved on mathematical reasoning. 17 of those students made double-digit improvements, and 11 improved by more than 30 points! All nine 7th grade target students who improved did so by at least 20 points.

**High school ELA:** 9 out of 10 target sophomores improved on inferential reading questions. All of those students gained at least 17 percentage points from pre- to post-assessment, and six went up 40 points or more!

*\* Data reflects identified SAM target students for whom both pre- and post-assessment data were available.*

# How Data-Driven Inquiry Works

Inquiry is a straight-forward approach to solving complex problems, and an inquiry cycle takes a similar track whether it's an instructional leadership team (ILT) tackling excessive absenteeism or a content team working to accelerate the progress of students who are missing foundational knowledge or skills. In every case, the process begins with data: Where are students now, and where do they need to be?



Once a school-year goal is set, the team digs into available data more closely to refine the problem, seeking evidence of specific skill gaps, misconceptions, or habitual behaviors that, if addressed, could pave the way for substantial progress in student performance.

## Tools for Inquiry Teams

**Inquiry Cycle Map** School: \_\_\_\_\_ Team: \_\_\_\_\_ Date: \_\_\_\_\_

**ASSESS EFFECT**  
Priority problem area\*  
School-year goal\*

**ANALYZE EVIDENCE**  
Analyze evidence

**MAKE AND TEST INFERENCE**  
Make and test inferences

**ANALYZE CURRENT CONDITIONS**  
Analyze current conditions

**STATE WHAT NEEDS TO CHANGE AND WHY**  
State what needs to change and why

**LEARNING TARGET/ CYCLE GOAL**  
Learning Target/ Cycle goal\*

**HOW TO ASSESS**  
How to assess

**WHEN TO ASSESS**  
When to assess

**PLAN TO MEET THE DESIRED CHANGE**  
Plan to meet the desired change

**ASK**  
Ask

**ASSESS EFFECT**  
Analyze evidence  
- to assess effect of this cycle\*  
- to identify next learning target

\* Attach implementation plans, assessments, student performance data, etc.

Then comes the cycle — actually, many cycles, as many as it takes to reach the big goal. Each time, the team sets a specific data-based goal, defines what success will look like, plans what change they will make in instruction or school practice, implements that change, and assesses whether it had the desired effect on student performance. The particular skill they teach in a single cycle may result in a significant leap for some students, partial progress for many, or it may shed light on a need of which teachers were not yet aware. Then, the team asks, “What’s the next limit to growth in this area?” and the process begins again.

See the appendix for guiding questions and examples of each stage of the inquiry cycle.

## What Inquiry Looks Like in a School

As opposed to an added responsibility, data-driven inquiry becomes the work of schools, using time and structures already in place – e.g., common planning time, professional development hours, and instructional leadership team (ILT) meetings. With its relentless focus on how to succeed with struggling and underperforming students, inquiry provides coherence and focus to everyone’s work, ensuring that they spend time and energy where it is most likely to have an impact.

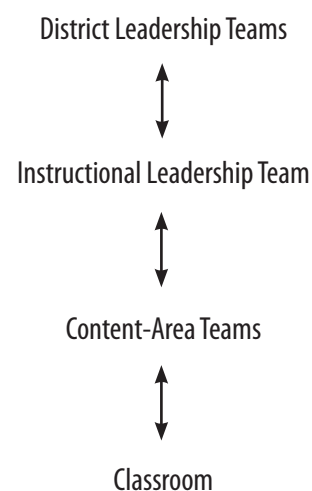
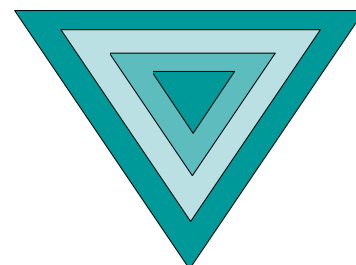
Inquiry teams have the potential to improve practice at all levels of a school — and the district — because part of the work of each team is to make explicit connections to school and district goals and to illuminate problems of practice that often are broadly applicable.

In a given school, those nested levels of inquiry might play out like this: After aligning Whole-School Improvement Plan priorities with the eight BPS Acceleration Agenda performance targets, an ILT asks content-area teams to identify which students are currently struggling in those areas, analyze performance data to understand why, and set more specific learning targets. As those teacher teams design and deliver instruction to address students’ skill gaps and misconceptions, they may use collaborative coaching and learning (CCL) cycles or low-inference classroom transcripts to analyze what worked and learn from one another’s practices.

