

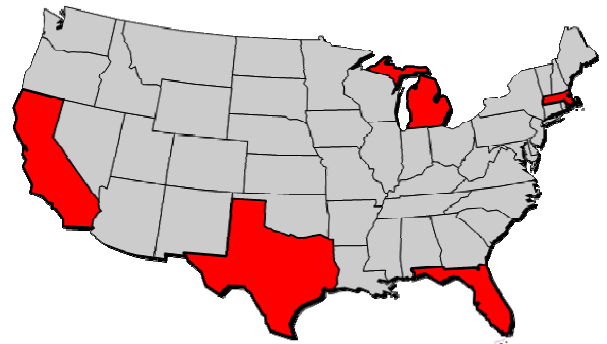


## CASE STUDY

# Core Practices in Math & Science: An Investigation of Consistently Higher Performing Schools in Five States

## Coolidge Elementary School

Flint Community  
Schools  
(Michigan)



## Introduction

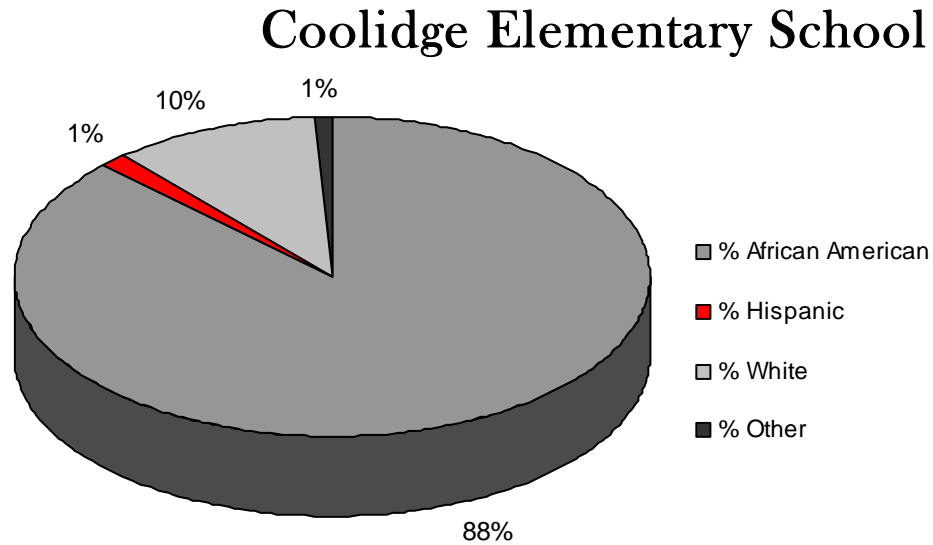
Since 1999, the National Center for Educational Achievement (NCEA) and its affiliated research teams have studied over 500 public schools across the country in an effort to identify and disseminate effective practices embraced by higher performing schools that distinguish their campuses from their average-performing peers. Building on the foundation established by this previous research, NCEA sought in the current study to focus specifically on educational practices in the areas of mathematics and science in five states: California, Florida, Massachusetts, Michigan, and Texas.

Criteria used in school selection in the current study included three years of state assessment data in mathematics and science (2004, 2005, and 2006), campus demographic make-up, percentage of economically disadvantaged students, school size, and geographic location. In addition, all of the schools selected for participation met the state and federal requirements for Adequate Yearly Progress (AYP) in 2006. Schools categorized as higher performing based on the selection criteria were those “beating the odds” with consistently better student achievement over three years, when compared to peer campuses with a similar student population. Therefore, a list of the state’s highest performing schools may contain schools different from those selected for this study.<sup>1</sup>

In order to illuminate the roles of different members in a school community, for each selected school, NCEA researchers interviewed district-level administrators, school administrators, and classroom teachers. To supplement the interview data, researchers collected pertinent documents, observed secondary level algebra classes, and invited participants to take part in the NCEA *Self-Assessment* online.

<sup>1</sup> For more detailed information about the school identification process and the list of higher performing schools included in the study, please see the full cross-case report at <http://www.nc4ea.org>.

**Figure 1: Student Demographics**



## District and School Profile

The Flint Community Schools serves 18,081 students in 39 schools. Approximately 80% of the students are African American. Formerly a manufacturing center for the U.S. automobile industry, the city of Flint (population 125,000) has suffered from high unemployment and economic decline in recent years, since General Motors closed several plants in the area. As a result, the district serves a high-need student population, with 72% of the students eligible for free and reduced-price meals.

