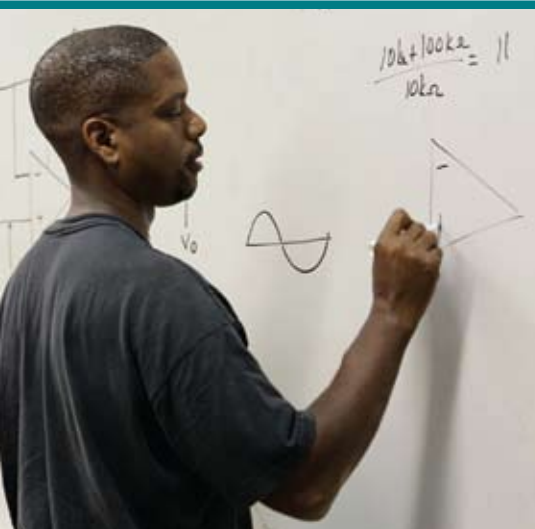


# Important, but Not for Me

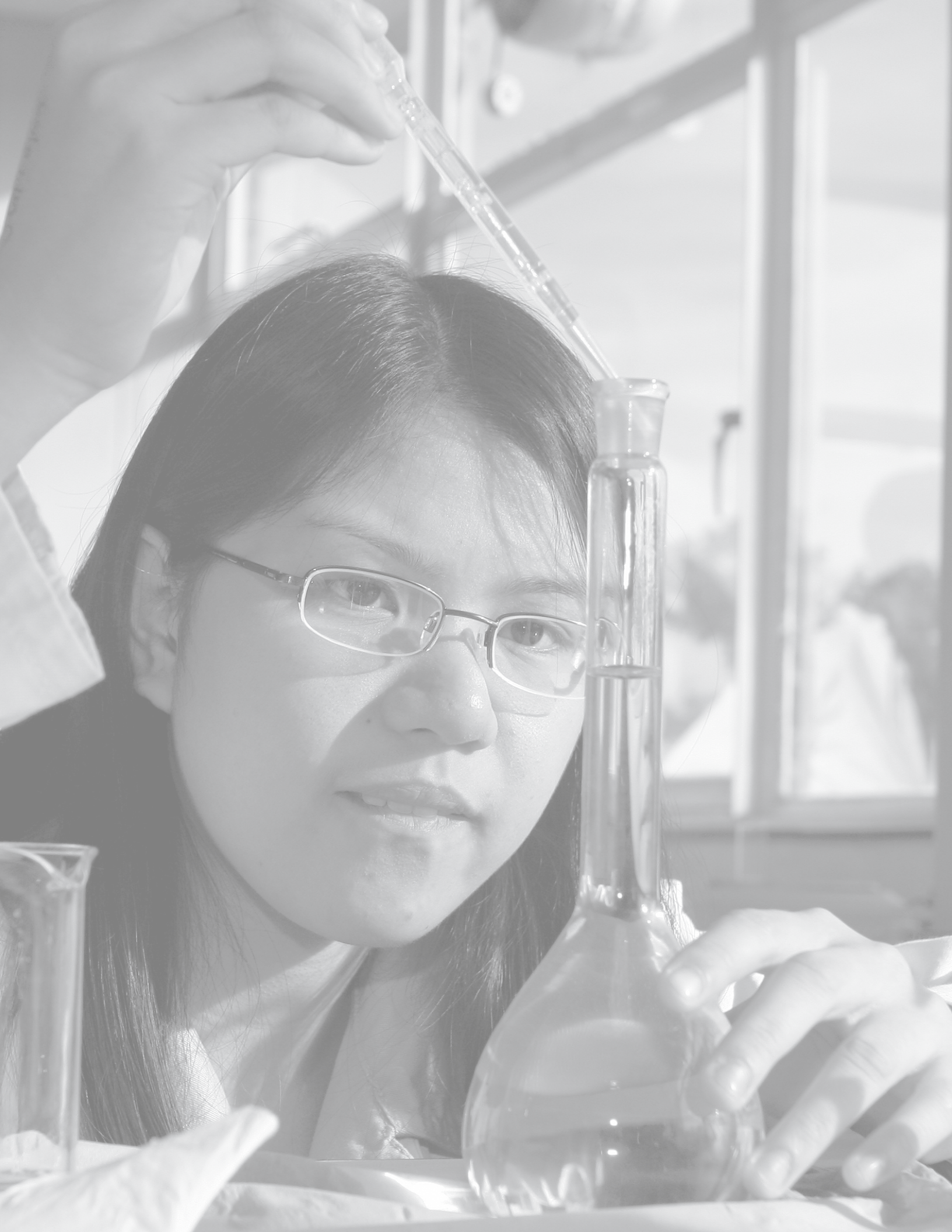
## Parents and Students in Kansas and Missouri Talk About Math, Science and Technology Education