Drawing on what the teachers learn, the principal/headmaster might organize a schoolwide learning walk, looking for consistent application of the instructional practices that the teams identified.

Meanwhile, teacher teams would share what they learn about school or district practices that limit students’ success, prompting systemic changes that will make a difference for many more struggling learners.

### Inquiry Happens at Every Level



	Inquiry about Student Learning	Inquiry about Enabling Conditions
<b>Who?</b>	A team of teachers who teach the same content or the same students	The school’s instructional leadership team (ILT), and small learning communities or student support teams
<b>When?</b>	During regularly-scheduled common planning time (at least weekly)	During regularly-scheduled ILT meetings (at least twice per month)
<b>With what focus?</b>	Important skills or knowledge gaps in reading, writing, and math	Factors that enable success, e.g., attendance, course passing
<b>With what data?</b>	Summative, formative, and classroom assessments	Key off-track indicators, e.g., students’ grades, absences, and suspension rates

## What Makes Inquiry So Powerful?

The approach to data-driven inquiry introduced here draws on effective practices from around the country and in Boston. A few characteristics make this approach particularly powerful.

**It makes careful use of data at every phase.** Teams invest time up front analyzing data to define a specific problem, and confirm it's worth solving, so they don't end up wasting effort on vague or tangential issues. Teams then define what success will look like and plan how to assess the results of their action. They plan backwards from that goal, careful to select an intervention that is likely to get results.

**It uses small changes to achieve big results.** Teams begin with a small group of target students who have struggled previously, examining their performance data to uncover patterns in curriculum and instruction that allow learning gaps to persist, and to identify a specific area of skills or knowledge where those students most need help. The team then tackles that specific learning goal with a series of small changes to classroom and school practices. No single quick fix can get students who are far behind to the goal, but when teachers use data to identify and address specific learning gaps one by one, target students can make impressive progress. Their peers will make substantial progress too.

**It begins with what teachers already know.** Inquiry doesn't depend on outsiders to bring the answers, nor does it wait for the elusive perfect program or solution. Instead, inquiry begins with teams of teachers studying where their students are, and it empowers them to get better at understanding each student as a learner, planning, teaching, and reassessing. Inquiry supports teachers to learn what they need to learn when they need it by connecting them to each other and to what research says about which practices are likely to work with which students.

**It leads to collective action.** Typically, individual teachers make instructional decisions in their own classrooms, but inquiry provides a systematic way for teachers to utilize each other's expertise and build a shared repertoire of practices that work for struggling learners. It further empowers them to influence school and district-level decision-making with concrete evidence about what is making a difference for their students.

In short, this approach to inquiry maximizes everyone's energy, helping teachers and school leaders to deliberately and efficiently get more students on track for success.



Accelerating Improvement through Inquiry (AI<sup>2</sup>) is a partnership of:



AI<sup>2</sup> is supported by:  
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# Inquiry Cycle Map: Guiding Questions for Inquiry Teams



**ASSESS EFFECTS**  
of current practice

**Priority problem area\***

\* in the form of a data-based problem statement

What patterns of student performance suggest that current practices are insufficient to meet the eight student performance targets of the BPS Acceleration Agenda? *Craft a data-based problem statement to describe current performance at a strand or broad skill level.*

**School-year goal\***

How important is this problem? What are its consequences for students? for the school? *Reframe your problem statement as a goal for this school year that defines desired performance.*

**When and how to assess**

When and how will you assess whether you have met the goal?



**HYPOTHESIZE**  
what to change & why

**Analyze evidence**

Analyze summative and formative assessments and other sources of data related to this problem. What patterns emerge from more detailed (e.g., item and error) analyses?

**Make and test inferences**

What do you infer is the skill gap, misconception, or habitual behavior that's producing these results? *Test this inference against the following questions:*  
 • What else could it be?  
 • If this inference were true, what else would we expect to see?  
 • What evidence confirms this inference?  
 • What evidence contradicts or complicates it?  
*Generate or gather additional sources of evidence (e.g., interview students, give a diagnostic assessment, gather daily attendance data) to refine the problem statement.*

**Analyze current conditions**

Which current school or classroom practices may contribute to or perpetuate this problem for some students? Is "it" being taught? When? How? To which students?

