APPENDIX A
METHODOLOGY

Case studies offer rich information about how schools implement practices in different contexts. This section describes how the six case study schools were selected, the procedures and instruments used to collect data, and the steps taken to analyze the data.

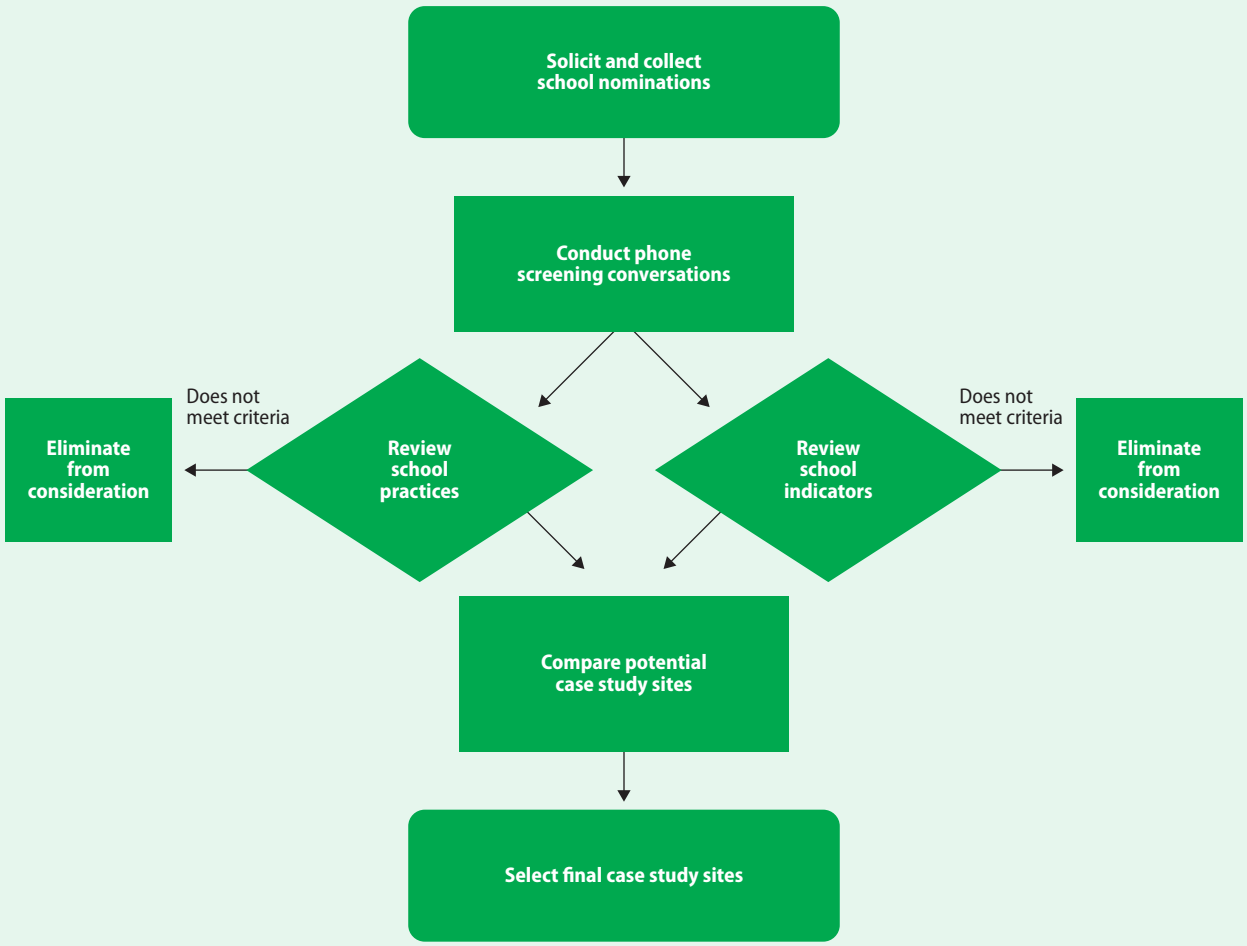
School selection process

Nomination, screening, review, and selection of case study sites were carried out during the 2006/07 school year. The process is described below (figure A1).

Soliciting nominations. Researchers solicited nominations for case study schools from the following types of education leaders:

- State education leaders in special education.
- Leaders of special education district collaboratives in Massachusetts and Boards of Cooperative Educational Services in New York. Both types of bodies provide special education services for schools in many districts.
- District leaders, including superintendents, special education directors, and math coordinators.

FIGURE A1
Process for selecting case study schools



Source: Authors' schematization based on process described in text.

- University professors in math and special education.

- Leaders of projects by nonprofit research institutions that focus on both math education and students with disabilities.

To identify the most appropriate leaders to target for school nominations, researchers drew on the contacts and knowledge gained from three Education Development Center, Inc. projects: the Urban Special Education Leadership Collaborative, Addressing Accessibility in Mathematics (funded by the National Science Foundation; NSF), and Mathematics for All (funded by NSF). These leaders were asked to use their knowledge of district or school initiatives to nominate schools they believed were making strong, targeted efforts to improve the math learning of students with disabilities and other struggling learners. To help provide a common set of nomination criteria, the research team provided them with a list of suggested practices (drawn from the research literature [described at the beginning of this report; table A1]) and asked them to identify the school's strengths in one or more areas. They could also cite practices not on the list to support their reasons for nominating a school.

All communications during the nomination and screening process were carried out under task 1.1 of the Northeast and Islands Regional Educational Laboratory: need-sensing work in the areas of special education and math education. This process ultimately yielded 38 nominations, 19 each from Massachusetts and New York.

Screening the nominations. Reviews of publicly available data on each school's demographics, annual yearly progress status, and grade 4 math state assessment results were used to screen the nominated schools. Project staff determined each school's need-level category and then compared its assessment results with the averages for that need level (see appendix C). Conversations with contacts at the nominated schools were used to verify and learn more about specific practices.

The project staff then determined whether the identified practices met the following criteria:

- *The school serves general and special education students.* Schools that serve only students with disabilities or a special subgroup within that population were eliminated from consideration because such schools are often more highly specialized and do not reflect the types of student populations that most schools in the region face.

- *The school includes a grade 4.* Because it was important to have a standardized measure of student math performance in the case study schools—and grade 4 was the only elementary grade tested in math before 2005/06 in both Massachusetts and New York—only elementary schools with a grade 4 and publicly available state math assessment results for both general and special education students were considered.

- *The school serves a medium- to high-need population.* Medium- to high-need schools were preferred because lessons learned from these schools are likely to be of greater interest across the region than those from schools with less challenging populations, greater resources, or both.

- *The school has been using its math curriculum for more than one year.* Because implementing a new curriculum often involves particular challenges for teachers, schools in their first year of implementation were eliminated.

- *The school made adequate yearly progress in math during 2005/06.* Schools that did not meet adequate yearly progress were eliminated because their status could raise questions about the school and its practices. This standard was based on the No Child Left Behind report cards for 2005/06 for Massachusetts and 2004/05 for New York. Many elementary schools (including all of the ones selected) did not have adequate yearly progress determinations for students with disabilities because fewer than 40 grade 4 students had disabilities.

TABLE A1

School practices suggested by the research team to guide nomination of schools

Category	Practice
Classroom math instruction	
Instructional strategies and time	Uses instructional strategies such as peer tutoring, graphic organizers, differentiated instruction, and multisensory approaches, to make math accessible to students with disabilities and other struggling learners
	Uses computers or other technologies to support math learning among students with disabilities and other struggling learners
	Allocates additional time for math instruction and uses that time effectively to meet the needs of a range of learners
Staffing arrangements	Has math specialists who provide coaching, resources, or support to teachers
	Places additional staff, such as special educators, in general education classes
Math supports and interventions	
Services for students with disabilities and other struggling learners	Provides math support services (math tutoring programs, additional math classes, other programs during or outside the school day) to help all struggling learners
Intervention programs for students without Individualized Education Programs	Has Response to Intervention program in place to identify struggling learners in math and provide them with interventions.
	Has program that focuses on grades K–3 in order to provide early intervening services for struggling math learners
Assessment	
Assessment strategies for math	Uses variety of assessment strategies, including formative and benchmark assessments, and uses assessment data to inform instruction
Support for students who perform poorly on state assessments	Provides classes or other kinds of support for students who perform poorly on standardized math assessments
Collaboration	
Collaboration between general educators and special educators	Implements strong collaborative practices, such as coteaching
	Provides coplanning time during the day, when general and special educators can work together to plan lessons, assessments, accommodations, and interventions
Professional development	
Professional development	Has a professional development program (study groups, professional learning communities, coaching, workshops, institutes) geared toward improving one or more of the following: math teaching practices for students with disabilities, math content, inclusive practices, differentiated instruction, and collaborative teaching
Leadership	
Leadership	Leaders (math coordinators, special education coordinators, principals, and others) engage in practices that focus on improving math learning for all struggling learners and spearhead initiatives to improve math learning for all struggling learners or practices in other relevant areas, such as math teaching, special education services, and collaboration

Note: These practices are from six of the seven practice categories. The school culture category was not used in the school selection process; however, it was incorporated into the site visits and data analysis.

Source: Authors' compilation based on research data described in the beginning of the report.

- *The school met the project's criteria for the performance of students with disabilities on the grade 4 state math assessment.* Project staff used datasets from Massachusetts and New York and the data analysis reports in this series to compare each school's performance with the averages for schools in the same need-level category to determine whether the school met or exceeded that average for at least two of the three years examined. (See appendix C for assessment data on the six schools and explanation of need-level categories.)

Schools that did not meet the screening criteria were eliminated from consideration, reducing the pool from 38 schools to 10.

Selecting the case study schools. For the remaining 10 schools phone conversations with principals or math specialists at the schools were used to gather more detail about the school's nominated practices and to learn about other practices the schools believed were benefiting the math learning of students with disabilities or other struggling learners. Gathering additional information on schools and their practices after the nomination phase was an essential part of the site selection process. The education leaders who nominated schools helped direct the project team to a pool of potential case study candidates, but because these leaders (most often state or district leaders) tended to be removed from the day-to-day workings of the schools, they typically did not have in-depth knowledge of individual school practices.

The data on schools' characteristics and detailed practices gathered by the project team from publicly available sources, principals, math leaders, and designated school contacts was the most important determinant in the selection of the case study schools. The project team discussed the information for each school, first individually and then in comparison with the other candidates. A matrix was created to organize the 10 schools' practices.

Because the project's goal was to describe a wide variety of math education practices for students with disabilities and other struggling learners in diverse settings, sites were selected to maximize the variety of practices across major categories. In comparing schools, the team gave more weight to schools whose practices appeared more closely aligned with research and policy recommendations and those whose approaches had been in place longer. For schools with similar practices the team assigned greater weight to schools with higher need levels and more diverse student populations. In considering these different factors, the project team discussed different combinations of sites before selecting the six schools (tables A2 and A3).

Data collection

Two-day site visits were conducted between March and June 2007. During these visits researchers observed classrooms, interviewed teachers and administrators, and gathered primary documents. The primary contacts were the principal at Cedar Elementary School, an assistant principal at Redwood Elementary School, a Title I math leader at Aspen Elementary School, the informal math leader at Maple Elementary School, a math coach at Beech Elementary School, and a school administrator at Willow School.

All site visits were conducted by at least one of the two project leaders and at least one of the two research associates. This arrangement helped the researchers maintain consistent observation and interview procedures across the six schools. The researchers worked in pairs, with the pairings rotating both within and across schools to ensure quality control and provide multiple perspectives for data corroboration of classroom observations.

The project targeted the following staff members for interviews and observations at each school:

- Administrator (principal, assistant principal).
- Math coach or leader.
- Grade 4 general education teacher.

TABLE A2
Similar math practices at the six case study schools, 2006/07

Math practice	Cedar Elementary School: math lead teacher who works with students and teachers	Redwood Elementary School: integrated classrooms, multiple support services	Maple Elementary School: professional learning communities	Aspen Elementary School: Primary Prevention Response to Intervention program	Beech Elementary School: math coaches, multiple support services	Willow School: pairing of elementary and middle school teachers
Classroom math instruction		✔				✔
Math supports and interventions	✔			✔	✔	
Assessment				✔		
Collaboration		✔	✔			✔
Professional development	✔		✔		✔	
Leadership[a]						
School culture[b]						

a. No school was nominated specifically for the leadership category, perhaps because nominators identified practices that provide direct services to students with disabilities rather than practices such as leadership that have more indirect relations with student learning.

b. School culture was not used in the screening process, but was incorporated into site visits and data analyses.

Source: Authors' compilation based on interviews with staff at case study schools and primary documents described in this appendix.

- Grade 3 general education teacher.
- Grades K–2 general education teacher.
- Special education teacher providing in-class or resource room services.
- Teaching assistant and paraprofessional.
- Other key informants suggested by the school's primary contact, including special educators in integrated or inclusion classrooms, special educators in separate special education classrooms, early interventionists, a special education service coordinator, and teachers who worked together to design a schoolwide assessment for the early grades.

In preparation for the site visits the project team provided each school's primary contact with a list of the staff positions noted above and requested that the primary contact recruit participants in each role for interviews and classroom observations. The team asked the primary contacts to select staff members knowledgeable about the school's math education or special education practices. To gain different perspectives at each school, the team also asked the primary contact to schedule at least one new general or special educator for an interview, a classroom observation, or both. The primary contacts made recruitment and selection decisions and scheduled site visits.