A Report from  PUBLIC AGENDA

*with support from the Ewing Marion Kauffman Foundation*







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A Report from  PUBLIC AGENDA  
by Alison Kadlec and Will Friedman  
with Amber Ott

*Research Consultants: FDR Group*

*with support from the Ewing Marion Kauffman Foundation*



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## Introduction

**“We look for [workers] who are about to graduate from college in a lot of very technical fields... and often we just can’t find anyone.”**

—Kansas City–area chemist

The warnings from experts are unequivocal: U.S. leadership in science and technology is at risk unless schools do more to train and nurture a whole new generation of young Americans with strong skills in math, science and technology. More and more, national experts and leaders are pointing out that far too few students are learning even the basics, let alone mastering the higher-level math, science and technology they’ll need to take advantage of the opportunities offered by the new economy and maintain America’s international competitiveness. According to one report, for example, less than half (42 percent) of ACT-tested students are “on target to be ready for college level math.”<sup>1</sup>

National research from Public Agenda has shown that in stark contrast with most employers and professors who are dissatisfied with high school graduates’ math, science and technology skills, most families tend to express confidence that their own schools are preparing youngsters well. In a 2006 study, we found that less than a third (32 percent) of parents said schools should be teaching a lot more math and science, while a clear majority (57 percent) said “things are fine as they are.” Furthermore, a large majority of parents said

their teenage children would graduate from high school equipped with the skills needed to succeed in college (69 percent) and the workplace (61 percent). Perhaps most surprisingly, given the level of leadership anxiety about math and science education in the United States today, this national research shows that the number of parents who worry about whether local schools are teaching enough math and science has *declined* since the mid-nineties. In 1994, 52 percent of parents said that it was a “serious problem” that students weren’t learning enough math and science, but by 2006 the number had dropped to 32 percent.<sup>2</sup>

This study, conducted to inform the Ewing Marion Kauffman Foundation’s 10-year initiative to improve math, science and technology education in the Kansas City region, asks how parents and students in Kansas and Missouri view these issues—and a host of others relevant to improving results in these important subject areas. The Kauffman Foundation provided funding for the research.

The findings here are based on a random survey of 1,472 parents and 1,295 middle and high school students in Kansas and Missouri, probing their attitudes on math and science education—and, to a lesser extent, technology education as well.<sup>3</sup> The survey was preceded by 12 focus groups with parents, students and teachers in the Kansas City region and a series of interviews with local employers, leaders and experts. (For more details on how the research was conducted, see the methodology section on p. 21; full survey results can be found on our website at [publicagenda.org](http://publicagenda.org).)

### Local leaders deeply concerned

When it comes to gauging the importance of math, science and technology education, experts we spoke with in the Kansas City region echoed national leaders and did not mince words. “Today’s global language for economic competitiveness is math and science,” a local business leader told us. “If we’re illiterate in [these areas], we’re not

<sup>1</sup> Cynthia Schmeiser, “State of College Readiness in Mathematics,” presented at the National Math Panel, 2006. Full presentation may be found at [www.ed.gov/about/bdscomm/list/mathpanel/4th-meeting/testimony/schmeiser.ppt#342,22](http://www.ed.gov/about/bdscomm/list/mathpanel/4th-meeting/testimony/schmeiser.ppt#342,22), State of College Readiness in Mathematics.

<sup>2</sup> “Reality Check: Are Parents and Students Ready for More Math and Science,” Public Agenda 2006 and “First Things First,” Public Agenda 1994. For more comparisons to national surveys, see the Appendix.

<sup>3</sup> We probed technology questions less fully than math and science because our qualitative research suggested that people’s understanding of what constitutes technology education is so fragmentary and ill formed that there’s only so much to be learned via a survey of this type. While experts and leaders define technology education with terms such as “design,” “innovation,” “engineering” and the “built environment,” we found in our focus groups that parents and students think of technology education primarily in terms of computer literacy. Additional qualitative research could be used to assess public perceptions and attitudes toward technology education, especially if it is designed to probe and clarify people’s views and thinking on the subject and gauge their reactions to new ideas.

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going to be able to compete globally.” And a science expert warned, “We are creating a class society based on the gaps between those who are scientifically and mathematically literate and those who aren’t.”