**State what needs to change and why**

What do you hypothesize needs to change to get better results? What small change to classroom or school practices will lead to the greatest improvement for target students?



**DEFINE SUCCESS**  
for this cycle

**Learning target/  
Cycle goal\***

Define success: what each target student will be able to do as a result of this change. (Example: Students will add fractions with unlike denominators with 80% accuracy.)

**How to assess**

What will count as evidence that students "got it"?  
 How will you design tasks/items that assess the targeted skill precisely enough to know if your efforts have produced the desired results? *Be specific.*

**When to assess**

When will you assess whether this change led to more students meeting the cycle goal?



**PLAN & ACT**

**Plan**

Who will do what? When?

Strategize about *how* to do this: What can you build on? What will get in the way? How will you manage this context?

**Act**

What's the evidence that the intended actions took place?  
 What did you learn about your students, your school, and yourself?



**ASSESS EFFECT**  
of this cycle

**Analyze evidence:**  
• to assess effect of this cycle\*

Did you accomplish what you set out to in the time you expected? Who "got it" or progressed? Who didn't? What evidence do you have? How confident are you in that evidence?

• to identify next learning target

What does that evidence suggest may be the next limit to growth?

This analysis will help to develop your next hypothesis.



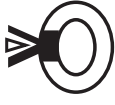
Attach implementation plans, assessments, student performance data, etc.

# Inquiry Cycle Map

School: \_\_\_\_\_

Team: \_\_\_\_\_

Date: \_\_\_\_\_



**ASSESS EFFECTS**  
of current practice

**Priority problem area\***  
\* in the form of a data-based statement

**School-year goal\***

**When and how to assess**



**HYPOTHESIZE**  
what to change & why

**Analyze evidence**

**Make and test inferences**

**Analyze current conditions**

**State what needs to change and why**



**DEFINE SUCCESS**  
for this cycle

**Learning target/  
Cycle goal\***

**How to assess**

**When to assess**



**PLAN & ACT**

**Plan**

**Act**



**ASSESS EFFECT**  
of this cycle

**Analyze evidence:**  
• to assess effect of this cycle\*

• to identify next learning target

This analysis will help to develop your next hypothesis.



Attach implementation plans, assessments, student performance data, etc.

# Inquiry Cycle Map

School: **SAMPLE MIDDLE SCHOOL** Team: **WRITING** Date: **Oct 2009**

  
**ASSESS EFFECTS**  
of current practice

**Priority problem area\*** Over the past three years, our 7th graders averaged 11.2/20 overall and 6.1/12 for topic development on the MCAS ELA long composition.  
\* in the form of a data-based problem statement

**School-year goal\*** 100% of our 7th graders will earn at least 8/12 possible Topic Development points on the 2010 MCAS long composition.

**When and how to assess** 7th grade ELA MCAS — March 2010

  
**HYPOTHEESIZE**  
what to change & why

**Analyze evidence** In the past three years, 7th graders averaged 6.1/12 possible points in the topic development category and 6.7/8 on conventions (convention scores have been trending upward). Students in the Warning and low Needs Improvement levels averaged 4.4 on topic development; in past essays, students maintained a general focus or idea, but did not elaborate with sufficient detail.

**Make and test inferences** We identified 50 target students who scored between 2-6 on topic development and ruled out 5 students who had excessive absences. We looked at these students' responses to last year's common analytical writing assignment and noted that most had a general theme of what they wanted to say, but it was not clear nor was it well-developed. Papers that were more than one page long had a lot of repetition of thoughts, and they were not well organized.

**Analyze current conditions** We weren't sure whether students had received explicit instruction on thesis development, so we talked to our 6th grade colleagues and found that it is not specifically included in the G6 curriculum. Only one teacher had directly taught elements of analytical writing in 6th grade.

**State what needs to change and why** Instead of assuming that students come to 7th grade having been taught how to write and expand on a good thesis statement, we will teach it directly early in the year.