Classroom observation procedures. At each school the research team observed math lessons in a variety of classrooms, including general education, inclusion, and separate special education settings. After each observation, team members interviewed the teachers. Classroom observations (typically lasting one class period) were conducted by pairs of researchers who followed a common observation protocol. (This protocol was guided by a project leader's work on the Addressing Accessibility in Mathematics project, funded by the

TABLE A3
Characteristics of case study schools, 2006/07

Characteristic	Cedar Elementary School	Redwood Elementary School	Maple Elementary School	Aspen Elementary School	Beech Elementary School	Willow School
Geographic setting	Urban Massachusetts	Urban New York	Rural New York	Suburban Massachusetts	Urban New York	Rural Massachusetts
Number of students	430	970	230	380	1,240	420
Grade span	1–4	PreK–6	K–4	K–4	K–5	PreK–8
Need level	High[a]	High (N/RC 2[b])	Average (N/RC 5[b])	Medium[a]	High (N/RC 1[b])	Medium[a]
Title I school[c]	Yes	Yes	Yes	Yes	Yes	Yes
Percentage of students of races other than White	88	95	2	4	98	31
Percentage of students eligible for free or reduced-price lunch	91	84	37	17	81	14
Percentage of students with disabilities (percent with Individualized Education Programs)	12	21	12	14	10	22
Percentage of students who are English language learners	18	11	0	4	10	6

a. For Massachusetts this report used the methodology of the New York City public schools, calculating need level by weighing three separate school measures: the percentage of students who receive free or reduced-price lunches, the percentage of students with disabilities, and the percentage of students with limited English proficiency. As part of the data analysis for the companion Massachusetts report in this series, schools were assigned need-level categories of low, medium, or high. (For more details see appendix C.)

b. For New York schools need level was determined by a need-to-resource-capacity (N/RC) index developed by the New York State Education Department. This index has two components: a district's level of need (defined by the percentage of students eligible for free or reduced-price lunch) and its level of resources (defined by the combined wealth ratio). There are seven need-to-resource-capacity index categories. (For more details see appendix C.)

c. Indicates that the school has a schoolwide or targeted Title I assistance program. Maple has Title I funding for reading but not for math.

Source: Authors' compilation based on interviews with staff at case study schools and primary documents described in this appendix.

National Science Foundation.) Fifty-two classroom observations were conducted across the six schools.

The goal of the classroom observations was to gather descriptive information on teachers' practices to guide conversations with teachers afterwards, provide evidence of the use of practices, and collect concrete examples that could illustrate the school's practices in vignettes in the case study report. During interviews the researchers asked teachers to provide more information about specific practices used during the observation. The researchers then compared the strategies teachers described in interviews with practices observed in the classroom to identify areas of data consistency and inconsistency.

During each observation the researchers took detailed notes on what the teachers and students said and did throughout the math lesson. The researchers took a purely descriptive approach and did not evaluate or rate the practices. The project built consistency across researchers by having researchers conduct frequent discussions of the observations and review their field notes together.

During an observation of either a general or special education math class, the researchers took notes on the following areas:

- Teacher's instructional practices for making math accessible to all students
    - Type of instruction (whole classroom, small group, pairing of students, one-on-one attention to particular students).
    - Method of instruction (lecturing, giving examples orally or on the board, having students perform examples on the board).
    - Time given to slow and fast workers to complete problems.
    - Grouping of students (homogenous or heterogeneous).
    - Use of different materials (manipulatives, overheads, individual wipe boards, sheets for following along, other hands-on materials).
    - Teacher's role when students are working individually (help getting individual students started, waiting for students to ask for help).
- Teacher's interaction with students
    - Does the teacher wait for the student to ask for help or focus on students who are struggling?
    - What does the teacher do while students are working in small groups or individually?
    - What is the teacher's procedure for answering questions (do students come up to her desk, raise their hand)?
- Teacher's strategies for engaging all students
    - Strategies used to ensure that all students are on task (calling on students, standing next to them, moving students around).
    - Grouping of students.
- Teacher's approaches to helping struggling students, including types of accommodations and interventions used
    - Are students given different or modified assignments?
    - Are students given additional directions?
    - Do students receive additional help to start the assignment?
    - Are students working separately with a resource room teacher or aide?
    - Are students sent to the resource room during math time?
- Use of different types of materials, including computer technology, in the classroom
    - What types of materials are used?
    - Are they available to all students or only to struggling learners?
    - Are the materials freely available to students or kept in a cabinet controlled by the teacher?
    - Is there a space dedicated to using special materials, or do students bring the materials back to their desks?
    - Is computer work directed, or are computers used only during students' free time? Do struggling learners get an opportunity to use the computer?
- Seating arrangement for students
    - How are the desks arranged (grouped together or in rows)?
    - Do all students face the board?

    - How do students seem to be grouped? Are fast and slow learners grouped together or taught in their own groups?
    - Do the students move around during class?
    - How is the space in the room used?
- Roles of and communication and collaboration among classroom staff
    - Do teaching assistants or special educators focus on particular students, or are they available for general help?
    - Do teaching assistants and special educators work with an assigned group?
    - What do teaching assistants and special educators do while the lead teacher is giving whole class instruction?

Interview procedures. All interviews were conducted based on agendas tailored to the school and the roles of the staff at the school. The choice of school-specific topics was based on information gathered from phone conversations with the principals or math lead teachers during the site selection process (tables A4 and A5). Across the six schools, researchers conducted 55 interviews, which were recorded and transcribed. Interviews lasted 40–75 minutes.

Training and staffing procedures for the six site visits. To prepare for each site visit, the four researchers reviewed the preliminary information gathered on the school through the nomination and screening process. The team identified and discussed topics on which to focus to find out more about the school's practices. Through these discussions researchers established a common understanding of the goals for each site visit. During each visit researchers met at the end of the first day to discuss information from the interviews. They identified

TABLE A4
Issues examined at each school, 2006/07

School and setting	Topic
Cedar Elementary School, urban Massachusetts	Math lead teacher Use of assessments and data Multiple support services
Redwood Elementary School, urban New York	Integrated classrooms Continuum of services America's choice model Administrative structure
Maple Elementary School, rural New York	Professional learning communities Use of math software programs School-based intervention team Inclusion classrooms
Aspen Elementary School, suburban Massachusetts	Language-based inclusion classrooms Response to Intervention program Title I math services Special education resource room
Beech Elementary School, urban New York	Math coaches Workshop model Design of assessments Multiple support services
Willow School, rural Massachusetts	Pairing of elementary and middle school teachers Inclusion classrooms Responsive classroom model

Source: Authors' compilation based on interviews with school principals, math leaders, and designated contacts at the six case study schools.

TABLE A5
Role-specific focus, number of staff observations, and number of interviews, 2006/07

Role	Focus	Number of observations	Number of interviews
School leaders			
Administrators	Role and leadership style, vision and programs for math and special education, support for teachers	0	9
Math leaders, including math lead teachers, coaches, and specialists	Role and work with teachers and students	8	7
General education teachers			
Grades K–2 teachers	Early intervention strategies	9	3
Grade 3 teachers	Strategies for accessibility, differentiation, and classroom assessment	8	6
Grade 4 teachers	Areas of difficulty for students, math teaching methods, and state test preparation	9	6
Special education teachers			
Resource room teachers	Supports and interventions for students with disabilities	6	9
Inclusion and collaborative classroom teachers	Experiences with coteaching and coplanning	3	3
Separate special education classroom teachers	Instructional approaches, particularly for multigrade classrooms	2	3
Intervention specialists	Role and intervention program	1	2
Service coordinators	Role and availability of special education services	0	1
Teaching assistants	Role, experience, and collaboration with general and special education teachers	6	2
Assessment design team	Experience creating, administering, and analyzing assessments	0	4
Total		52	55

Source: Authors' compilation based on interviews with school principals and math lead teachers at the six case study schools.

information that was contradictory, unclear, or missing and planned ways to obtain clarification and additional information on the second day. At the end of each visit the project team met again to discuss and consolidate information.

The four members of the research team reviewed and discussed the project's research questions and data collection instruments (the classroom observation protocol and specific topic agendas for individual interviews) before each site visit. All four members of the team participated in the first site visit (at the Maple Elementary School), to ensure that all team members were following similar data collection procedures and to have a shared experience on which to base discussions and reconcile different data observations and interpretations. Both for training and quality control purposes, each of the project's two team leaders was paired to work with one of the research associates for each classroom observation and interview during the first site visit.

Primary documents collected from each school included school improvement plans, school mission or vision statements, grade 4 report cards, and examples of pre-referral forms for special education services. At some schools researchers also collected other materials, such as districtwide math scoring rubrics, math curriculum pacing calendars, school technology plans, and school newsletters.

Data analysis

Several steps were followed to conduct the individual- and cross-case analyses. These procedures are described below.

Individual case analysis. A detailed set of codes was developed to categorize the data obtained from teachers and administrators. These codes classified the following information:

- Descriptions of how the school organized and implemented math education practices in classroom math instruction, math supports and interventions, student assessment, staff collaboration, professional development, leadership, and school culture.
- Opinions about the school's strongest practices for improving the math learning of all struggling learners.
- Opinions about the greatest challenges involved in raising the math achievement of all struggling learners.

Coded data were used to assemble preliminary descriptive narratives that answered each of the three primary research questions for each school. Transcript data from interviewees, data from classroom observations, and primary documents were used to corroborate or identify inconsistencies in the preliminary narratives. When interviewees gave different accounts of school practices and field observation notes and other primary documents could not resolve discrepancies, the project team contacted school staff members to verify information. For each school data from all the interviewed administrators and staff were examined to determine which practices were most consistently identified as the school's strongest. Consistently identified strengths were practices identified by two or more interviewees and not identified by any interviewees as a challenge. The most consistently identified strengths were those identified by the greatest number of interviewees. When different practices were cited as strengths by the same number of people, opinions of staff members and administrators with more years of experience at the school were weighted more heavily.

These practices were used to organize the main narratives in the individual case study reports. After the project staff completed the reports, copies were sent to the schools for review. Principals and other key staff members were asked to confirm the accuracy of the descriptions of their practices. The reports were then revised based on their corrections.

Cross-case analysis. Data analysis across cases began by compiling large master matrices containing detailed information from the interview transcripts about the practices in each of the seven practice categories in the six schools. Master matrices were also created to array the strengths and challenges described by interviewees from each school.

Within each of the matrices containing one of the seven practice categories, data were organized along key dimensions that the research literature had identified as important and that describe how practices were executed in schools. The master matrix for classroom math instruction, for example, identified how much time schools designated for classroom math instruction; the types of classrooms in which students with disabilities were placed (general, inclusion, separate special education classrooms); and the types of instructional strategies used to make math accessible to students.

The project team examined the master matrices to identify common themes and patterns within practice dimensions and across schools. This was an iterative process that involved many cycles of returning to the transcript data for additional information and then further refining the matrices. To identify patterns, the team compared and contrasted practices and counted instances of evidence, such as descriptors for a particular practice, within and across schools. The team also searched for outlier practices within schools that

diverged from more common practices among the six schools. When team members disagreed over findings, the researchers reexamined transcript data, observation notes, and primary documents to provide further evidence or refine cross-case generalizations.

Summary tables for each practice category and for school strengths and challenges were created by taking the master matrices, devising overarching descriptions of practices and their constituent dimensions within each school, and organizing practice dimensions to highlight patterns across schools. Final summary tables were created through successive iterations of data consolidation and table review among project team members to verify that identified patterns were valid and consistent with the original data.

The primary goal of the case studies was to describe current school practices, but the identification of common strengths and challenges (as well as outlier practices) across schools allowed the project team to generate tentative hypotheses about how certain practices might lead to different teacher or student outcomes. Whenever rival theories could be discounted through collected data, this evidence was reported. Whenever rival theories could not be invalidated by existing data, this fact was noted to qualify proposed hypotheses as highly preliminary.

Study limitations and ideas for future research

Several limitations of the data and the methodology need to be taken into account. First, the data do not provide evidence that specific school practices are effective or ineffective; the methods do not allow valid causal inferences to be made.

Second, because of small sample sizes and the sample selection methods used, school characteristics and opinions of teachers and administrators cannot be considered representative of all personnel within each school or of broader populations of schools or school personnel. The possibility of selection bias must be taken into account in interpreting the findings. Although not all staff interviewed spoke in consistently positive terms about their work experiences, staff members interviewed may have had more positive views of the school than other staff.

Third, the process used for nominating the schools has some limitations. Because many leaders are removed from the day-to-day workings of schools, they may have nominated schools that have strong reputations, overlooking other schools that also have noteworthy practices. In addition, the education leaders targeted for school nominations tended to be extremely busy. Thus, leaders who responded to the call for nominations may have worked in jurisdictions with more resources or readily available information to participate in the project. If so, the sample of nominated schools may be biased toward those in jurisdictions with more resources or other characteristics.

Fourth, because of time constraints, the study did not solicit the views of students, parents, and district administrators. Case studies of students with disabilities and other struggling learners would shed light on how well different school practices may be meeting student needs and affecting math learning. Longer site visits would allow researchers to gather information about the broader context of each school by interviewing district administrators and parents.

Fifth, the visits to each site were limited in scope. Additional visits would allow researchers to observe school practices, such as child study team meetings, that do not occur daily. Future studies could observe professional development activities as well as classroom practices.

Sixth, there are limitations to the cross-case analysis. Most of the data for this project came from interviews that covered topics tailored to specific schools and personnel playing specific roles. Because of the constraints of this fast-response project, the researchers were unable to administer a systematic survey of standardized questions

to school personnel across all sites. Thus, variations in interview questions across personnel and schools may have resulted in different information on particular practices for specific schools. Findings about commonalities and differences across the schools, therefore, cannot be viewed as definitive. Because many similar themes were voiced by study participants, despite different topic agendas and interview conditions, the common descriptions of school practices and characteristics should be viewed as provocative and worthy of further study.