Indeed, from the perspective of local employers with whom we spoke, recruiting and retaining a high-quality workforce in the growing sectors of the life sciences, biotechnology, financial services and advanced manufacturing is the single greatest economic challenge facing the region today and for the foreseeable future. And a main source of this challenge, they say, is that students are simply not emerging from high schools and colleges with the background in math, science and technology required for success in the fields in which there are the greatest economic opportunities. As a local working chemist explained, “We look for [workers] who are about to graduate from college in a lot of very technical fields...and often we just can’t find anyone.”

### **Have local families embraced the challenge?**

Just how ready are families in Kansas and Missouri to take up the challenge leaders describe? Our research suggests that local parents and students are aware of the importance of math, science and technology for local and national economic competitiveness but that they nevertheless do not view them as a vital key to personal opportunity and see no pressing reason to push hard for better results.

As we outline in some detail in the report, parents are, generally speaking, complacent about the need for improvements in higher-level math, science and technology education, in large measure because they have the sense that their children’s schools are doing a bang-up job already. Most students, meanwhile, experience these subject areas as profoundly uninteresting and largely irrelevant to their futures. They pay some lip service to the notion that one can get a good-paying job with these skills, but very few seem to have a real appreciation for the range of opportunities that are enabled by mastery of these subjects or envision themselves pursuing them.

In short, while parents and students have a measure of appreciation for the role science, math and technology will play in the future world of work, this appreciation remains thin, and relatively few seem to absorb the implications in a personal sense. Most parents do not see improving math, science and technology education as a top challenge facing their local schools, and most students do not come to these subjects with a strong sense of motivation and interest.

There remains, in other words, a considerable “urgency gap” between leaders and experts on the one hand and parents and students on the other. Leaders need to make the case that more advanced study in math, science and technology is now essential for all students—not just the select few. They also need to think boldly and creatively about ways to engage parents, students and teachers in increasing student interest and success in these critical subjects.

## Finding 1: Parents Are Aware of the Importance of Math, Science and Technology but Remain Complacent

**While parents sense the increasingly important role of math, science and technology in the future economy, they do not see the need for schools to improve math, science and technology education for their own children**

In contrast with local business leaders who see an urgent need to upgrade math, science and technology (MST) education in local schools, most parents do not view this as a top priority.<sup>4</sup> While parents clearly have a general sense of the increasingly important role these areas of expertise will play in the future economy, they do not share leadership's sense of urgency about the need to improve MST education for today's students. In fact, most parents are quite pleased with the status of math and science education in local schools, although, as we demonstrate in later findings, minority parents are far more likely to believe their children's schools are below par in this area.

For instance, 57 percent of Kansas and Missouri parents say that the United States is "far behind other countries" in math and science achievement, while a scant 10 percent say we're "well ahead." Moreover, 86 percent agree that "students with advanced math and science skills will have a big advantage when it comes to work and college opportunities."

But behind this general awareness lurks complacency. When parents are asked if their child's school should be teaching "a lot more

math and science, less, or are things fine as they are," a full 70 percent choose the latter response. Meanwhile, less than a quarter (23 percent) say that advanced math and science courses such as calculus and physics are "absolutely essential," and nearly three-quarters (73 percent) say that advanced science courses should be expected only of students who show a special interest in the subjects. Certainly parents view basic math and science as essential, but they do not feel that advanced math and science courses are vital for most kids.

It should be noted, however, that algebra represents something of a special case. In recent years, algebra has been given quite a bit of national attention by leaders who have argued it is a critically important subject for all students to master, and our research suggests that this emphasis has paid off: Nearly 8 in 10 parents in our survey viewed algebra as a subject that is "essential" for student success after high school (79 percent).<sup>5</sup> This shift in opinion regarding algebra suggests that parents may be open to arguments about the importance of advanced MST mastery for today's students—and, in fact, this is something we saw clearly in focus groups conducted for this project. As people learned more about the expanding role of MST in the new economy, they attached more importance to students mastering these subjects.

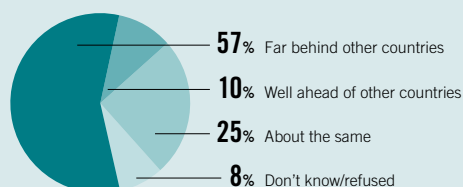
<sup>4</sup> For the sake of simplicity, we use the acronym MST in the remainder of the report.

<sup>5</sup> In the 1990s, advocates for education standards began a movement toward "algebra for all." See, for example, Steen, Lynn Arthur, "Algebra for All in Eight Grade: What's the Rush?" *Middle Matters* 8, no. 1 (Fall 1999): 1, 6–7.