  
**DEFINE SUCCESS**  
for this cycle

**Learning target/ Cycle goal\*** 100% of target students will be able to successfully write a thesis statement and will score at least a 2/3 on the skill assessment

**How to assess** Students will be given three familiar topics and will write a thesis statement that includes a position and at least two major supporting ideas for each topic (e.g., "The school day should not be extended because many students need to work, it is unsafe, and students need time to be with family," or "Frederick Douglass's speeches are still relevant today because...")

**When to assess** Thursday October 15th, after one week of classroom lessons on thesis development

  
**PLAN & ACT**

**Plan** We will create lessons on how to write a thesis statement and teach them to the 7th grade ELA classes for one week. All 7th grade ELA teachers will teach this lesson. The literacy coach will work with our two new teachers and the SEI teacher, who may need additional scaffolding.


**Act** 4 of 6 ELA teachers delivered the lessons as planned. One was out sick with the flu; one other struggled with classroom management and wasn't confident in the effectiveness of the week's lessons.

  
**ASSESS EFFECT**  
of this cycle

**Analyze evidence:**

- to assess effect of this cycle\*** 32 of the 50 target students (64%) scored 2 or 3 on the thesis-statement assessment. Of the other 18, 10 had missed 2 or more days during the week the unit was taught. (Our team lead will report this to the ILT and check whether any of those 10 students are part of the ILT's target group as they try to improve attendance.)
- to identify next learning target** What we taught was effective for most of the students who "got the dose." To move the other 18 students, we will analyze their responses to determine next steps.

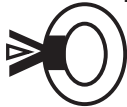
This analysis will help to develop your next hypothesis.



**Attach** implementation plans, assessments, student performance data, etc.

# Inquiry Cycle Map

School: **SAMPLE HIGH SCHOOL** Team: **ILT** Date: **September 2009**



**ASSESS EFFECTS**  
of current practice

**Priority problem area\***  
\* in the form of a data-based problem statement

101 of our 298 9th graders (34%) were absent more than 20 days last year. 40 students had between 20-60 absences last year.

**School-year goal\***

The 40 identified target students will miss 15 or fewer days in the 10th grade.

**When and how to assess**

Check attendance at the end of each quarter and at the end of the year.



**HYPOTHESIZE**  
what to change & why

**Analyze evidence**

We analyzed CLI data and found that 61 students had >60 absences or >20 tardies last year in G9. We selected 40 students who had been absent 20-60 days and were tardy 19 or fewer days to be our target group. 82% of those 40 students were absent in clumps of days; 30 missed the first two days of the year; 18 missed school mostly on Mondays and Fridays; and 13 missed whole weeks before or after school vacations. We suspect that communication and feedback to students and parents about attendance is inconsistent.

**Make and test inferences**

**Analyze current conditions**

The ILT interviewed a sample of students with poor attendance at the end of last year: 65% felt that no adults cared whether they came to school or not, and 53% reported that their parents did not know they were absent so frequently. Our current practice is for an automated phone message to call home when a student is out, but many phone numbers in our records are outdated.

**State what needs to change and why**

We need to send a clear, immediate, and consistent message that adults **do** notice and care whether students come to school; we'll do so with phone calls to target students and their families before school and each of the first two days.



**DEFINE SUCCESS**  
for this cycle

**Learning target/  
Cycle goal\***

100% of our 40 target students will attend the first two days of school.

**How to assess**

We will closely check that the target students attend each of the first two days of school.

**When to assess**

By the end of each of the first two days of school.



**PLAN & ACT**

**Plan**

Each member of the ILT will call four target students before school starts, using common talking points to ensure the students understand the importance of the first two days of school. Follow-up calls will be given after each of the first two days, both to students and parents ("Glad you came!" or "We missed you").

**Act**

All team members attempted calls to their designated target students. We successfully reached 21 of the 40 students and family members of 11 others. The phone numbers we had for the other eight were outdated.



**ASSESS EFFECT**  
of this cycle

**Analyze evidence:**  
• to assess effect of this cycle\*

This was successful with 31 of the 40 target students (77.5%). Only 9 target students missed both of the first 2 days—this is a 50% reduction from last year! 7 of these 9 students also missed the first 2 days last year; 6 had outdated phone numbers; 2 said they weren't coming

• to identify next learning target

We will ask advisory teachers to procure correct, current phone numbers for all students' families to update school records (and will particularly test numbers for all target students).

This analysis will help to develop your next hypothesis.



Attach implementation plans, assessments, student performance data, etc.