Coolidge Elementary School serves 412 kindergarten through 6th-grade students. Coolidge's student population is 88% African American, 10% White, and 1% Hispanic. Within this student population, 75% receive free or reduced-price lunch services.

As a strong proponent of higher standards, NCEA recognizes school efforts to move more students to the state's higher standard of achievement by accounting for those students in the analysis of consistent higher performance. Tables 1 and 2 summarize performance at both the state's proficient and advanced standards attained by the students at Coolidge for the years of 2004, 2005, and 2006. The state averages included in the tables represent student performance among schools with a student population similar to Coolidge, particularly based on the percentage of economically disadvantaged students.

**Table 1: Performance Trends based on Proficiency Standard**

Grade	2004				2005				2006			
	3	4	5	6	3	4	5	6	3	4	5	6
Mathematics	Not Tested	89 %	Not Tested	Not Tested	90%	92%	74%	61%	92%	92%	72%	73%
Science	Not Tested	Not Tested	78%	Not Tested	Not Tested	Not Tested	82%	Not Tested	Not Tested	Not Tested	40%	Not Tested
State Average for Similar Schools (Math)	Not Tested	51%	Not Tested	Not Tested	69%	57%	46%	40%	71%	65%	49%	43%
State Average for Similar Schools (Science)	Not Tested	Not Tested	51%	Not Tested	Not Tested	Not Tested	47%	Not Tested	Not Tested	Not Tested	58%	Not Tested

**Table 2: Performance Trends based on Advanced Standard**

Grade	2004				2005				2006			
	3	4	5	6	3	4	5	6	3	4	5	6
Mathematics	Not Tested	39%	Not Tested	Not Tested	45%	27%	40%	18%	47%	21%	48%	37%
Science	Not Tested	Not Tested	52%	Not Tested	Not Tested	Not Tested	16%	Not Tested	Not Tested	Not Tested	31%	Not Tested
State Average for Similar Schools (Math)	Not Tested	14%	Not Tested	Not Tested	20%	12%	11%	9%	24%	14%	14%	13%
State Average for Similar Schools (Science)	Not Tested	Not Tested	11%	Not Tested	Not Tested	Not Tested	8%	Not Tested	Not Tested	Not Tested	12%	Not Tested

## Theme 1

### Student Learning: Expectations & Goals

**The district’s curriculum adds substance and clarity to state standards. Educators work together to ensure curricular alignment and consistency across schools, grade levels, and classrooms.**

- District leaders in Flint develop a standards-aligned, specific curriculum, with the goal of delivering a quality education to a high-need, high-mobility student population. Observed a district administrator, “In the past we had less consistency from school to school. We have a lot of mobility in our schools, and in previous years a student could move from one building to another and not be learning the same curriculum. We realized that we had to make things consistent and aligned. We started with the state standards, and then identified the skills that must be taught and learned at each grade level.”

- As part of their alignment work, district leaders establish a 3-year cycle of mastery for each state standard. A district administrator explained, “For each standard, we identify the grade level when we will introduce the concept, the grade level where the student will master the concept, and the grade level when we will work on enrichment of the concept.” In order to ensure that students meet these district-identified learning outcomes, teachers and administrators at Coolidge Elementary meet regularly to align curriculum and instruction across all grade levels, kindergarten through sixth grade. A school leader noted, “We hold integrated, cross-grade meetings where teachers will identify learning or skill gaps that concern them. Teachers also meet to break down student performance data by state standards, identify certain state standards that are not currently being taught at particular grade levels, and develop plans to remedy the situation.” A teacher described, “Our principal really encourages teachers to communicate across grade levels so that we all understand what must be taught and learned in each grade. He wants to make sure that there are no gaps in students’ knowledge and skills.”
- Teachers at Coolidge meet in grade-level teams to align instruction within their grade level. These meetings allow teachers to ensure that the district’s written curriculum is taught at similarly high levels of rigor across classrooms. Explained a school administrator, “If one teacher’s students are showing a high level of mastery of a particular state standard, but another teacher’s students, at the same grade level, are not showing similar mastery, then the school leadership will make sure that those two teachers sit down together and have a conversation about how they are each teaching this standard. The goal is for the two teachers to get on the same page.”