## Most parents recognize that the United States is behind other countries in math, science and technology education

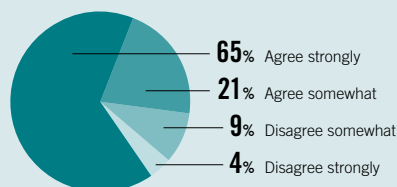
As far as you know, do you think that the U.S. is well ahead of other industrialized countries when it comes to educating its young people in science and math?



Parents in Kansas and Missouri

## Large majorities of parents recognize that students with good math and science skills have good future prospects

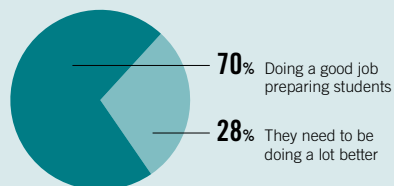
Do you agree or disagree that students with advanced math and science skills will have a big advantage when it comes to work and college opportunities?



Parents in Kansas and Missouri

## But unlike local leaders, they are confident that local schools are doing a good job preparing students for the future

Would you say that, generally speaking, your local schools are doing a good job preparing students to be successful as adults, or do they need to be doing a lot better?

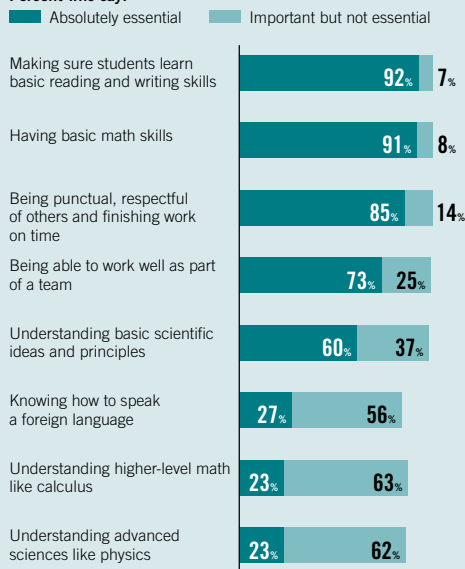


Parents in Kansas and Missouri

## While most parents see basic math as “absolutely essential,” relatively few see advanced science and math in the same light

Do you think the following is essential for schools to teach students before they're done with high school and go out into the real world?

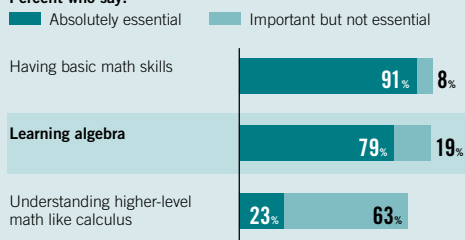
Percent who say:



## However, parents see algebra as essential for getting into college

Do you think the following is essential for schools to teach students before they're done with high school and go out into the real world?

Percent who say:



Parents in Kansas and Missouri

## Finding 2: Satisfaction with Teachers and Curriculum Underlies Many Parents' Complacency

**"I think the algebra that [my son] does as an eighth grader is the [same] algebra I did as a freshman in college. It seems so much harder...."**

—Kansas City-area parent

It appears that one of the main reasons many parents are complacent about improving math, science and technology is that they think schools are doing a fine job. While leaders we spoke with warned that MST curriculum is not up to snuff and said things like "It is so hard to find and retain high-quality math and science teachers, especially given the opportunities those individuals have in the private sector," a large majority of parents are satisfied with their kids' MST teachers and curriculum. Large majorities give high marks to both the math and the science curriculum and its teachers.

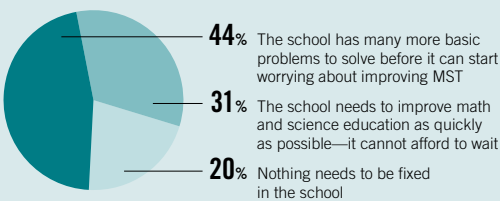
Many parents find the MST curriculum their children are studying to be much tougher than what they had to contend with when they were in school, and this likely contributes to their perception that schools are succeeding with MST instruction. Sixty-nine percent say

math is harder today, while 51 percent say that science is harder. As one mother told us in a focus group, "I think the algebra that [my son] does as an eighth grader is the algebra I did as a freshman in college. It seems so much harder...." In another focus group, the father of a high school student said, "I don't think I even had to take much more than one or two math and science classes when I was in high school. Now they have to take three of each in order to graduate. I'm thinking like, wow, things have changed a lot...."

Parents' sense that the schools have substantially raised the level of MST education already may go a long way toward explaining why less than a third of them (31 percent) see improving math and science as an urgent priority and why experts' call to ramp up achievement in these areas has not sunk in.