APPENDIX B
SIDE BY SIDE SUMMARIES OF CHARACTERISTICS AND PRACTICES AT THE SIX CASE STUDY SCHOOLS

TABLE B1

In-class math services for students with disabilities at the six case study schools by classroom type, 2006/07

Classroom type	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
General education classroom						none
Student composition						
General education students	Majority	Majority	Majority	Majority	Majority	
Students with disabilities	Very few	A few	A few	A few	A few	
Staff						
General educator	Full-time	Full-time	Full-time	Full-time	Full-time	
Special educator, in-class math support	None	Hours vary[a]	Hours vary[a]	Hours vary[a]	Hours vary[a]	
Teaching assistant and paraprofessional[b]	None	None	Part-time	Part-time	Part-time	
Other in-class math support	None	Occasional[c]	—	Hours vary[d]		
Integrated or inclusion classroom						
Classroom name	None	Integrated	Inclusion	Language-based	Collaborative	Inclusion[e]
Student composition						
General education students		Half or more	Half or more	Half or more	60 percent	Three-fourths
Students with disabilities		Up to half	Up to half	Up to half	40 percent	A fourth
Staff						
General educator		Full-time	Full-time	Full-time	Full-time	Full-time
Special educator		Full-time	Hours vary[a]	Hours vary[f]	Full-time	Hours vary[g]
Teaching assistant and paraprofessional[b]		none	Hours vary[a]	Part-time	Full-time	Part-time
Other in-class math support		On request[c]	—	Hours vary[d]	—	Two periods per week (middle school math teachers)
Separate special education classroom[h]						
Classroom name	Substantially separate	Self-contained	None	None	Self-contained	None

(CONTINUED)

TABLE B1 (CONTINUED)

In-class math services for students with disabilities at the six case study schools by classroom type, 2006/07

Classroom type	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Student composition						
General education students	na	na			na	
Students with disabilities	10–15 students	8 or 12 students			8 or 12 students	
Staff						
General educator	na	na			na	
Special educator	Full-time	Full-time			Full-time	
Teaching assistant and paraprofessional[b]	Full-time	Full-time			Full-time	
Other in-class math support	Part-time[i]	Occasional[c]				

na is not applicable.

— is not available.

a. Services depend on students' needs according to their Individualized Education Programs. At Redwood these services cannot exceed five hours a week per student.

b. Teaching assistants and paraprofessionals are assigned to classrooms, not individual students.

c. The math specialist supports teachers with lesson plans, demonstrations, student assessments, and occasionally in-class support.

d. The Title I teacher or one of her two teaching assistants provide in-class math support whenever possible based on student needs and teacher schedules.

e. All general education classrooms are defined as inclusion classrooms.

f. The Title I math teacher and the special education resource room teacher together provide full-time in-class math support to one classroom of students with language-based disabilities.

g. The special educator serving students below grade 5 provides only pull-out services, while the special educator for the upper grades provides in-class services.

h. Does not include districtwide programs serving students with severe cognitive, emotional, behavioral, or physical disabilities.

i. The special education resource room teacher provides support for grades 3 and 4 during classroom math instruction time.

Source: Authors' compilation based on primary documents gathered at schools and interviews with administrators and staff, as described in appendix A.

TABLE B2

Staff teaching experience and background at the six case study schools, 2006/07

Staff	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Principal						
Years at school	1	8	7	14	4	11
Years in education	33	More than 25	30	36	More than 38	About 25
Other information	Prior experience as assistant principal at another school Former special educator	Prior experience as assistant principal at another school Taught grades 4, 5, and 6 for eight years	Served as assistant principal during first year at school	Prior experience as assistant principal at another school Former special educator	Prior experience as assistant principal at three other schools Former district math coordinator and math teacher	Prior experience as a principal at another school Former special educator
Math leader						
Years at school	18	7	24	14	More than 10	11
Years in education	18	More than 34	24	More than 14	—	13
Other information	Previous math lead teacher for the district	Taught grades 2, 4, 5, and 6	Also the inclusion classroom general educator for grade 4	Title I math teacher Previous district math coordinator	A school math coach Taught grades 3–5 Lead coach for the region	Grade 8 math teacher and informal lead math teacher
General educator[a]						
Years at school	8	8	24	8	4	20
Years in education	14	8	24	14	More than 6	20
Other information	Grade 4 general educator Teaches grade 4 struggling learners in the after-school program	Grade 4 integrated classroom general educator	Grade 4 inclusion classroom general educator	Grade 4 language-based classroom general educator Has served as a special educator	Grade 2 collaborative classroom general educator	Grade 3 general educator paired with middle school math teacher Served on district math committee Assistant principal at another school during two-year leave
Special educator[b]						
Years at school	11	More than 7	31	8	19	7

(CONTINUED)

TABLE B2 (CONTINUED)

Staff teaching experience and background at the six case study schools, 2006/07

Staff	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Years in education	20	20	—	More than 20	27	More than 7
Other information	Grades 1 and 2 special educator	Grade 4 integrated classroom special educator	Grades 3 and 4 previous special educator Currently an administrator at another school	Special educator, resource room director	General education teacher support services (GETSS) teacher	Grades K–2 special educator

— is not available.

a. The noted general educator at each school participated in this project and taught math to students with disabilities or struggling learners.

b. The noted special educator at each school served as an informal special education expert and resource for other staff members.

Source: Authors' compilation based on primary documents gathered at schools and interviews with administrators and staff, as described in appendix A.

TABLE B3

Reported and observed accessibility strategies used for math instruction at the six case study schools, 2006/07

Practice	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Differentiated instruction	✔*	✔*	✔*	✔*	✔*	✔*
Provide small, flexible groups						
Provide one-on-one assistance						
Teach individualized curriculum						
Multi-sensory methods	✔*	✔*	✔*	✔*	✔*	✔*
Use manipulatives and hands-on materials						
Encourage visual and audio activities						
Select kinesthetic and interactive activities						
Math-specific strategies	✔*	✔*	✔*	✔*	✔*	✔*
Use math games						
Model multiple problem-solving approaches						
Teach math language						
Break down problems						
Increase math instruction time	✔*	✔*	✔*	✔*	✔*	✔*
Repeat, reinforce, review						
Integrate math into other subjects						
Peer instruction	✔*	✔*	✔*	✔*	✔*	✔*
Encourage paired tutoring						
Use students to teach class						
Other						
Use computers	✔	✔	✔*	✔	✔	
Apply schoolwide instruction model		✔*			✔*	✔*
Highlight success to build student confidence	✔*	*	✔*	*	✔*	✔*
Simplify or rephrase language	*	✔*	✔*	*	✔*	*
Relate lessons to real life	✔*	✔	✔	*	*	

✔ indicates that three or more interviewees mentioned the practice as a strategy at the school.

✔ indicates that one or two interviewees mentioned the practice as a strategy at the school.

* The practice was observed in at least one classroom.

Source: Authors' compilation based on primary documents gathered at schools, staff interviews, and classroom observations, as described in appendix A.

TABLE B4

Math curricula, curriculum support, and instruction time at the six case study schools, 2006/07

Category	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Math program	Scott Foresman/ Addison-Wesley (grades 1–4)	Investigations (grades K–5); Connected Math (grade 6)	Scott Foresman/ Addison-Wesley (grades K–4)	Scott Foresman/ Addison-Wesley (grades K–4)	Everyday Mathematics (grades K–5)	Everyday Mathematics (grades K–5); Impact Math (grades 6–8)
Current year of implementation	2nd	2nd	5th	2nd	4th	7th
Curriculum aligned with state standards	Yes	Yes	Yes	Yes	Yes	Yes
Staff available for curriculum implementation	School math lead teacher	School math specialist	School professional learning communities	District math coordinator[a]	School math coaches	District curriculum coordinator
Time spent on math instruction per day (minutes)	60	60	60	60	60 (grades K–2); 90 (grades 3–5)	60
Schoolwide instructional model	None	America's Choice	None	None	Teacher's College workshop model	Responsive Classroom
Current year of implementation	na	6th	na	na	4th	10th

na is not applicable

a. In Aspen teachers can also get curriculum support from the Title I math teacher and a kindergarten teacher, who are trained to provide this support.

Source: Authors' compilation based on primary documents gathered at schools and interviews with administrators and staff, as described in appendix A.

TABLE B5

Out-of-class math services and programs at the six case study schools, 2006/07

Math services	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Math resource room	✔			✔		
Special education resource room	✔	✔	✔	✔	✔	✔
Before-school program	✔				✔	
After-school program	✔				✔	
Saturday program		✔			✔	
Summer school (districtwide)	✔	✔			✔	
Vacation program (districtwide)	✔					
Response to Intervention program			✔	✔	✔	
Short-term test preparation course	✔			✔		
Other services	✔					

Note: See table B13 for further detail.

Source: Authors' compilation based on primary documents gathered at schools and interviews with administrators and staff, as described in appendix A.

TABLE B6

Summary of math assessment practices at the six case study schools, 2006/07

Assessment	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
State math assessment						
Name	Massachusetts Comprehensive Assessment System	New York State Testing Program	New York State Testing Program	Massachusetts Comprehensive Assessment System	New York State Testing Program	Massachusetts Comprehensive Assessment System
When given	Once a year in May	Once a year in March	Once a year in May	Once a year in March	Once a year in May	Once a year in March
Who analyzes data	Math lead teacher	Assistant principal and math specialist	Principal and teachers in professional learning communities	Principal, elementary school math specialist, Title I teacher, and grade 3 and 4 teachers	Math coaches and principal	Administrators
How data are used	Identify student curriculum difficulties, guide instruction, and identify students needing support	Identify student curriculum difficulties, guide instruction, identify students needing support, and set targets	Identify student curriculum difficulties, guide instruction, and identify students needing support	Identify student curriculum difficulties, guide instruction, and identity students needing support	Identify student curriculum difficulties, guide instruction, and identify students needing support	Identify student curriculum difficulties and guide instruction
Districtwide math assessments						
Name	District math exam[a]	District foundational assessment	District exam (forthcoming)[b]	District benchmark tests (new)	Princeton Review	None
When given	Four times a year	Once (start of year)	Goal: four times a year	Every two chapters and mid- and end-year	Five times a year	
Grades assessed	1–4	3–6	K–4	K–4	3–5	
Who analyzes data	Math lead teacher	Math specialist with classroom teachers	Teachers in professional learning communities	District math coordinator	District	
How data are used	Identify student curriculum difficulties, guide instruction, identify students needing support, and monitor progress	Identify student curriculum difficulties, guide instruction, identify students needing support, and set targets	Identify student curriculum difficulties, guide instruction, identify students needing support, and monitor progress[c]	Not reported	Identify student curriculum difficulties, guide instruction, identify students needing support, and monitor progress[d]	

(CONTINUED)

TABLE B6 (CONTINUED)

Summary of math assessment practices at the six case study schools, 2006/07

Assessment	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
School-based assessments						
Name	None	TerraNova	None	None	Design your Own (DYO) assessment	None
When given		Once (start of year)			Five times a year, grades 1 and 2 Four times a year, kindergarten	
Grades assessed		K–2			K–2	
Who analyzes data		TerraNova and classroom teachers			DYO team and classroom teachers	
How data are used		Identify student curriculum difficulties, guide instruction, identify students needing support, and set targets			Identify student curriculum difficulties, guide instruction, identify students needing support, monitor progress[d]	
Classroom assessments						
Name	Curriculum unit tests; other teacher measures	Curriculum unit tests; other teacher measures	Teacher-designed or textbook assessments	Curriculum unit tests; other teacher measures	Curriculum unit tests; other teacher measures	Curriculum unit tests; other teacher measures
When given	Throughout year	Throughout year	Throughout year	Throughout year	Throughout year	Throughout year
Grades assessed	1–4	K–6	K–4	K–4	K–5	K–5
Who analyzes data	Classroom teachers	Classroom teachers	Classroom teachers	Classroom teachers	Classroom teachers	Classroom teachers
How data are used	Identify student curriculum difficulties, guide instruction, identify students needing support, and monitor progress	Identify student curriculum difficulties, guide instruction, identify students needing support, and monitor progress	Identify student curriculum difficulties, guide instruction, identify students needing support, and monitor progress	Identify student curriculum difficulties, guide instruction, identify students needing support, and monitor progress	Identify student curriculum difficulties, guide instruction, identify students needing support, and monitor progress	Identify student curriculum difficulties, guide instruction, identify students needing support,[e] and monitor progress

a. The district math exam is developed by the four district math lead teachers.

b. The district assessments are at varying stages of implementation in different grades.

c. The principal holds teachers accountable for raising student achievement levels on the districtwide assessments based on student scores.

d. Teachers factor student performance on district and design your own assessments into student report card grades.

e. Teachers use unit tests and other classroom assessments to determine student placement in small groups.

Source: Authors' compilation based on primary documents gathered at schools and interviews with administrators and staff, as described in appendix A.

TABLE B7

Formal collaboration practices among staff at the six case study schools, 2006/07

Collaboration	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Between general educators and						
Within school						
General educators in same grade						
Common planning time	Daily	Daily	Weekly	None	Weekly	Weekly
Grade-level meetings	Semi-weekly	Monthly	Weekly	Occasional	Monthly	Weekly
Math leader						
Grade-level meetings	Weekly	Occasional	—	—	Occasional	None
In-class math support	Upon request	Upon request	None	Arranged with teachers	Upon request	Twice a week
Special educators						
Grade-level meetings	Monthly	Weekly	Weekly	None	None	Weekly
Co-teaching (in inclusion-type classrooms)	None	Daily	Daily	Daily	Daily	None
General educators, multiple grades						
School staff meetings	Semi-monthly	Semi-monthly	—	—	—	Monthly
Vertical grade meetings	—	—	—	Yearly	Yearly	—
Across district						
General educators, multiple grades						
Districtwide meetings	—	Monthly	Monthly	Monthly	Twice a year	—
Between special educators and						
Within school						
Math leader						
Regular meetings	Weekly	Occasional	—	—	Occasional	None
In-class math support	Upon request	Upon request	—	Arranged with teachers	Upon request	None
Special educators, multiple grades						
Regular meetings	Every other week	None	—	—	—	—
Across district						
Special educators						
Regular meetings	Monthly	—	Monthly	1–2 times per month	—	—

(CONTINUED)

TABLE B7 (CONTINUED)

Formal collaboration practices among staff at the six case study schools, 2006/07

Collaboration	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Between in-school math leader and						
Across district						
Math leaders						
Regular meetings	Monthly	Biweekly	Monthly	—	—	—

— is not available.

Note: For further detail see table B14.