**When engaged in goal setting and improvement planning, district and school leaders establish high expectations for teaching and learning based on the district curriculum.**

- In recent years, the academic performance of elementary schools in Flint improved dramatically. District leaders attribute their success to the implementation of a consistent district curriculum, supported by improved professional development. Explained a district leader, “Four years ago, we had 18 elementary schools under varying phases of improvement planning. By the 2006-07 school year, all of those schools were making Adequate Yearly Progress, and all but one school were off the improvement list. Now, we’re beginning to attack similar problems at the middle school level.” A district administrator noted, “We have placed a big emphasis on developing school improvement plans, having those plans reviewed....This was a massive undertaking, because every school’s improvement plan went through a peer review. It was a learning process for school personnel and central office staff, because it gave us notice to what issues had been identified at the school level. We could focus in on what we needed to be doing to help each

school meet students' needs in terms of teacher professional development and curriculum development.”

- School leaders described their goal for all Coolidge educators to raise the level of academic rigor expected of all students as a “work in progress.” A school administrator noted, “In general, we’re finding that we really need to raise academic standards. Based on our student data, we know what students are capable of at each grade level. Unfortunately, students are too often not asked to actually do these things. So now we’re ratcheting up our expectations and asking students to do more. Students know that they are capable of doing and learning much more than they are asked to do currently.”

## Theme 2

### Staff Selection, Leadership, & Capacity Building

**District and school leaders build time for teacher collaboration, both within and across grade levels, into the school day. Teachers understand that structured collaborative planning and reflection helps them learn how to do a better job of reaching every student.**

- When designing schools' master schedules, district leaders ensure that core content-area teachers have regular time to collaborate with their colleagues. Throughout the district, while elementary school students attend their music, art, and physical education classes, teachers receive a 90-minute block of time for collaborative meetings. According to a Coolidge school administrator, teachers often use this planning time to analyze student data and improve their curricular alignment across grade levels. He explained, “During these meetings, teachers meet in clusters (K-2, grades 3-4, 5-6, etc.) to work on alignment. More specifically, they try to clarify exactly what each student needs to know by the time they complete each grade. These expectations need to be reassessed and revisited from time to time.” Observed one teacher, “The building staff is making a commitment to institutionalize cross grade-level articulations this year. The goal is to identify curriculum holes, as well as identify high-risk students.”
- In addition to meeting during their scheduled collaboration time, teachers at Coolidge described constant informal collaboration that allows them to continually improve their own instruction, as well as help their peers do the same. Teachers organize their own weekly grade-level team meetings in which they review the progress of individual students and discuss what is and is not working in terms of instruction. “Coolidge has excellent teamwork,” said one teacher. “We cling together pretty tightly as professionals. If a teacher is weak in one area, other teachers will step in and work with that teacher so that they can master those essential skills. I wish I could clone our high-functioning team at other struggling schools.”

**School leaders at Coolidge develop a teacher selection and induction process that ensures they equip all new educators to meet school-specific academic goals and become members of high-functioning collaborative teams.**

- At Coolidge Elementary, school leaders work closely with district administrators to customize teacher selection processes for their school. Observed a school administrator, “A school’s most valuable commodity is their teaching staff. I tell the district, ‘Let me select my staff, and then hold me responsible, I guarantee that I will select the staff that will get the job done.’ When I have a teaching vacancy, I look really carefully at the list of district teachers looking for new positions. With the last two teachers I hired, I saw their names on the list and recognized them from conversations with principals at their previous schools. Since those two teachers had a good reputation, I talked to the district Human Resources office and made sure that I could get those teachers for Coolidge. I want to hire the teachers who are the best fit for the building.”
- Once hired, new teachers in Flint receive mentoring from a veteran teacher who teaches similar subjects or grade levels. Mentors earn a small stipend for their work. Teachers and school leaders at Coolidge view mentoring as a way to help new educators understand the school’s academic culture and expectations. Explained a school administrator, “Mentorship helps new teachers learn about the way we do things here at Coolidge. There are certain expectations of teachers at Coolidge, certain ways that we approach teaching and learning, and these are the most important things for new teachers to understand.” A school leader noted Coolidge’s especially high teacher retention rate: “Coolidge is very lucky, in that we have a really good core of teachers who have been here for a long time, some for over 20 years. We only have to hire new teachers occasionally.”

### Theme 3

## **Instructional Tools: Programs & Strategies**

**Math and science teachers employ a variety of proven instructional practices, combining hands-on learning with direct instruction, to help students master key concepts and develop problem-solving skills.**

- Teachers throughout the district develop students’ math skills by planning lessons that offer a mix of small-group, independent, and whole-class activities. Noted one teacher, “Sometimes we do hands-on activities, sometimes we do review sessions, sometimes we play games. We just reinforce and repeat the knowledge and skills until students understand.” According to another teacher, “In math, the district really encourages the use of the ‘whole-part-whole’ teaching method, and I use it quite a bit. You

introduce a concept, show a few example problems, have students practice the concept independently, and then have everyone come back together and tie the practice into the lesson I presented at the beginning of the class.” The district recently introduced a new math instructional program that uses a similar three-part instructional approach, along with a greater focus on hands-on activities and problem solving. A teacher explained, “Now the responsibility is really on all teachers to implement the program and integrate these methods into their teaching.”