### Most parents do not think that improving math and science education is a pressing need in their own child's school

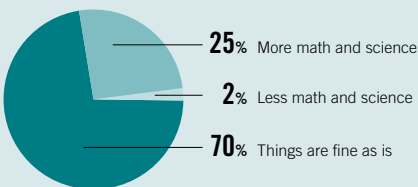
Which comes closer to your view about your child's school?



Parents in Kansas and Missouri

### A large majority of parents think their children are learning about the right amount of math and science in local schools

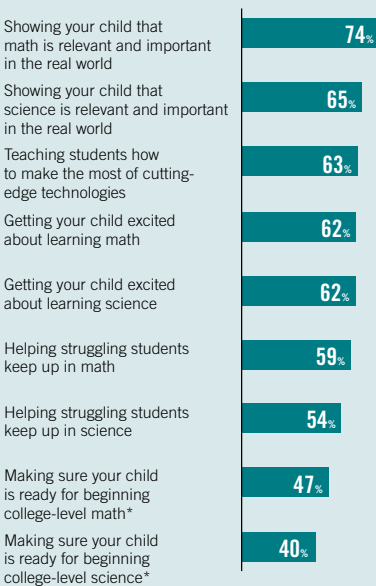
Do you think that your child's school should be teaching a lot more math and science, less, or are things fine as they are?



Parents in Kansas and Missouri

### Most parents say teachers are succeeding in making math, science and technology interesting and relevant and in making sure students are ready for college-level work

Overall, would you say your child's teachers are mostly succeeding when it comes to the following?



\* Asked of parents of students in high school

Parents in Kansas and Missouri

## Finding 3: Minority Parents and Students Are Less Satisfied with Student Learning, Teacher Quality and Resources in Their Local Public Schools

While parents and students tend, overall, to be pretty satisfied with math, science and technology education in their local schools, it is important to note that there are several significant differences among racial groups.

In many cases, white, African-American and Hispanic parents and students share similar views. And even where there are differences, perspectives do not tend to be on opposite ends of the spectrum; rather, they reflect a matter of degree. For example, when asked why their peers might do poorly in math and science, 79 percent of white, 62 percent of African-American and 65 percent of Hispanic students said it was because they feel the subjects are irrelevant to their lives.

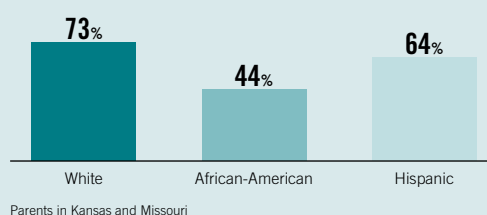
But there are several notable exceptions. Compared with their white and Hispanic peers, African-American parents are most concerned about student preparation and learning, teacher quality and school resources. When it comes to students' perspectives, both African-American and Hispanic students are less satisfied with their teachers and the equipment in their classrooms.

On the subject of student preparation and learning, both African-American and Hispanic parents are more likely to say that “students today are not really learning basic math” (65 percent of African-American and 61 percent of Hispanic compared with 42 percent of white parents). African-Americans are also much less likely (44 percent) to say that their children’s schools are “doing a good job of preparing students for success as adults” than their white counterparts (73 percent).

In addition, both African-American and Hispanic students are less likely to say that their schools have the teachers and equipment they need to help students learn (84 percent whites, 69 percent African-Americans, 76 percent Hispanics).

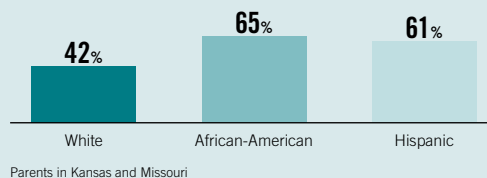
### African-American PARENTS are considerably less satisfied with the job schools are doing to prepare students for success in life

Percent of parents who say their child's schools are doing a good job preparing students for success as adults:



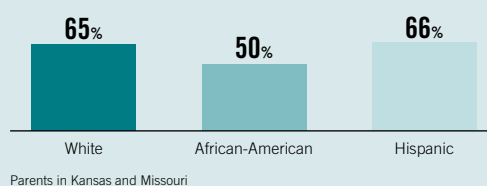
### African-American and Hispanic PARENTS are concerned that students aren't learning basic math

Percent who agree that students today are not really learning basic math:



### African-American PARENTS are concerned that their students are not getting an adequate education in the use of technology