Source: Authors' compilation based on primary documents gathered at schools and interviews with administrators and staff, as described in appendix A.

TABLE B8A

Math professional development providers for the six case study schools, 2006/07

Provider	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
In-house providers	Math lead teacher	Math specialist Collegial learning circles	Informal math leader Professional learning communities	Title I math teacher Kindergarten teacher	Math coaches	Middle school math teachers Math committee[a] Study groups
Outside providers	District University partner Curriculum publishers Conferences	District Curriculum publishers Program trainers[b] Conferences	District Curriculum publishers Conferences	Varies[c] Curriculum publishers Conferences	District Local university Curriculum publishers Conferences	District Curriculum publishers Program trainers[d] Conferences

Note: For further detail see table B15.

a. Not active during the year of the study.

b. When the program was introduced, Redwood staff received training in math instruction and the workshop model from America's Choice.

c. The district allows Aspen staff to attend two conferences or other training sessions a year from any outside provider.

d. Willow teachers were trained in Responsive Classroom instructional techniques when the program was introduced. Although Responsive Classroom is not a math program, training for this program is included here because interviews with teachers linked it to positive benefits for math instruction.

Source: Authors' compilation based on primary documents gathered at schools and interviews with administrators and staff, as described in appendix A.

TABLE B8B

Types of professional development provided by the in-house math leaders in the six case study schools, 2006/07

Professional development	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School,[a] Rural Mass., K–8
Schoolwide staff presentations	✔	✔	✔		✔	
Schoolwide staff workshops	✔					
Presentations or support at grade-level meetings	✔	✔			✔	
In-class lesson modeling	✔	✔			✔	✔
Informal support to individual teachers	✔	✔	✔	✔	✔	✔
Support or mentoring for new teachers	✔		✔		✔	

a. In the prior year to the study Willow School had a math committee that made occasional presentations during schoolwide staff meetings; however, during the year of the study the committee was inactive.

Note: For further detail see table B15. The in-house math leaders at each school are the staff members in row 1 of table B8a.

Source: Authors' compilation based on interviews with administrators and staff as described in appendix A.

TABLE B9

Leadership characteristics at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Empowers teachers						
Encourages leadership development	—	"[The principal] does give opportunity. You have the freedom, but you also have responsibility. . . . [For] teachers, [he is trying to] develop the leadership in them." —Assistant principal	—	—	"I tend to give people little jobs, and then see how they accomplish them before I give them bigger jobs. I try to scaffold them into taking responsibility and becoming leaders in their own right." —Principal	"[The principal] really looks at teachers that want to take on roles, so he doesn't hold on to power. . . . That has been totally refreshing for me. . . . I've just been empowered here more so than other places." —Administrator
Grants autonomy	—	"[The principal is] laissez-faire. He lets us do our jobs." —Special education teacher "He doesn't micromanage." —Special education teacher	"[The administrators] don't micromanage; they basically put out the information and allow the professionals, because teachers are professionals, to do the job." —General education teacher	"I think that [teachers] have to feel ownership of what they're going to do. . . . They definitely have to be empowered." —Principal	"Everybody is free to make it their own within some parameters. They're respected as professionals and therefore give respect to their colleagues and to their students." —Math coach	—
Encourages risk-taking, creativity, initiative	"[The principal] welcomes ideas. So, I mean, that's going to help to make the staff more trusting and willing to work together and to take risks." —Special education teacher	"People can be as creative as they want. . . . People are able to try things and know that we're going to support them and [the fact that] they're trying something." —Assistant principal	—	"I'm looking for enthusiasm, creativity, somebody who has got a lot of ideas and they're so excited that they can't wait to share." —Principal	—	"I said, I have [had] this really great experience, and I found it to be really helpful to my instruction. . . . I would love to have an opportunity to share. And so [the principal] said: Would you like to lead a staff meeting? I said sure." —General education teacher

(CONTINUED)

TABLE B9 (CONTINUED)

Leadership characteristics at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Respects teachers						
Listens to opinions	—	"[The principal] is always saying: you are the educational leaders of the classroom. . . . He puts that respect and faith in us. . . . You know that he's willing to listen." —Special education teacher	—	"Our principal listens to us and is great." —General education teacher "I feel that she respects us as professionals." —General education teacher	"Anybody in the school can tell me: 'You're going the wrong way with this.' I'll listen." —Principal	"[The principal] takes advice from the teachers during staff meetings. We have a brainstorming session and everything is written down. . . . There is no questioning anything." —Assistant principal
Treats as equals or treats equally	—	"So the goal here . . . was [to] walk the talk and show staff through my actions . . . that I would not ask them to do anything that I wouldn't do myself." —Principal	"Every one of us is equal, we are all the same, and we all just have a job to do. We're all in the same boat." —General education teacher	"We're here as a group . . . We all have the same vote. We're all here for the same reason so I don't get a bigger vote than anyone else." —Principal	—	—
Supports teachers						
Provides resources and training	—	"[The administration has] helped with resources . . . making professional development available . . . It's been astronomical." —Special education teacher	—	—	—	"[The] teachers and the administration are open to any idea. They don't shut you down or they try to help you get the resources in order to do something different." —Special education teacher

(CONTINUED)

TABLE B9 (CONTINUED)

Leadership characteristics at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Is nurturing and receptive	"I have felt like it's a very nurturing place to work. . . . I have felt welcomed here from day one. The support that I get . . . if I have a question that they don't know the answer to, they find the answer." —Special education teacher	"[The principal] is receptive. He's a good listener. . . . He's going to give you that chance to always sit down with him and discuss what your concerns are. . . . So, he always gives you that respect of not feeling like he is this super administrator that is untouchable." —Special education teacher	—	"As far as the principal, I feel she is very warm. She's very supportive. If there's an issue I feel like I could definitely approach her with it, run it off of her." —General education teacher	—	—

— No quotations were available for this category.

Source: Authors' compilation based on staff interviews.

TABLE B10
Staff culture at the six case study schools, 2006/07

Characterization	Some descriptions from staff
Warm, inclusive community	"The teachers, the quality of teachers, and the community: we're like one big family on personal levels and school levels, which help[s] us build that collaboration for the kids." —Special education teacher at Maple Elementary School
Positive relationships	"Everyone including special ed—we're a team. We all can share resources and ideas and work together." —Special education teacher at Cedar Elementary School
Supportive colleagues	"We have a lot of great teachers here that will bend over backwards and do anything for anybody to really help out." —Special education teacher at Maple Elementary School
Noncompetitive, nonjudgmental peers	"There is a freedom to try new things . . . to share your strengths and your weaknesses. . . . There is a level of comfort. There is just a sense of 'we're all in this experience together.'" —General education teacher at Willow School
Mutual respect and admiration	"We've appreciated our co-workers' efforts. . . . And there is a lot of respect for people because of this, a lot of admiration for this kind of effort. . . . Overall, it's just a nice staff. We have a nice group of people here." —General education teacher at Redwood Elementary School
Flexibility and dedication	"[T]he thing that struck me here is the teachers are very willing to change. . . . We have teachers that are willing to go above and beyond." —General education teacher at Aspen Elementary School
Enjoyable workplace	"It's a very happy place to work; it's very positive. . . . I truly believe that because of [the principal's] aura in this school, it's carried out through the teachers and the children and the assistants. . . . Everyone seems to get along, and I look forward to coming to work everyday." —General education teacher at Aspen Elementary School
Stable staff	"We have longevity here. And longevity says a lot." —Math coach at Beech Elementary School

Note: For further detail see table B19.

Source: Authors' compilation based on staff interviews.

TABLE B11

Staff attitudes toward students at the six case study schools, 2006/07

Attitudes	Some comments from staff
Shared ownership of kids	"I don't think anybody has the thought that their class . . . that those are their only kids. All of the teachers here view every child here as one of their kids." —Special educator at Maple Elementary School
Inclusive of students with disabilities	"[E]veryone is included. Even those learning disabled kids, they're not isolated. They're not in the dungeon, they're not in the basement. Everyone's included, everybody has a purpose and everybody is here." —Primary preventionist at Aspen Elementary School
Know the students	"And what's also good is that we actually have an assistant principal who used to be a special ed teacher, so she's extremely involved with special ed children, and she knows every kid. I think she knows every child with a disability . . . knows everybody's name." —Special educator at Beech Elementary School
Believe in kids	"These kids are great kids. And they know I believe in them. . . . They've given it their all. They've tried their hardest. They work to the best of their ability." —Math leader at Cedar Elementary School
High expectations	"I think we all have high expectations for them. Just because they have disabilities, we don't [give] them any more. . . . We still hold them up to the same standard as everybody else." —Special educator at Redwood Elementary School
Nurturing staff	"There is a lot of nurturing going on. Many of our students are very needy and really are seeking out attention and love and guidance up and beyond just the academic piece. And I think our teachers really try to provide that." —Special education administrator at Redwood

Note: For further detail see table B20.

Source: Authors' compilation based on staff interviews.

TABLE B12

Teacher qualifications and longevity at the six case study schools and in Massachusetts and New York, 2004/05–2006/07

Teacher qualification and longevity	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8	Massachusetts (total), 2005/06	New York (total), 2004/05
State-reported data								
Number of teachers	34	99	18	29	81	49	73,176	221,204
Teachers certified in teaching assignment (percent)[a]	100	90	94	100	97	96	95	93
Total teachers in core classes[b]	31	na	na	27	na	44	60,604	na
Highly qualified teachers in core classes (percent)[c]	100	na	na	100	na	90	95	na
Total core classes[b]	na	260	66	na	260	na	na	763,211
Highly qualified teachers in core classes (percent)[d]	na	97	92	na	98	na	na	95
School-reported data[a]								
Total teachers	35	91	18	28	81	49	na	na
Veteran teachers (five or more years at school)	16	80	9	21	29	34	na	na

na is not applicable.

a. For Massachusetts schools, designates the percentage of teachers who are "licensed with Provisional, Initial or Professional licensure to teach in the area(s) in which they are teaching" (Massachusetts Department of Education 2008). For New York schools, designates the percentage of teachers teaching for five or fewer periods per week outside their certification.

b. Defined by the No Child Left Behind Act as English, reading or language arts, math, science, foreign languages, civics and government, economics, arts, history, and geography.

c. In Massachusetts teachers are considered highly qualified if they hold a valid Massachusetts license and demonstrate subject matter competency in the areas they teach (Massachusetts Department of Education 2008).

d. In New York teachers are considered highly qualified if they have at least a bachelor's degree, are certified to teach in their subject area, and show subject matter competency (http://www.emsc.nysed.gov/irts/reportcard/).

Source: Authors' analysis based on data from Massachusetts Department of Education (2006a); New York Education Department (2005a); and interviews with administrators at each school for 2006/07.

TABLE B13

Out-of-class math services for students with disabilities and other struggling learners at the six schools, 2006/07

Service	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Math resource room						
Staff	Math lead teacher			Title I teacher and teaching assistant		
Students served	Students with Individualized Education Programs and struggling learners (grades 2–4)[a]			Title I students and struggling learners (grades 2–4)		
Special education resource room						
Staff	Special educator	Special educator	Special educators (one each for grades K–2 and 3–4)	Special educator (only grades 1 and 2 for math) and teaching assistants	Special educator	Special educator
Students served	Students with Individualized Education Programs, all grades	Students with Individualized Education Programs, all grades[b]	Students with Individualized Education Programs, all grades[c]	Students with Individualized Education Programs, all grades	Students with Individualized Education Programs, all grades	Students with Individualized Education Programs, all grades
Before-school program						
Name	Before-school				Extended day	
Staff	Math lead teacher and general educators				General educators (grouped by administrators)	
Students served	Struggling learners, teacher-identified (grades 2–4)				Struggling learners from own classroom, teacher-identified, those who scored low 2s on state exam, mandatory	
Frequency and duration	Math leader: every morning (at least 30 minutes per session, twice a week)				Daily (8:00–8:30 a.m.)	
Name					Project Sunrise	
Staff					General educators and special educators	

(CONTINUED)

TABLE B13 (CONTINUED)

Out-of-class math services for students with disabilities and other struggling learners at the six schools, 2006/07

Service	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Students served					Struggling learners, teacher-identified (grades 1 and 2)	
Frequency and duration					Daily (45 minutes, 7:00–7:45 a.m.)	
After-school program						
Name	After-school				Project Sunset	
Staff	General educators				General educators and special educators	
Students served	Students with Individualized Education Programs Struggling learners, teacher-identified (grade 4)				An early intervention program for struggling learners, grades 2–5, academic intervention services (AIS) students, focus on New York State test preparation, based on teacher recommendations and test scores	
Frequency and duration	At least one day a week devoted to math, 40 minutes				Two days per week (one hour and 45 minutes; 3:00–4:45 p.m.)	
Saturday program						
Staff		General educators			General educators	
		Special educators				
Students served		Students with Individualized Education Programs, struggling learners			Grades 3–5, struggling learners	
Frequency and duration		Weekly (three hours per session)			Weekly (three hours and 30 minutes per session, November–May)	

(CONTINUED)

TABLE B13 (CONTINUED)

Out-of-class math services for students with disabilities and other struggling learners at the six schools, 2006/07

Service	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Summer school (districtwide)						
Staff	Math leader teacher and general educators	AIS staff			Principal and general educators	
Students served	Students with Individualized Education Programs, struggling learners	Grades K–6 (not all grades; in the past was only for upper grades), struggling learners who have shown substantial regression without summer services, measured by general education teachers			Grades 3–5, struggling learners (students who have failed the state exam)	
Frequency and duration	Monday–Thursday (half days with math block)				Monday–Thursday (five hours a day, six weeks)	
Vacation program (districtwide)						
Staff	Math leader teacher and general educators				General educators	
Students served	Students with Individualized Education Programs, struggling learners whose scores were close to passing on the Massachusetts Comprehensive Assessment System (MCAS)				Struggling learners	
Frequency and duration	February and April vacations (focus is on MCAS); Monday–Thursday mornings					

(CONTINUED)

TABLE B13 (CONTINUED)

Out-of-class math services for students with disabilities and other struggling learners at the six schools, 2006/07

Service	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Response-to-intervention (RtI) program						
Name			School based intervention team (SBIT)	Primary prevention RtI	General education teacher support services (GETSS) program	
Staff			SBIT coordinator All staff	Primary preventionist	GETSS teacher	
Students served			Struggling learners (all grades)	Struggling learners (grades K–2)	Struggling learners (grade 2: teacher identified; grades 3–5: AIS students)	
Other programs and services						
Name	Lunch group	Extended Day			AIS support	Informal time before and after school, during recess for extra help
Staff	Math lead teacher				General education teacher	General educators and special education teachers; grade 6 teachers have a schedule among them to cover the days of the week
Students served	Struggling learners, grade 4 (any who wish to participate)					General education students and students with disabilities
Frequency and duration	When math leader has time and throughout the year				8:00–8:30 a.m. everyday	Middle school teachers stay until about 4:00 p.m. everyday
Name	MCAS camp (districtwide)			MCAS preparation (districtwide)		
Staff	General educators			Staffed by teachers who apply		

(CONTINUED)

TABLE B13 (CONTINUED)

Out-of-class math services for students with disabilities and other struggling learners at the six schools, 2006/07

Service	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Students served	Grades 2–4 (districtwide)			For MCAS students at risk and those recommended by teachers		
Frequency and duration	Starts in June, lasts for five weeks, 8:15 a.m.–12:30 p.m.			Held twice a week for 10 weeks just before the math MCAS before school, 8:00–8:50 a.m.		

a. In January the math lead teacher stops serving grade 2 students and focuses on MCAS preparation for grades 3 and 4 students whose scores were on the border between passing or failing the test.

b. Students eligible for AIS services in math are typically served by general educators in general education classrooms.

c. Students eligible for AIS services in math are served by teachers whom the staff consider most appropriate to help the student with his/her specific needs.