- Teachers at Coolidge observed that hands-on activities help students build understanding of math concepts and processes. “Transferring knowledge to students by finding new and better ways to reach them is the key to good teaching,” said a teacher. “I do lots of hands-on work and use lots of manipulatives. The students can’t learn if you don’t use hands-on instructional practices.” She continued, “I also work on teaching students how to transfer the activities they’re doing with manipulatives to pencil-and-paper, written work. I’ve developed ‘transfer worksheets’ for students to use during hands-on activities. This is especially important in the first grade, because the students are just learning to write.”

**School and district leaders organize teacher assignment, school schedules, and other instructional arrangements to support academic rigor for all students.**

- At Coolidge, team-teaching in the upper-elementary grades allows teachers to focus on their areas of expertise. Each grade level consists of two classes of students. Teachers divide the school day into morning and afternoon sessions, with one teacher teaching math, science, and social studies to both classes and another teaching the same students English Language Arts and reading. A Coolidge educator described the benefits of this arrangement: “My team teacher is a better English Language Arts teacher than I am, and I am more familiar with the state standards in math. Our principal always says, ‘If you recognize that people are better at teaching certain subjects, why not let them focus on teaching those subjects?’ The teachers are assigned to teach the subjects in which they are the most comfortable, and they can really concentrate on teaching the curriculum for those subjects, rather than having to master a curriculum for an entire grade level.”
- Understanding the importance of strong literacy skills to future educational achievement, district leaders require all elementary schools in Flint to schedule a mandatory 2½-hour daily literacy block. A district leader explained, “As in most urban districts, students come to us with very few literacy experiences, such as being read to or reading on their own, and the literacy block allows us to make up a lot of ground with these students. We’re actually planning to expand this type of program to the middle schools, with a mandatory reading class, for the students who do not get to where they need

to be with literacy skills by the end of elementary school.” During the literacy block, as well as during math and social studies lessons, instructors treat instructional time as *protected*. During protected time, special education or intervention teachers may not pull students out of class.

## Theme 4

### Monitoring: Compilation, Analysis, & Use of Data

**District and school leaders develop and administer regular benchmark assessments to measure student mastery of the curriculum. In addition to these formative assessments, teachers regularly monitor student progress through quizzes, assignments, and other informal methods of capturing their students’ understanding of skills and concepts.**

- At the elementary level, regular benchmark tests in math and reading allow teachers in Flint to assess student learning. District administrators compile the data and then distribute data reports to school leaders. A school leader noted, “We do lots of monitoring via testing. We don’t just look at final scores on state assessments. We do item analysis of the state tests and the benchmark tests to identify areas of weakness, and then teachers go back and devote more time to teaching those concepts.” A teacher noted, “[Our principal] loves analyzing data! He analyzes all student performance data before he gives it to teachers. This is important, because if an administrator wants to implement data-driven instruction, he has to really understand data himself.”
- Regular progress monitoring allows Coolidge teachers to measure student understanding and quickly adjust their teaching if they identify gaps in student learning. A teacher explained, “During class, I walk around a lot, informally assessing my students. This helps me ensure that students are really trying to solve the math problems I give them. I would not be able to tell if I just stood at the front of the classroom. I also give a math quiz or test every week.” Another teacher observed that, when teaching science, it is especially important that students learn and become comfortable using science vocabulary. To build students’ vocabulary skills, she begins each class with an informal quiz covering the science terms students learned the day before.

**Classroom walkthroughs and other forms of instructional monitoring are common activities for school administrators, and teachers expect and welcome these visits.**

- A school leader at Coolidge noted that, in addition to participating in district’s formal teacher evaluation cycle, he is “constantly evaluating teachers informally” and giving teachers constructive feedback on their instructional practices. Observed one teacher, “Our principal really cares, and you can tell he cares. When he visits classrooms, he’s always really interested in what we



are teaching. Teachers know that they have to be 'on their game,' and that pressure is a good thing."

- New teachers receive extra time and attention from school administrators. A teacher explained, "When I first came to this school, the principal came to my classroom every day. He was especially interested in how I was teaching math. He told me 'You have to prove to me that you can teach math well.'" The same teacher said that the principal is always available to talk to teachers about instructional issues, observing, "He recognizes that we are all in the same profession, working towards the same goals. At my previous schools there were all these procedures you had to follow if you wanted to meet with your principal. It was way too much of a hassle. That is never a problem at Coolidge."