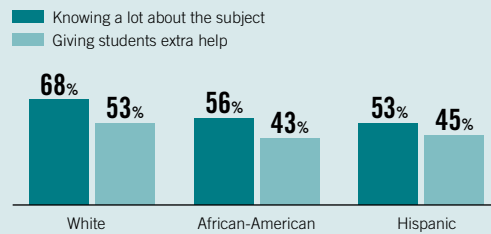
Percent of parents who say their child's teachers are mostly succeeding when it comes to teaching students how to make the most of cutting-edge technologies:



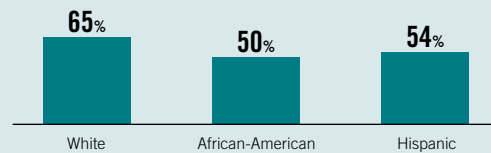
Compared with white parents, African-American and Hispanic parents are more concerned that children are not learning basic math

## And African-American STUDENTS are less satisfied with their teachers overall

Percent of students who say their math teachers are mostly succeeding when it comes to:



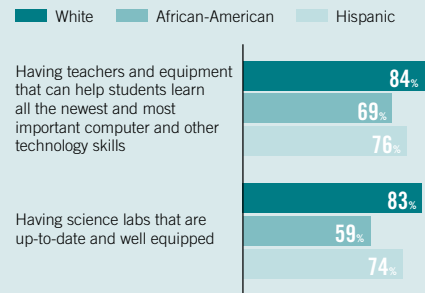
Percent who say their science teachers know a lot about their subject:



Students in Kansas and Missouri

## Both African-American and Hispanic STUDENTS are less satisfied with their schools' teachers and equipment

Percentage of students who say their schools have teachers and equipment that can help students learn:



Students in Kansas and Missouri



## Finding 4: Students Pay Lip Service to the Importance of Higher Level Math, Science and Technology, but Most Find It Irrelevant

While students in our survey sent mixed signals about the importance of higher-level math, science and technology education, overall, most find these subjects to be of very little relevance to their futures.<sup>6</sup>

For instance, 63 percent of students said they believe it is “crucial” for most students to take higher-level math, like advanced algebra and calculus, because “they are the gateway to success in college and work.” At the same time, however, an even larger majority of students (72 percent) say that advanced science should be expected only of those students who show special interest in these subjects. And only 26 percent view “understanding higher-level math like calculus” as “absolutely essential” for high school graduates to learn. Moreover, more than three-quarters (76 percent) say that students do poorly in math and science because they think these subjects are irrelevant.

Our qualitative research amplifies these survey findings, suggesting that even if students might pay some lip service to the value of advanced MST, few really feel its value when it comes to their own lives and futures. This point was made forcefully by students in focus groups in and around Kansas City. Before students knew what the topic of the discussion would be,

we asked them the following question: “There are probably some things you’re learning that you think will be helpful to you later in life, and there are probably some things you’re learning that you think are totally useless—what are the most useless things you’re learning?” In all of the groups, an overwhelming majority of participants spontaneously volunteered higher-level math and science as the least relevant subjects.

*You have to use basic math every day of your life. It’s just good to know, but you don’t need a whole bunch more than that. When are we ever going to use  $x$  plus  $y$  and all that?* —Urban student

*I hate math just because it’s hard for me to understand how that’s ever going to come back and help me. There’s just not a point.* —Suburban student

*Science doesn’t matter unless you want to become a doctor or something like that.* —Exurban student

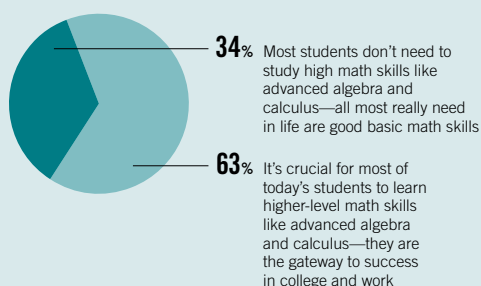
In light of these attitudes, it is no surprise that a significant proportion of students (41 percent) said they would be unhappy if they ended up in a career that involved a lot of math or science. In fact, students appear to have very little sense of the range of MST career opportunities. In the focus groups, when we asked students to talk about the kinds of careers available to people with strong skills in math and science, the result was a stilted con-

**Even if students say they appreciate the value of math, science and technology, few really feel its value when it comes to their own lives and futures**

<sup>6</sup> In the survey, we used advanced algebra, calculus, advanced chemistry and physics as examples of higher-level classes. In the focus groups, we allowed students to lead the way in telling us what they considered advanced courses, and those most frequently identified as irrelevant were geometry and chemistry.

### Students seem to pay lip service to the value of higher-level math

Which comes closer to your view?