Source: Authors' compilation based on interviews and personal communication with staff and primary documents gathered at schools, as described in appendix A.

TABLE B14
Formal collaboration practices in the six case study schools, 2006/07

Collaboration	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Between general educators and						
Within school						
General educators from same grade level						
Common planning time	Daily common planning time.	Daily common planning time (for most teachers within grade levels).	Weekly common planning time.	No weekly common planning time	Weekly common planning time.	Weekly common planning time.
Regular meetings	Two grade-level meetings each week, during common planning time: teachers meet twice a week (once for literacy, once for math).	Monthly grade-level meetings during one staff meeting each month. Agendas set by administration (may include lesson planning or analysis of student data).	Weekly grade-level professional learning community (PLC) meetings. Teachers can meet during common planning time or at another time, but must meet weekly. Agendas for monthly (full-day) PLC's set by administrators; teachers can add to it. Topics include math standards, student assessment data and writing assessments.	Occasional grade-level meetings occur a few times a year to every month, for one hour before school. Teachers examine topics (such as Massachusetts Comprehensive Assessment System, math, and school culture) assigned by the principal.	Monthly grade-level (40–50 minute) meetings during common planning time in which teachers discuss upcoming assessments, the curriculum, and so on.	Weekly grade-level meetings during common planning time. Teachers discuss curriculum and share ideas.
Math leaders						
Regular meetings	Weekly meetings in which grade-level teams meet with the math lead teacher every Thursday or Friday to plan lessons for support.	Occasional meetings during the year in which the math specialist may attend monthly grade-level meeting if requested.	—	—[a]	Occasional meetings during the year in which math coaches may attend grade-level meetings to illustrate new curriculum components and distribute materials.	—

(CONTINUED)

TABLE B14 (CONTINUED)

Formal collaboration practices in the six case study schools, 2006/07

Collaboration	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
In-class math support	Individual lesson modeling and in-class support sessions in which math leader will model lessons and provide other in-class support to teachers upon request.	Individual lesson modeling and in-class support sessions in which math specialist will model lessons and provide other in-class support to teachers upon request.	—	—	Individual coaching or coteaching sessions in which math coaches work with teachers in their classrooms for one week, upon request, to model lessons, provide feedback, and confer about students. Math coaches worked with Design Your Own team to develop and analyze grades K–2.	Individual math support sessions in which middle-school teachers provide in-class support to elementary-school teachers in paired arrangements two to three times a week (for two hours total), each semester.
Special educators						
Regular meetings	Goal is to meet once a month (not yet fully in place).	Special educators invited to weekly grade-level meetings.	Special educators invited to weekly PLC meetings. They receive minutes when they cannot attend.	—	General education teacher support services (GETSS) teacher works closely with general educators who have referred students to her.	Middle school special educators participate in grade-level weekly meetings.
In-class math support	—	General and special educators collaborate daily in integrated classrooms.	General and special educators collaborate daily in inclusion classrooms.	General and special educators collaborate daily in language-based classrooms.	General and special educators collaborate daily in collaborative classrooms.	—
Across district						
General educators from same grade level						
Regular meetings	—	Monthly districtwide meetings for teachers of all grades: for 1 hour and 50 minutes after school for professional development.	Monthly districtwide grade-level PLC meetings for a full day.	Monthly districtwide meetings for kindergarten teachers for two hours each. Teachers share best practices, have guest speakers, and discuss curriculum focal points.	Districtwide meetings for teachers of all grades each year for a couple days at the beginning and end of each year. Teachers discuss plans for upcoming year.	—

(CONTINUED)

TABLE B14 (CONTINUED)

Formal collaboration practices in the six case study schools, 2006/07

Collaboration	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Between special educators and						
Within school						
Math support staff						
Regular meetings	Math leader meets once a week with new special educator for curriculum planning and guidance.	Math specialist can provide support to special educators in their classrooms and meet during grade-level meetings.	—	Title I math teacher has worked out an arrangement with the special educator and a general educator to provide full-time math support in a language-based classroom.	Math coaches can provide support to special educators in collaborative teams. Math coaches occasionally meet with the GETSS teacher.	—
Special educators						
Regular meetings	Team meetings every other week include all special educators, principal, and assistant principal(s), and occupational therapist. Staff discuss support needs and topics raised by district.	No regular special education team meetings. Instead, special educators can meet weekly with general educators during grade-level meetings.	—	—	—	—
Across district						
Special educators						
Regular meetings	Monthly special educator meetings for professional development on writing Individualized Education Programs and other topics.	—	Monthly special educator meetings. Monthly districtwide grade-level PLC meetings, including special educators.	Monthly or semi-monthly meetings between district primary preventionists and director of special education to plan Response to Intervention instruction.	—	—

(CONTINUED)

TABLE B14 (CONTINUED)

Formal collaboration practices in the six case study schools, 2006/07

Collaboration	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Between in-school math support staff and						
Across district						
Math leaders						
Regular meetings	The math committee consisting of the four math leaders and math teachers from each school meet at least once a month	Every other Friday for a full day district math specialists and leaders meet to review standards, lessons, and curriculum focal points.	Monthly districtwide grade-level PLC meetings.	None reported between Title I math teacher and district math coordinator.	None reported across the district, although math coaches meet regularly with the school administration.	—[b]

— is not available or was not reported.

a. A district math coordinator meets with each grade level at the beginning of the year and is available to answer questions about the curriculum and assessment. She met with grade-level representatives from each school in the district to decide on math assessment tools.

b. A math committee (consisting of middle school math teachers, grade-level representatives, a special educator, and the administration) met monthly the previous year to examine math support and professional development needs across the school. The committee was disbanded during the year of the study because of changing priorities.

Note: Formal collaboration practices excludes collaboration between school administrators, special educators, and general educators during the Individualized Education Program referral process.

Source: Authors' compilation based on primary documents gathered at schools and interviews with administrators and staff, as described in appendix A.

TABLE B15

A summary of math professional development at the six schools, 2006/07

	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
In-house training						
Provider	Math lead teacher	Math specialist	Math expert teacher	Title I teacher kindergarten teacher	Math coaches	Middle school math teachers
Type	Staff presentations and workshops	Staff presentations	Staff presentations	—	Staff presentations	—
Details	For all teachers, held on occasion during staff meetings, and includes lesson demonstrations, curriculum training, Massachusetts Comprehensive Assessment System (MCAS) data analysis.	For all teachers, held on occasion during staff meetings, includes strategies for standardized test preparation, and addresses state math standards.	For all teachers, held on occasion during staff meetings, and includes lesson demonstrations and instructional strategies.	—	For all teachers, held on occasion during staff meetings, and includes lesson modeling and training in the curriculum for new teachers.	—
Type	In-class lesson modeling	In-class lesson modeling	na	na	In-class lesson modeling	In-class lesson modeling
Details	For all teachers, by request, throughout the year.	For all teachers, by request, throughout the year.	na	na	For all teachers, by request, for one-week sessions (with focus on new teachers).	For paired teachers from grades 3–5, twice a week (two hours total) for semester or year.
Type	Additional formal and informal math support.	Additional formal and informal math support.	Informal math support.	Informal math support.	Additional formal and informal math support.	Informal math support.
Details	For all teachers available all year and includes developing lesson plans, curriculum support, and instructional strategies. Formal consultations during grade-level meetings.	For all teachers available all year includes developing lesson plans, curriculum support, and state standards. Formal consultations during grade-level meetings.	For all teachers available all year and includes instructional strategies.	For all teachers available all year and includes curriculum support and instructional strategies.	For all teachers available all year, formal consultations during grade-level meetings.	For all teachers available all year.
Provider	na	Staff colleagues through Collegial Learning Circles	Grade-level colleagues through professional learning communities (PLCs)	Staff colleagues through grade-level committees	na	Math committee,[a] staff colleagues through informal study groups

(CONTINUED)

TABLE B15 (CONTINUED)

A summary of math professional development at the six schools

	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Type	na	Study groups	Group meetings	Study groups	na	Staff presentations (math committee)
Details	na	For all teachers (voluntary), available all year; frequency depends on teachers' initiative; topics chosen by teachers (not necessarily math).	For all teachers, weekly PLC meetings (districtwide once a month); topics include analysis of New York State Assessment results and designing benchmark exam.	For all teachers (voluntary), available all year; frequency depends on teachers' initiative; topics chosen by teachers (not necessarily math).	na	For all teachers, one half-day a year (math committee)[b]; math committee's focus last year was teaching and learning math vocabulary. Study group topics were chosen by teachers (not necessarily math).
Outside training						
Provider	District and university partner	District	District	Varies	District and local university	District
Type	Courses, workshops	Courses (including online), workshops	Workshops, conferences	Courses, workshops, conferences	Courses, workshops, conferences	Workshops, conferences
Details	For all teachers, but special training for math lead teachers[c] all summer and all year on a variety of topics (time and money; probability and statistics; hands-on activities).	For all teachers, but special training for math specialist[d] all year on a variety of topics (such as curriculum training and online math tools).	For all teachers and teachers assistants, but special training for math expert[e] once or twice a month on a variety of topics.	For all teachers. Staff can attend two sessions a year on a variety of topics.	For all teachers, but special training for math coaches.[f] Staff have five half-days of professional development per year on a variety of topics (such as curriculum training and math assessment scoring).	For all teachers special training for middle school math teachers[g] every other week on a variety of topics (such as math open response writing).
Provider	Curriculum publishers	Curriculum publishers; program trainers	na	Curriculum publishers	Curriculum publishers	Curriculum publishers; program trainers
Type	Scott Foresman	Investigations and America's Choice	na	Scott Foresman	Everyday Mathematics	Everyday Mathematics and Responsive Classroom

(CONTINUED)

TABLE B15 (CONTINUED)

A summary of math professional development at the six schools

	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Details	Training in the Scott Foresman curriculum for all teachers when it was introduced	Training in the Investigations curriculum and America's Choice program when they were introduced for all teachers.	na	Training in the Scott Foresman curriculum when it was introduced for all teachers.[h]	Training in the Everyday Mathematics curriculum when it was introduced for all teachers.	Training in the Everyday Mathematics curriculum and the Responsive Classroom program[i] when they were introduced for all teachers.

— is not available or was not reported.

na is not applicable.

a. The math committee, alive in the previous year, was disbanded the year of the study. Members included administrators and middle school math teachers.

b. Two half days per year were designated for professional development, with one half day focusing on local school topics, including math instruction.

c. The math leader was trained by university partner professors. She met with other district math leaders each month.

d. The math specialist met each month with other district math specialists to review state standards, the curriculum, and information for teachers.

e. The principal sent the school's informal math expert to national and international math conferences so that she could share the information with staff.

f. The district provided training for the math coaches to serve as math and workshop model coaches. The principal sent the math coaches to math conferences.

g. The principal sent the middle school math teachers and a few other teachers to math conferences.

h. The Title I math teacher and a kindergarten teacher were trained by curriculum publishers to be in-school consultants for the curriculum.

i. Teachers received training in Responsive Classroom instructional techniques when the program was introduced. Although Responsive Classroom is not a math program, training was included because interviews with teachers linked this program to positive benefits for math instruction.

Source: Authors' compilation based on primary documents gathered at schools and interviews with administrators and staff, as described in appendix A.