## Theme 5

### Recognition, Intervention, & Adjustment

**Employing a tiered intervention model, teachers and school leaders provide focused resources and support to identify and assist struggling students.**

- At Coolidge, intervention teachers at each grade level work closely with regular classroom teachers and attend grade-level team meetings. These intervention teachers are integral members of grade-level teams. A teacher explained, "My intervention teacher and I have really found an effective way to work together, especially when it comes to math. She is really interested in building the math skills of our students. She watches me teach, takes notes on what I am teaching, and then develops different ways of working with the lower-performing students to reinforce key math concepts. She'll develop worksheets, and work with them on vocabulary. Often, I'll use these materials with the higher-achieving students because they are so effective! I grew a lot as a teacher by collaborating with her."
- To assist struggling students, Flint uses a pyramid of interventions model that moves from in-class interventions delivered by the regular classroom teacher, to additional in-class help from intervention teachers, to pull-outs and separate intervention classes for the students with the greatest need. Interventions occur when students do not meet district-identified performance thresholds on benchmark exams and other assessments. Describing this process, a teacher noted, "[We] do regular benchmark tests in reading, and after we grade the benchmarks, we identify students who need intensive assistance. We put those students in small groups of six to eight students and they work closely with the intervention teacher, following a formalized intervention program connected to the reading instructional program. The intervention teacher monitors the progress of each individual student very carefully."

**Because the Flint Community Schools serves a high-need student population, educators at the district, school, and classroom levels work together to monitor the well being of every student. When educators identify a student with low attendance or other problems, they work to connect the family with social, behavioral, or mental health services as needed.**

- Each school in the district organizes a student assistance team that meets to discuss individual students and intervenes with students facing serious academic, behavioral, or family problems. At these meetings, the student's teacher, the parents, the school psychologist, and the school social worker sit down to discuss the student's problems and develop an improvement plan. When the student assistance team cannot meet a student's needs within the school, it directs the family towards outside interventions, such as mental health treatment. Noted a school leader, "We've found that many lower-achieving students are not achieving because of social or family issues. At Coolidge, we work closely with parents, and as a result, we're proud that we have very low retention rates and low rates of special education referrals. An effective teacher will always recognize when something is going on outside the classroom. I insist that all my teachers take a personal interest in each child, and really get to know them. And parents know that we take a personal interest. They recognize the quality of the teaching staff here."
- Educators in Flint monitor student attendance and make contact with parents if students are frequently absent from school. Observed a school administrator, "More and more of the district's students are not attending school as much as we would like. Students cannot achieve at a high level if they're not attending school. On our last attendance check, roughly a third of the student body at Coolidge had more than the allotted number of absences. Usually, low attendance at the elementary level is due to a family situation. The school will work with families, and we'll get our behavioral specialist involved. The district also makes phone calls home after a high number of absences, and district administrators will not hesitate to get law enforcement involved if we're really concerned. It's good to know that the district values high attendance as much as all of us at Coolidge do."

## **Summary of Findings**

### **Student Learning: Expectations & Goals**

The district's curriculum adds substance and clarity to state standards. Educators work together to ensure curricular alignment and consistency across schools, grade levels, and classrooms. When engaged in goal setting and improvement planning, district and school leaders establish high expectations for teaching and learning based on the district curriculum.

## **Staff Selection, Leadership, & Capacity Building**

District and school leaders build time for teacher collaboration, both within and across grade levels, into the school day. Teachers understand that structured collaborative planning and reflection helps them learn how to do a better job of reaching every student. School leaders at Coolidge develop a teacher selection and induction process that ensures they equip all new educators to meet school-specific academic goals and become members of high-functioning collaborative teams.

## **Instructional Tools: Programs & Strategies**

Math and science teachers employ a variety of proven instructional practices, combining hands-on learning with direct instruction, to help students master key concepts and develop problem-solving skills. School and district leaders organize teacher assignment, school schedules, and other instructional arrangements in ways that support academic rigor for all students.

## **Monitoring, Compilation, Analysis, & Use of Data**

District and school leaders develop and administer regular benchmark assessments to measure student mastery of the curriculum. In addition to these formative assessments, teachers regularly monitor student progress through quizzes, assignments, and other informal methods of capturing their students' understanding of skills and concepts. Classroom walkthroughs and other forms of instructional monitoring are common activities for school administrators, and teachers expect and welcome these visits.

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