Students in Kansas and Missouri

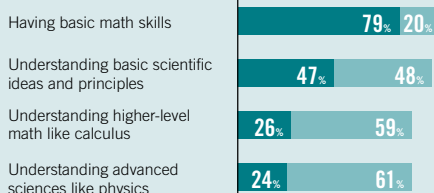
### But most students don't see higher-level math or science as essential

Do you think the following is essential to teach students before they're done with high school and go out into the real world?

Percent who say:

Absolutely essential

Important but not essential



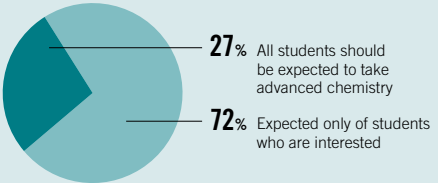
Students in Kansas and Missouri

versation punctuated by long bouts of silence. After naming the usual suspects of doctor and scientist, students simply seemed to run out of

ideas. Too few, it appears, can imagine a rewarding and exciting career in which math, science and technology play a large role.

**Most students don't believe that high-level science should be required**

Should all students be expected to take advanced science classes such as physics and chemistry, or should that be expected only of the students who show special interest in science?

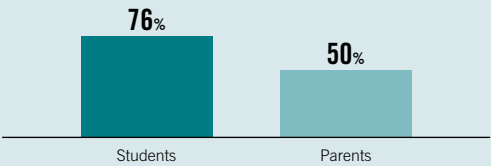


Students in Kansas and Missouri

**Most students feel that poor achievement in math and science can be chalked up to the fact that they find these subjects irrelevant—and they are far more likely than parents to say this**

What can explain why students may do poorly in math and science?

Percent who say it is because students think these subjects are irrelevant to their lives:

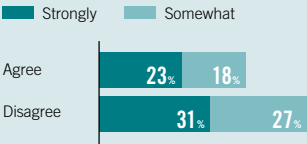


Parents and students in Kansas and Missouri

**Many students still say they would be unhappy in careers involving a lot of math and science**

Do you think that you would be really unhappy if your career required doing advanced math or science?

Percent who say:



Students in Kansas and Missouri

## Finding 5: However, Students Do Not Buy Into Negative Stereotypes and Give Their Teachers High Marks

There is some good news from students when it comes to math, science and technology education for those hoping to build student interest and motivation in this area. For instance, they do not buy into the stereotypes that MST achievement depends on natural ability or that students who do well in these subjects are less popular or socially awkward. A full 70 percent of students disagree with the statement “Students who are strong in math or science tend to be less popular.” An even larger majority (85 percent) hold that math and science are subjects that “kids can learn in school and develop with experience” rather than being “something that kids are mostly born with.”

Also, like their parents, students give MST teachers high marks. More than 7 in 10 say that their teachers are helping them “learn a lot” about these subjects. And only 20 percent say that low student achievement can be attributed to the notion that “there aren’t enough really good math and science teachers.” Further, an overwhelming majority of students say that their past MST teachers have prepared them adequately for the next level of schooling.

Of course, just because students believe their teachers are doing a good job does not mean that they are, in fact, being adequately prepared for success after high school. Questions about teaching remain at the fore of experts’ concerns. For example, experts we spoke with in the Kansas City region

suggested that finding and retaining talented MST teachers is a particular challenge simply because the private sector offers so many high-paying opportunities in these areas.

*It’s particularly hard to recruit science and math teachers because there are other opportunities, [especially when] working conditions and expectations make [teaching] not a very attractive path.*

—Teacher training expert, math and science

In addition to the challenge of attracting teachers with strong MST backgrounds, many leaders we spoke with stressed the importance of professional development opportunities that help teachers keep up with their disciplines and better connect their content areas to the real world in ways that bring the material to life for students.

*Teachers have lost track of what the real world is like, and they’re teaching in silos and not connected to the real world. Therefore, they can’t even make the curriculum relevant to students.*

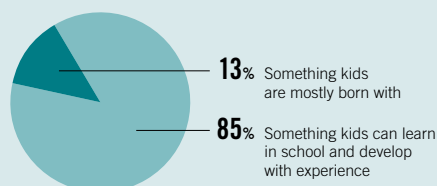
—Community leader

While it is a good sign that students are happy with their teachers and do not find these subjects intrinsically “uncool,” the fact that they still find these subjects irrelevant suggests that a closer look be taken at both the curriculum and the challenge of attracting and developing strong teachers.