TABLE B16

Governing approaches—words from administrators at the six case study schools, 2006/07

Governing approach	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Staff input		"If you want to make a change go to your best teachers first. . . . People may not always agree [with each other], but I think they at least feel like they were heard." —Assistant principal	—	"We pretty much are a consensus building. I'm open to any suggestions." —Principal	"Anybody in the school can tell me: 'You're going the wrong way with this.' I'll listen." —Principal	"During staff meetings . . . we have a brainstorming session and everything is written down. . . . There is no questioning anything. It's just: what are your concerns?" —Assistant principal
Decisionmaking		"Rather than top-down, call it the bottom-up and side-to-side [approach] that is a collective effort." —Principal	—	"We're here as a group. . . . We all have the same vote. We're all here for the same reason, so I don't get a bigger vote than anyone else." —Principal	"In most cases, I do hold the final veto. Because let's face it . . . if something goes wrong, it's my head on the chopping block, not anybody else's." —Principal	"The decision ultimately rests with the principal . . . [but] normally it's the teachers [who] decide what's going to happen." —Assistant principal
Management style	"I'm giving them a little more freedom to make decisions in their classroom. . . . But I'm also making them more accountable by being in there [as an observer]." —Principal	"Equip people adequately to do the job . . . equip them in a manner where they're going to feel very competent . . . [then] provide incentives along the way, recognition for the work that they do." —Principal	"Always remember we're here for kids, because every time there's an issue . . . it's because they're thinking of adults. They've missed the kids and as soon as you bring the problem back down to kids, we can solve it and move on." —Principal	"I think that they have to feel ownership of what they're going to do. You can't come and mandate them to do something when . . . they're going to say, 'How do you know what we do?' They're right. They definitely have to be empowered." —Principal	"Hire good people, tell them what to do, and let them do it. . . . I don't believe in micromanaging things. But I do believe in laying out my expectations. Also . . . I try to scaffold [people] into taking responsibility and becoming leaders in their own right." —Principal	—

— No quotations were available for this category.

Source: Authors' compilation based on interviews with administrators.

TABLE B17

Roles of school administrators: summary of the six case study schools, 2006/07

	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Administrative structure	Principal Assistant principal	Principal Three assistant principals One senior program administrator	Principal	Principal	Principal Three assistant principals	Principal Assistant principal
Described roles and activities						
Principal	• Helps serve as school's instructional leader. • Provides teacher support. Oversees teacher hiring. • Oversees student discipline.	• Oversees school improvement efforts. • Tracks school achievement data, sets school vision, and communicates it to staff. • Oversees accountability monitoring. • Works to upgrade the physical plant. • Seeks resources to support teachers. • Oversees teacher hiring.	• Sets schoolwide expectations for teaching and learning. • Provides support to teachers. • Oversees teacher hiring. • Introduced and continues to monitor the work of school professional learning communities (PLCs).	• Seeks resources to support teachers. • Oversees teacher hiring. • Established language-based classrooms at the school. • Initiated and directs the work of school committees that focus on promoting a different social value each month (collegiality, respect). • Initiated formation of a student council and meets with grades 3 and 4 student representatives twice a month. • Organizes community outreach events.	• Oversees use of the physical plant. • Provides training to coaches and teacher leaders by sending them to conferences. • Decides how to deploy teachers for different roles (in collaborative team, in resource room). • Oversees teacher hiring.	• Attends grade-level meetings. Runs faculty meetings. • Plans Friday community meetings. • Attends and brings back information from national educator conferences. • Helps analyze Massachusetts Comprehensive Assessment System (MCAS) data and reports with staff. • Examines student progress.

(CONTINUED)

TABLE B17 (CONTINUED)

Roles of school administrators: summary of the six case study schools, 2006/07

	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Assistant principal	• Assists the principal as school instructional leader. • Provides teacher support. Chairs the special education team.	na	na	na	na	• Helps examine student progress. • Helps set learning priorities. • Visits classrooms daily.
Assistant principal 1	na	• Chairs the Educational Support Services team, which evaluates teacher requests for student referrals to special education.	na	na	• Oversees literacy instruction and special education.	na
Assistant principal 2	na	• Oversees all assessment and test data analysis for the school.	na	na	• Oversees the science curriculum.	na
Assistant principal 3	na	• Oversees all special programs (such as, art or music).	na	na	• Oversees the social studies curriculum. • Assistant principals also help set up staff trainings after school.	na
Senior program administrator	na	• Oversees PreK and kindergarten programs.	na	na		na

(CONTINUED)

TABLE B17 (CONTINUED)

Roles of school administrators: summary of the six case study schools, 2006/07

	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Teacher supervision practices						
Principal	• Observes and evaluates all first-year, third-year, and professional-status teachers (latter shared with assistant principal). • After observations converses with teachers and provides instructional advice.	• Has no direct observation or evaluation duties.	• Holds teachers accountable for student performance. • Examines students' assessments administered every 10 weeks. Teachers with struggling students must show improvement at the end of 5 weeks.	—	• Makes very few observations. • Receives information about teachers from his assistant principals and writes up evaluations.	• Conducts monthly, half-hour meetings with every teacher in the building to check for support needs. • Accompanied by regular classroom observations.
Assistant principal	• Observes and evaluates all second-year and professional-status teachers (latter shared with principal).	na	na	na	• Oversees the teachers' paraprofessionals and teaching assistants.	• Shares monthly teacher meetings and observations with principal.
Assistant principal 1	na	• Supervises grades 1 and 2 teachers.	na	na	• Supervises grades 1 and 4 teachers; library, nursing, special services, and health coordinator staff; makes observations and gives evaluations of teachers.	na

(CONTINUED)

TABLE B17 (CONTINUED)

Roles of school administrators: summary of the six case study schools, 2006/07

	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Assistant principal 2	na	• Supervises grades 3 and 4 teachers.	na	na	• Oversees K and grade 3 teachers; computer, music, art, and substitute teachers.	na
Assistant principal 3	na	• Supervises grades 5 and 6 teachers.	na	na	• Oversees grades 2 and 5, English language learner teachers, guidance counselor, behavior modifications dean, and attendance coordinator.	na
Senior program administrator	na	• Supervises PreK and kindergarten teachers.	na	na	na	na

— is not available.

na is not applicable.

Source: Authors' compilation based on interviews with administrators and staff, as described in appendix A.

TABLE B18

Goals for the school, staff, and students at the six case study schools—words from administrators, 2006/07

Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
"That's the bottom line . . . it's what the kids need. We're here for them. And I think that's really the motto of the school . . . learning takes place for students." —Principal	"For me, it was . . . getting people to feel good about who they may be . . . [so] that it will transfer to students, and students will feel good about being here, and it would translate to whatever we ask of them, that hopefully we would get the results that we were seeking." —Principal	"I said our whole goal of why we're here is to answer these three questions: One, what is it we want children to know and be able to do? Which means we all have to start talking to each other. . . . The second thing is how do we know what kids know? So we have to talk to each other again. . . . And the third thing is how do we respond to those kids who don't learn? And those three questions have really truly been our guiding force." —Principal	"I think what I want the kids to leave here with [is] that they're going to be a good member of the community and they're going to get along and be able to work with other people." —Principal	"And this is perhaps the core of my philosophy: I have three grandsons. I'm not going to accept anything in my building where I would not put my grandsons in that situation." —Principal	"Look at the whole child . . . put him in a classroom. Let him get along with his peers. Let him have friends; let him have fun. Teach him new things. Find his affinity. Find a passion for him or her, you know, and let him run with it. . . . Create a life-long learner. . . . That's what we shoot for, is we want to produce good citizens." —Assistant principal

Note: This study did not set out to examine administrators' overall school goals and visions; thus, systematic information about these ideas was not collected. The statements in this table were made in various contexts and are unlikely to represent administrators' full views. They are presented to suggest the spirit that these leaders bring to their schools.

Source: Authors' compilation based on interviews with school administrators.

TABLE B19
Staff culture at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Sense of home	"We always think it's like our second home." —General education teacher	"I think we have a family. That's really how it feels here. . . . [It] really is a family-oriented kind of situation. I mean we all know each other well." —General education teacher	"The teachers, the quality of teachers, and the community: we're like one big family on personal levels and school levels which help[s] us build that collaboration for the kids." —Special education teacher	"For the most part, [the parents] are very happy. They like the school. We call ourselves a family, which is the way I want it to be." —Principal	"[It's] a fantastic staff. I think that it's a family. . . . We have longevity here." —Math coach	—
Sense of community	"We work as a community. We care about the children. We care about the parents. We want to make them feel like they're part of a community." —Special education teacher	—	—	"I do think . . . [we are] very community-centered." —Special education teacher	—	"Because it is a small school, I think, people feel a connection. . . . The parents work together for fundraising, and there's a large population of the kids that are involved in sports . . . drama and music and so all of those parents kind of know each other." —General education teacher
Everyone is equal	—	—	"Every one of us is equal, we are all the same, and we all just have a job to do. We're all in the same boat." —General education teacher	"Everyone is included. . . . We're in this together, and I don't think anyone is above anyone else. . . . We all have the same vote; we're all here for the same reason so I don't get a bigger vote than anyone else." —Principal	—	"There is a real sense of community. . . . Everybody is on the same page; nobody is excluded." —Special education teacher

(CONTINUED)

TABLE B19 (CONTINUED)

Staff culture at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Good relationships, rapport, friendship	"For a lot of people, it's comforting because we do deal with kids coming from a rough home life or . . . stressful situations, and it's nice to have that collaboration . . . [and] friendship of colleagues." —General education teacher	"I think the teachers get along fine with each other. . . . If I go to somebody or ask somebody something, everybody is willing to share." —General education teacher	—	"Besides being great friends, we have a wonderful working relationship." —Special education teacher	"You really have to form a bond with them. . . . It's very rare that I can't collaborate with them. . . . I think I have a pretty good rapport with most teachers." —General education teacher	"I really think that people really care about one another. . . . We hang out. And people go out all the time and socialize as well." —General education teacher
Positive relations between general and special educators	"Everyone including special ed . . . we're a team. We all can share resources and ideas and work together." —Special education teacher	"And I think it's key that we're not looked at as self-contained [teachers]. . . . We are looked at as grade-level [teachers]. . . . We are not addressed as a secluded-type special education department. . . . They throw us right in there. We love it." —Special education teacher	"They love each other. We don't separate, we really don't. . . . The special ed teachers are right in the classroom. They would meet and talk with the classroom teacher and say OK these are the kids who need a small group." —Principal	"[T]he teachers here have been absolutely wonderful about loaning me things. They've let me come in, peek and go around." —Special education teacher	—	"I'm able to go into a lot of the classes, and the teachers are willing to let me go in and help them rather than just go in and sit in the back of class and pull my guys to the back. They're open to anything. . . . And even I'll teach a lesson." —Special education teacher

(CONTINUED)

TABLE B19 (CONTINUED)

Staff culture at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Teachers help and support each other	"As a new teacher, I think the support is really amazing here. . . . We meet as a team every week for literacy, every week for math. We have the literacy coach checking. We have the math lead checking in. New teachers have mentors. So, there's a lot of collaboration here and support." —General education teacher	"We have a very cohesive kind of relationship. It's supportive. If you need help with anything, you can ask. I mean there is no holding back on whether it's materials or advice or help with something." —Special education teacher	"I think overall it's the teamwork. We have a lot of great teachers here that will bend over backwards and do anything for anybody to really help out." —Special education teacher	"I think it's a warm, very warm environment here. . . . I think the staff is a fairly warm staff. I feel like on the whole the staff gets along well with each other . . . We work well together. We share. . . . Everyone is more than happy to help each other." —General education teacher	"[As a new teacher, the culture for the staff was] very supportive. . . . The teachers all were very friendly. Anybody I needed help from was more than willing to answer questions to help." —Special education teacher	"Everybody tries to help. . . . Everybody is on the same page. Everybody is part of everybody's classes. . . . Everybody works together; it's really a team here." —Special education teacher
Able to learn from peers, share ideas, strategies	"We try to share ideas that worked. . . . If something works, we say I tried this and it worked really great and the kids are really into it." —General education teacher	"And when we get together for our professional development, this is what we're allowed to do . . . is bounce ideas off of each other, and it's invaluable. . . . You get your best ideas from your colleagues." —Special education teacher	"They'll go to the person next door; they'll go to somebody on their team. They will talk with each other. They'll talk in the staff room and say 'I'm just stumped.' And automatically the other teacher will say: 'Try this, I have this in my class you can borrow' or 'Gee I'm free on Tuesday at one and I'll come observe." —Principal	"I think a lot of teachers here . . . this staff, veteran teachers, new teachers, any teacher that is here seems more willing to learn new things. . . . We share a lot." —General education teacher	—	"[T]here is a very nice collaborative piece that comes when you work with someone who is at an entirely different grade level. . . . Having the relationship and going with someone who has such a passion for this subject really opened my eyes to the possibilities of what my instruction could look like." —General education teacher

(CONTINUED)

TABLE B19 (CONTINUED)

Staff culture at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Team orientation, work together	"I think it's important that the first and second grade teachers see what's expected of the [4th grade] children because they're setting the foundation. . . . A fourth grade teacher actually sat at each table and went over the question with them.. I think we work very well together." —Math lead teacher	"[W]hy is this school differentiating itself from the others—especially in math—for students with disabilities? . . . I think because of the community of our building. I think our staff is outstanding. I think our administration, like I said, is excellent and, therefore, those two things working together, your really need them. You need teachers to fight." —Special education teacher	"I think overall it's the teamwork. We have a lot of great teachers here that will bend over backwards and do anything for anybody to really help out." —Special education teacher	"From the day I walked into this building, I just felt a part of it. . . . I just felt that everybody worked very well together. Yes, there are occasional conflicts, but I think people are reasonable and they just try to work together and solve the issue." —General education teacher	"[The coaches] come in and help the teachers at any time. For example, as a new teacher, [the coach] came in for a week. And we worked as a team. . . ." —Special education teacher	"[A]ll of us are a team and we all work together. And whatever I do affects everybody else. . . . I think that's the philosophy." —General education teacher
Nonjudgmental, can share weaknesses, can take risks, be creative	"I'm a colleague, and I do no evaluation, and I think that they can come to me and really genuinely ask for advice, and they know it's not going to go any further than that. I'm very non-threatening with them." —Math lead teacher	"It's not a competitive environment here. . . . Everybody says if I have it, you can borrow it." —Special education teacher	"I think a large piece of it comes from the trust factor. Teachers working together and being able to trust each other . . . they really feel that they could go to each other and that it was going to be kept in a professional fashion." —Special education teacher	—	"We also watch the teachers, but we have to be very careful how we phrase it. It is not an observation because we don't put any opinion to it. It doesn't matter whether it was good or bad; it is my job to make it better." —Math coach	"There is a freedom to try new things . . . to share your strengths and your weaknesses. . . . There is a level of comfort. There is just a sense of 'we're all in this experience together'." —General education teacher

(CONTINUED)

TABLE B19 (CONTINUED)

Staff culture at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Respect, admiration for fellow staff	"What has led to that great working relationship? I think the respect we have for each other." —Math lead teacher	"We've appreciated our co-workers' efforts. We see the hardworking [efforts]. . . . And there is a lot of respect for people because of this, a lot of admiration for this kind of effort. . . . Overall, it's just a nice staff. We have a nice group of people here." —General education teacher	—	"And I feel that [the principal] respects us as professionals. And so the atmosphere in the building and the way we work with each other I think is at a very high level." —General education teacher	". . . the coaches were respected by the staff, and the staff listened to what the coaches said. . . . All the coaches were from the school so the teachers knew that these were excellent teachers." —Principal	—
Dedicated, hard workers	"I do think the teachers really love the kids here. I mean like really work hard for these kids." —General education teacher	"We work hard (chuckling). We work really hard here. I can't possibly tell you how fortunate we all are to be here onboard. . . . It's a great school." —Special education teacher	—	". . . the thing that struck me here is the teachers are very willing to change. . . . We have teachers that are willing to go above and beyond." —General education teacher	"I think our staff knows the expectation and they take pride in their work. . . . I was the one that provided it but by no means you can lead a horse to water but they all take the drink. They do that in and of themselves. It is a very dedicated staff." —Math coach	"I think it's the relationship that the adult community has and the value that they place on the learning that happens here that really makes for the greatest gains with student achievement." —General education teacher

(CONTINUED)

TABLE B19 (CONTINUED)

Staff culture at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Flexible, open to change	"They let us do what we as teachers think that's best for our students. . . . [As] teachers we feel like we're flexible" —General education teacher	"Whatever the teachers are given, they really just do it. . . . The teachers here, I think, always come up to the plate. They know what they have to do. And they do it. There's not a lot of complaining." —Math specialist	"[There is] big time flexibility [here]. . . . If I had a couple of minutes to spare and you had a child come into the room you could do that, by all means you could do that." —General education teacher	"We're both very flexible, so I have no problem taking a child that is not special needs because I feel by having this kind of group, it boosts everybody's morale." —Special education teacher	—	"Our special education staff and program really every year sort of reinvents itself based on the needs of the kids and the places that they're at." —General education teacher
Enjoy, happy with work	"I have felt like it's a very nurturing place to work, both in terms of what I see happening with my students and my own personal experience. I have to say that I felt welcomed here from day one." —Special education teacher	"We work hard (chuckling). We work really hard here. I can't possibly tell you how fortunate we all are to be here onboard at. . . . It's a great school" —Special education teacher	—	"It's a very happy place to work; it's very positive. . . . I truly believe that because of [the principal's] aura in this school, it's carried out through the teachers and the children and the assistants. . . . Everyone seems to get along and I look forward to coming to work everyday." —General education teacher	—	"They're excited about their job; they love their job and they want to help the kids. And they've been doing it for years." —Assistant principal
Stable staff	—	"We've been stable. And I think you need to be stable." —General education teacher	—	"I think it is more of a community and the teachers have more of a drive to stay . . . and [they] do. . . . [A] lot of the teachers have been here for a long time." —Special education teacher	"We have longevity here. And longevity says a lot." —Math coach	—

— No relevant quotations were available.

Source: Authors' compilation based on interviews with school staff and administrators.

TABLE B20
Staff attitudes toward students at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Shared ownership of kids	—	"But at the grade level, they're taking stuff, beginning to really discuss the children and treating the children as everybody's children or all of our students." —Assistant principal	"I don't think anybody has the thought that their class . . . that those are their only kids. All of the teachers here view every child here as one of their kids." —Special education teacher	—	—	". . . everybody has all the kids. . . . And so it's just a huge team rather than these are just my homeroom; you don't know my guys. It's everybody knows everybody so it's a real team effort." —Special education teacher
Inclusive of students with disabilities	"This administration cares about special ed. No doubt about it. I mean she's really concerned . . . that they have the same opportunities to learn as every other child in this school." —Special education teacher	—	"We don't separate. . . . Whether the small group is with the classroom teacher or special ed, whether the children are identified or not, it doesn't matter . . . [It's] whatever the kids need." —Principal	"Everyone is included. Even those learning disabled kids, they're not isolated. They're not in the dungeon, they're not in the basement. Everyone's included, everybody has a purpose and everybody is here." —Primary preventionist	"A lot of the teachers care for them from what I've seen. . . . Teachers call parents here. They want their kids to learn. They want their kids to strive . . . will do the extra work to get the kid whatever services they need." —Special education teacher	—

(CONTINUED)

TABLE B20 (CONTINUED)

Staff attitudes toward students at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Know the students	". . . the advantage I have is that I know these kids. I mean I see them from first grade on. So, I probably know 85 percent of the kids. I know their strengths and weaknesses, which is great." —Math lead teacher	"In this school, there's a really tight bond between educators and the students. . . . There's a strong connection between home and school and parents as partners with the students and the teachers. They must work together." —General education teacher	—	—	"And what's also good is that we actually have an assistant principal who used to be a special ed teacher, so she's extremely involved with special ed children, and she knows every kid. I think she knows every child with a disability . . . knows everybody's name." —Special education teacher	"I get into the classroom a lot; and I think it's important for these kids to see me and know me. And the more they see me the more they're going to trust me. . . ." —Assistant principal
Believe in students	"These kids are great kids. And they know I believe in them. . . . They've given it their all. They've tried their hardest. They work to the best of their ability." —Math lead teacher	". . . I think [the teachers and administrators] really believe in the students. We really believe in teaching." —Special education administrator	—	—	—	"And then you're going to look at what your strengths are and be able to use those strengths to compensate for whatever that issue is in your learning. . . . So we're trying to use that kind of philosophy here to work with our special needs kids." —Principal

(CONTINUED)

TABLE B20 (CONTINUED)

Staff attitudes toward students at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Have high expectations		"I think we all have high expectations for them. Just because they have disabilities, we don't [give] them any more. . . . We still hold them up to the same standard as everybody else." —Special education teacher	"And we hold the same rules for all kids. . . . No one is allowed to hurt other people . . . and it has been a very consistent message straight across the board." —Principal		"I expect them to behave. I expect them to be good kids. The teachers expect them. . . . Their actions indicate that they expect the same things from these children as they expect from their own. . . ." —Principal	". . . [The kids] know where the line is drawn with the teachers. [The middle school math teacher] is the toughest teacher, but the kids also respect her the most. . . . They know they love the class; they love the math because she keeps them working." —Assistant principal
Nurturing toward students	"I think a lot of it is the teachers. . . . You make them feel safe. You give them routines, your expectations. I think that in and of itself makes them feel safe. You're strict but yet nurturing." —General education teacher	"I see teachers as being really invested with the students. . . . There is a lot of nurturing going on. Many of our students are very needy and really are seeking out attention and love and guidance up and beyond just the academic piece. And I think our teachers really try to provide that." —Special education administrator	"[Flexible support] gives kids [the chance] to see that all the adults in this building are helpers. . . . It gives them one on one with an adult and they get mentorship going there, which has been really beneficial for a lot of our kids who are really struggling with all kinds of issues." —Principal	". . . it's a very helping atmosphere. People feel like we can do anything. . . . Some of it comes from the principal who is very child-oriented." —Title I math teacher	". . . The teachers from what I've seen here will do the extra work to get the kid whatever services they need. I've seen that." —Special education teacher	"I think we work really hard to help them and to find out really what their learning style is and what we can do for them to help them understand themselves better, advocate for themselves and get the stuff they need." —General education teacher

— No quotations were relevant for this category.

Source: Authors' compilation based on interviews with school staff and administrators.

TABLE B21

School environment for students with disabilities at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
School is a safe place	"The time that they're here is their safest and happiest time of the day." —General education teacher	"The kids feel this is their safer place . . . much more than for a lot of them home is. And this is where there is some continuity and consistency, and I think our teachers are really good at showing them that they're loved and cared for and respected." —Special education teacher	"And our doors are always open. They're always opened. . . . So, it's also safe." —General education teacher	—	"It's a great place to learn. It's very welcoming. They like to come to school. Breakfast is provided. If [there is] anything the students need—any help or anything—[it] is always provided for them. It's a very warm and welcoming environment. It's a nice place to come to school." —Special education teacher	—
Good relations between students with disabilities and general education students	—	"The kids get along well in the classrooms. In the integrated rooms, I don't think that the Gen Ed kids know who the special kids are or vice versa. I think it's just one family." —School administrator	—	"There are so many different ways that students are getting help that the ones that are getting help I don't think feel different or isolated. . . . The children don't feel stigmatized in any way leaving the room to go for reading help or math help. It's just like, yes, I'm going, you know. It's very comfortable, very warm." —General education teacher	"It's a good place to come to school. They're included. No one teases them. No one picks on them. They're not made to feel like 'Oh, you can't do this.' It's a very supportive environment for the students. Even the other students are very supportive and helpful, which is nice." —Special education teacher	"The kids seem happy. They treat each other nicely. There's varying needs of kids in classrooms, and kids are so accommodating to that . . . like other kids. Like they treat each other so nicely because they've been in school with say an autistic kid since kindergarten, and they all love him in 6th grade." —Special education teacher

(CONTINUED)

TABLE B21 (CONTINUED)

School environment for students with disabilities at the six case study schools, 2006/07

Characteristic	Cedar Elementary School, Urban Mass., 1–4	Redwood Elementary School, Urban NY, PreK–6	Maple Elementary School, Rural NY, K–4	Aspen Elementary School, Suburban Mass., K–4	Beech Elementary School, Urban NY, K–5	Willow School, Rural Mass., K–8
Positive perceptions of student support	"They say: 'She's lucky; she gets to go see [the math lead teacher]. . . . She's a fun lady.' . . . It's not seen as, 'Little Johnny is really terrible at math. He has to go out and have these lessons.' [Instead, they think:] 'It's cool, they have their own special group.' And I think it's always been presented that way to kids." —Special education teacher	"I take the two groups where my kids fall in their reading, [and] anybody else who falls in that area as well. . . . I think that's really important so that the kids aren't teased for having that extra teacher in there. . . . They seem to think that my office is some special place." —Special education teacher	—	—	—	"The kids feel comfortable in this school; they feel comfortable with these teachers. And I think there is a lot of flexibility with these teachers. You don't have to call or make an appointment to see them. They want to help." —Assistant principal

— No quotations were relevant for this category.

Source: Authors' compilation based on interviews with school staff and administrators.

TABLE B22

Most commonly reported strongest math education practices for students with disabilities and other struggling learners at the six case study schools, 2006/07

Practice	Detailed areas
Staff collaboration, staff culture, and in-house professional development	**Common planning and regular meeting time** Increases communication Builds consistent instruction Promotes joint problem-solving Facilitates sharing of ideas and strategies Allows teachers to recognize their strengths and weaknesses **Coteaching in inclusion classrooms** Allows teacher learning from close collaborator Improves teacher lesson planning Promotes sharing and improving upon teaching strategies Allows teachers to gain greater mastery over fewer subjects **Collegial, supportive, and respectful staff culture** Builds trust Facilitates sharing of ideas and strategies Allows teachers to recognize their strengths and weaknesses Promotes initiative and risk-taking Supports dedication and hard work Accompanies positive staff relationships Accompanies high levels of teamwork Accompanies teacher job satisfaction Promotes shared ownership of all students **In-house expert math instruction support for teachers** Offers accessible and knowledgeable resource for teachers Offers regular in-house professional development through staff presentations and other meetings Provides nonevaluative coaching
Classroom math instruction	**High levels of individualized support for students** Through small class sizes Through small-group instruction **High quality teachers** **Use of peer teaching** **Strategies to increase math instruction time** By integrating math throughout the day By providing much practice in the mornings, through homework **Tailoring instruction to students' needs** By adjusting/supplementing curriculum **Full-time in-class support in inclusion classrooms** Provides support for students with disabilities in all subjects throughout the day Provides students with more one-on-one support Promotes more in-depth instruction for students Provides more stable environment for students when a teacher is absent Helps demonstrate that people have different strengths, can solve problems together

(CONTINUED)

TABLE B22 (CONTINUED)

Most commonly reported strongest math education practices for students with disabilities and other struggling learners at the six case study schools, 2006/07

Practice	Detailed areas
Multiple out-of-class math services and supports for students	**Availability of a wide range of additional math services** Through formal programs Through flexible support from willing teachers Through expert math leaders Through skilled special educators
Use of assessments	**Regular, ongoing assessment** **Use of assessments matched to state standards** **In-depth analysis and discussion among entire school staff of assessment results** **Use of assessment data to guide instruction**
Leadership	**Empowers teachers to take leadership in the classroom and beyond** **Encourages risk-taking** **Respects teachers' opinions** **Supports by providing professional development, resources, guidance, and encouragement**

Source: Authors' compilation based on interviews with school staff and administrators.

TABLE B23

Common challenges to math education for students with disabilities and other struggling learners at the six case study schools, 2006/07

Common challenge	Detailed areas
Insufficient staffing	**Classroom math instruction** Large class sizes **Out-of-class math support** Staffing reduced by district Hard to find trained support
Insufficient time for math instruction	**Classroom math instruction** Emphasis on reading over math Fast-paced calendar **Out-of-class math support** Difficult to find time Difficult to schedule
Teacher quality concerns	**Discomfort with weaker knowledge of math** Weaker teaching skills Need more professional development Resistance to more professional development Resistance to change in classroom practices
Insufficient teacher tools or supports	**Imperfect math curricula** Must be supplemented with other materials Not fully aligned with state standards Approach is difficult for students with disabilities and other struggling learners Insufficient practice and homework Lack of early intervention support Lack of early intervention tools Lack of math assessments for early grades and for measuring progress over the year Inconsistent leadership Shifting priorities, changing initiatives Not enough professional development available
Difficulties in communication and coordination among staff	**Scheduling difficulties** Coteaching pairing difficulties Teacher resistance to collaboration No common planning time
Difficult students to serve	**Classroom math instruction** Hard to meet every child's needs, even after creating smaller ability groups Hard to reach toughest kids, even after having tried everything Hard to get struggling learners to talk, present, participate, and not feel left out **Out-of-class math support** Difficult to maintain mandated pacing Difficult to support multiple grade levels simultaneously Students' needs change every year Some students need support but don't qualify for it **Student background conditions** Economically disadvantaged, with few opportunities for out-of-school learning High student mobility Many unmet basic needs Lack of parental involvement and support

Source: Authors' compilation based on interviews with staff and administrators.

APPENDIX C
STATE ASSESSMENT DATA FOR THE SIX CASE STUDY SCHOOLS

This section provides grade 4 state math assessment data for the six case study schools for three school years. These data were used as a secondary screening factor after schools were first identified for their practices through a nomination process (see appendix A). The assessment data are provided solely as background information on the schools. It would be invalid to infer from case study research that a school's practices have a causal relationship with a school's achievement results. Furthermore, there are many limitations to the data arising from the small numbers of students with disabilities and other factors (as described later in this appendix).

Use of assessment data in the screening process

In the screening process researchers reviewed each school's state assessment data using the datasets from the two companion reports in this series. These reports analyze achievement data for grade 4 students with disabilities on the state math assessments in Massachusetts and New York. To investigate how performance patterns vary by need level, schools were categorized by a need-to-resource-capacity (N/RC) index in New York and a need-level index based on student population characteristics in Massachusetts. Both reports found distinct differences in proficiency rates for students with disabilities by need level, with the lowest percentages of students with disabilities reaching proficiency at the highest need categories. Based on these results, the researchers compared the case study schools with averages for schools with the same need level rather than with the overall state average.

In the screening process researchers determined whether each school's results met or exceeded the average proficiency rate for students with disabilities for their similar-schools category for at least two of the three years examined. This criterion allowed for fluctuations in results because the schools had not only small numbers of students with disabilities but also considerable variations in numbers from year to year.

Data limitations

Tables C1 through C6 present data on the number of students and the percentage scoring proficient for the schools, organized alphabetically by state. There are several data limitations that need to be considered when interpreting these achievement results.

Causal inferences cannot be made between achievement results and school practices. A case study methodology can say nothing about causal relationships between a school's practices and its achievement results. Thus, it would be inaccurate to conclude that schools with higher performance results have more effective practices than other schools. Differences in performance may be related to differences in need levels of student populations, resources, geographic locales, or other factors.

The data are cross-sectional. The performance information for the schools is based on cross-sectional data for the school years 2002/03 to 2005/06, so each year's data came from a new cohort of students. Thus, a change in performance from one year to the next does not mean that a group of students improved or worsened over that period. Rather, variation from year to year might be due to changes in the composition of students. This issue is particularly important to consider for the students with disabilities subgroup, because it includes a small population of students with a wide range of disabilities.

The schools' students with disabilities subgroups have small numbers of students. At the case-study schools the numbers of grade 4 students with disabilities ranged from 5 to 30. The small numbers in each school are a major limitation of the data. In addition, some schools experienced large fluctuations in the size of this subgroup during the four years (2002/03–2005/06). For example,

the number of grade 4 students with disabilities at Maple Elementary School almost tripled from 2003 to 2005. Changes in performance from year to year could vary because of changes in student numbers and differences in the types and severity of disabilities between student cohorts. So, caution should be used in interpreting performance trends at each school.

Cross-state comparisons should not be made. Massachusetts and New York have different assessments and frameworks and different overall performance trends during this period, so cross-state comparisons are unreliable. (See the companion reports for a comprehensive analysis of grade 4 students with disabilities math performance patterns in each state.)

New York's math assessment and the need-to-resource-capacity index

This section provides background information on the state math assessment and the need-to-resource-capacity (N/RC) index. It also provides performance data for the New York State case study schools.

New York State Testing Program. The New York State Testing Program (NYSTP) has administered the grade 4 math test since 1997. Students take the test in three timed sessions. But testing accommodations, such as additional time, are available to students with disabilities based on specifications in their Individualized Education Program. Students with severe disabilities take the New York State Alternate Assessment. The NYSTP reports students' results using four performance levels. Reaching proficiency is defined as scoring at level 3 (meets standards) or 4 (meets standards with distinction).

Need-to-resource-capacity (N/RC) index. The need-to-resource-capacity index was developed by the New York State Education Department (NYSED) to categorize school districts. The index has three components: a district's level of need (defined by the percentage of students eligible for free or reduced-price lunch), its level of resources (defined by the combined wealth ratio), and to a lesser extent, a district's locale.[7] The index was created as a result of statistical research showing student performance is negatively related to a district's level of need and positively related to its level of resources (New York State Education Department 2005b).

There are seven need-to-resource-capacity categories. Each case study school was assigned the need-to-resource-capacity of its district:[8]

- Beech Elementary School N/RC 1: high need-to-resource-capacity, New York City.
- Maple Elementary School N/RC 5: average need-to-resource-capacity.
- Redwood Elementary School N/RC 2: high need-to-resource-capacity, four large city districts (Buffalo, Rochester, Syracuse, and Yonkers).

The companion New York data analysis report found that performance of students with disabilities varied by need-to-resource-capacity category, with the lowest percentage of students with disabilities reaching proficiency in high-need districts. For example, in 2005 there was a difference of more than 30 percentage points between the percentage reaching proficiency in N/RC 1 and N/RC 6 schools.

Performance data for the three New York case study schools. Tables C1 to C3 provide achievement data for the grade 4 NYSTP math assessment for 2002/03–2004/05.[9] Each table presents the data for the school and the average percentage of students with disabilities scoring proficient or above for schools in that need-to-resource-capacity category. For example, in 2004/05, 86 percent of students with disabilities at Maple Elementary School scored proficient compared with 65 percent of the students with disabilities in N/RC 5 schools across the state (see table C2).

TABLE C1
Grade 4 New York State Testing Program math performance for Beech Elementary School, 2002/03–2004/05

	Beech Elementary School		High index value (N/RC 1) New York City	
Year and student group	Number of students[a]	Percentage scoring proficient or above	Number of students	Percentage scoring proficient or above
2002/03				
General education students	240	76	67,520	73
Students with disabilities	30	34	8,913	37
2003/04				
General education students	190	75	67,754	73
Students with disabilities	15	40	8,068	37
2004/05				
General education students	190	82	64,058	83
Students with disabilities	20	50	8,878	49

a. The number of students has been rounded.

Source: Authors' analysis based on data from New York State Education Department (2005a) and Buckley et al. (2008), a companion report in this series.

TABLE C2
Grade 4 New York State Testing Program math performance for Maple Elementary School, 2002/03–2004/05

	Maple Elementary School		Average index value[a] (N/RC 5) New York	
Year and student group	Number of students[b]	Percentage scoring proficient or above	Number of students	Percentage scoring proficient or above
2002/03				
General education students	60	80	56,751	91
Students with disabilities	5	60	7,233	60
2003/04				
General education students	35	97	55,809	92
Students with disabilities	10	11	7,421	60
2004/05				
General education students	35	100	54,994	95
Students with disabilities	15	86	7,452	65

a. Districts with a need-to-resource-capacity index between the 20th and 70th percentiles.

b. The number of students has been rounded.

Source: Authors' analysis based on data from New York State Education Department (2005a) and Buckley et al. (2008), a companion report in this series.

Massachusetts' math assessment and school needs levels

This section provides information on the state math assessment and on the methods used to categorize schools by need levels. It also provides performance data for the Massachusetts case study school.

Massachusetts Comprehensive Assessment System. The Massachusetts performance data are from the Massachusetts Department of Education web site.[10] Since 1997 the state has been administering the Massachusetts Comprehensive Assessment System (MCAS) to grade 4 students. The math test is administered in May each year in two sessions, each

TABLE C3

Grade 4 New York State Testing Program Math Performance for Redwood Elementary School, 2002/03–2004/05

	Redwood Elementary School		High index value Large city districts[a] (N/RC 2) New York	
Year and student group	Number of students[b]	Percentage scoring proficient or above	Number of students	Percentage scoring proficient or above
2002/03				
General education students	110	77	7,351	68
Students with disabilities	30	55	1,596	43
2003/04				
General education students	100	89	6,900	70
Students with disabilities	20	57	1,603	45
2004/05				
General education students	100	91	6,635	79
Students with disabilities	20	44	1,512	51

a. Buffalo, Rochester, Syracuse, and Yonkers.

b. The number of students has been rounded.

Source: Authors' analysis based on data from New York State Education Department (2005a) and Buckley et al. (2008), a companion report in this series.

TABLE C4

Grade 4 Massachusetts Comprehensive Assessment System math performance for Aspen Elementary School, 2003/04–2005/06

	Aspen Elementary School		Medium need Massachusetts	
Year and student group	Number of students[a]	Percentage scoring proficient or above	Number of students	Percentage scoring proficient or above
2003/04				
General education students	60	71	18,800	50
Students with disabilities	20	41	3,780	17
2004/05				
General education students	80	44	18,674	48
Students with disabilities	20	27	3,868	14
2005/06				
General education students	65	33	18,452	47
Students with disabilities	15	23	4,272	18

a. The number of students has been rounded.

Source: Authors' analysis based on data from New York State Education Department (2005a) and Buckley et al. (2008), a companion report in this series.

designed to take 60 minutes (although all MCAS test administrations are untimed). The test consists of open response, short answer, and multiple choice questions. Testing accommodations are available to students with disabilities based on specifications in their Individualized Education Programs. If students with significant cognitive disabilities are unable to participate in the standard MCAS assessment even with accommodations, they take the MCAS Alternate Assessment (MCAS-Alt).

The Massachusetts Department of Education reports students' results on the standard MCAS assessment using four performance levels: advanced, proficient, needs improvement, and warning. Reaching proficiency is defined as scoring proficient or advanced.

Need-level categories. The case study schools were assigned need-level categories (low, medium, or high) as part of the data analysis for the companion Massachusetts report in this series.[11] The need level was established using a formula based on a school's student population: percentage of students with disabilities, students eligible for free or reduced-price lunch, and students with limited English proficiency. The companion Massachusetts report found that performance on the MCAS math test for grade 4 students with disabilities varied by need-level categories—proficiency rates were lowest among students with disabilities in high-need schools. In addition, the need level of a school had a stronger relation to the performance of students with disabilities than the locale of a school.

Performance data for Massachusetts case study schools. Tables C4 through C6 provide achievement data for the grade 4 MCAS math assessment for 2003/04–2005/06. Each table presents the data for the school and the average percentage scoring proficient for schools in that need level. For example, in 2005/06, 40 percent of students with disabilities scored proficient or above at Willow School compared with 17.5 percent of students with disabilities in medium-need schools across the state.

TABLE C5

Grade 4 Massachusetts Comprehensive Assessment System math performance for Cedar Elementary School 2003/04–2005/06

	Cedar Elementary School		High need Massachusetts	
Year and student group	Number of students[a]	Percentage scoring proficient or above	Number of students	Percentage scoring proficient or above
2003/04				
General education students	50	40	15,285	29
Students with disabilities	20	28	3443	9
2004/05				
General education students	60	51	14,792	26
Students with disabilities	30	17	3,636	7
2005/06				
General education students	60	56	14,118	28
Students with disabilities	10	8	3,652	8

a. The number of students has been rounded.

Source: Authors' analysis based on data from Massachusetts Department of Education (2008) and Ehrlich et al. (2008), a companion report in this series.

TABLE C6

Grade 4 Massachusetts Comprehensive Assessment System math performance for Willow School, 2003/04–2005/06

Year and student group	Willow School		Medium need Massachusetts	
	Number of students[a]	Percentage scoring proficient or above	Number of students	Percentage scoring proficient or above
2003/04				
General education students	30	67	18,800	50
Students with disabilities	20	14	3,780	17
2004/05				
General education students	30	58	18,674	48
Students with disabilities	15	28	3,868	14
2005/06				
General education students	35	56	18,452	47
Students with disabilities	10	40	4,272	18

a. The number of students has been rounded.

Source: Authors' analysis based on data from Massachusetts Department of Education (2008) and Ehrlich et al. (2008), a companion report in this series.

NOTES

The authors acknowledge the contributions of Katherine Culp Jane Donnelly, Teresa Duncan, Burt Granofsky, Denise Lamb, Michelle LaPointe, Allysen Palmer, and John Tapper. They also express their appreciation to the administrators and staff members at the six case study schools.

1. See www.ncee.org/acsd/index.jsp?setProtocol=true.

2. See http://www.tqnyc.com/NYC052376/resources_new.html.

3. See http://www.responsiveclassroom.org/.

4. Redwood also had a senior program administrator, who served as an unofficial assistant principal.

5. A separate special education classroom where students with disabilities receive their instruction. At Cedar Elementary School these students received all their instruction in this setting and were not integrated into general education classrooms.

6. For a student to qualify for special education summer school, teachers had to demonstrate that the student would suffer substantial regression without summer services. To do so, teachers assessed students before and after April vacation and measured how long it took them to return to their prevacation learning level.

7. The combined wealth ratio is derived from assessed property value and personal income, divided by the count of pupils and compared with a statewide average. See http://www.emsc.nysed.gov/repcrd2005/information/similar-schools/guide.shtml for more information.

8. Note that NYSED also categorizes schools into similar-schools groups. These were not used in the tables because the similar-schools data was not available for the students with disabilities subgroup.

9. Any inconsistencies between the data reported in the tables and those reported by the state are minor attributable mainly to missing data in the publicly available datasets. The 2006 results are excluded because they cannot be accurately compared with prior year results because of changes in state standards and testing dates.

10. Data were retrieved from Massachusetts Department of Education (various years).

11. The Massachusetts publicly available datasets do not have their own need-level variable. For the companion data analysis report researchers applied a needs-level formula developed by the New York City Department of Education as a way of grouping similar schools, known as the similar-schools achievement comparison.

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