**Just because students believe their teachers are doing a good job does not mean that they are, in fact, being adequately prepared for success after high school**

### Students believe that most kids can learn math and science—they’re not skills people are born with

Do you think that ability in math and science is something kids are mostly born with or is it mostly something kids can learn in school and develop with experience?



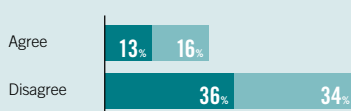
Students in Kansas and Missouri

### Students don't believe that those who do well in math and science are less popular

Do you agree or disagree that the students who are strong in math and science tend to be less popular?

Percent of students who say:

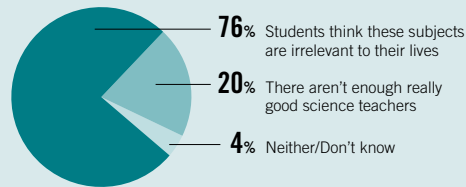
Strongly Somewhat



Students in Kansas and Missouri

### Few students blame poor achievement on teachers

Do you believe that students may do poorly in math and science because:

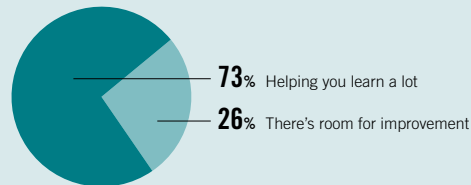


Students in Kansas and Missouri

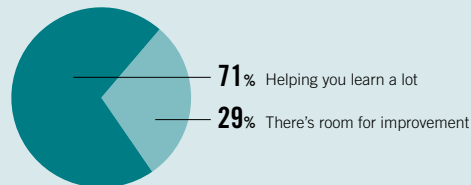
### In fact, students give teachers very high marks when it comes to helping them learn math and science

Overall, would you say that your teachers are helping you learn a lot about the following, or do you think there is room for improvement?

**Math:**



**Science:**

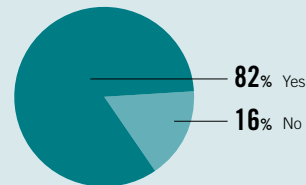


Students in Kansas and Missouri

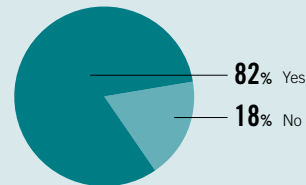
### And students believe that previous teachers have prepared them adequately for the next level of schooling

Thinking back to when you first started middle school, do you think that your elementary school teachers prepared you for middle school-level work or not?

**Math:**

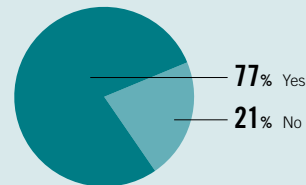


**Science:**

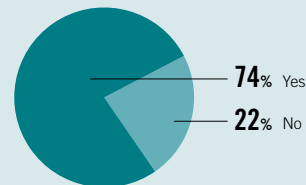


Thinking back to when you first started high school, do you think that your middle school teachers prepared you for high school-level work or not?

**Math:**



**Science:**



Students in Kansas and Missouri



## Finding 6: Improving Results, I: Where Do Parents Stand on Improving Math, Science and Technology Education?

Given that parents don't see improving math, science and technology education in local schools as a top priority, most haven't thought much about the ideas and solutions leaders are discussing and so haven't settled on specific solutions in any real sense. That said, the survey did test out a series of strategies to gauge where Kansas and Missouri parents line up. Not surprisingly, their views reflect their current perspective and level of understanding. They are especially attracted to ideas that focus on bringing struggling students up to current levels. Leaders, in contrast, are focused both on helping struggling students and on ramping up MST learning and achievement among average and top students as well.

### Some strategies are more appealing than others

Fifty-four percent of parents in our survey felt that “putting students in classes according to their ability, so that fast learners are together in one class and slower learners are together in another” would improve MST results “a lot,” while only 17 percent said this approach would do “nothing at all.” Almost as many (50 percent) say it would improve MST education “a lot” if schools make “struggling students stay after school for extra help” and another 48 percent think it will help a lot if struggling students “take summer school” to help them catch up. Significant proportions (if not quite as high) also appear open to the ideas of “establishing a national curriculum...so that schools everywhere teach the same topics” and “requiring students to pass challenging tests in math and science in order to graduate.”

Several other proposals fared less well. Only 27 percent thought it would improve results “a lot” to pay “math and science

teachers more than English and social studies teachers because those positions are hardest to fill,” while a greater percentage (35 percent) said this strategy would do “nothing at all.” Similar levels of support were shown for encouraging “students to rely more on calculators so that they can concentrate on math concepts instead of doing math by hand” as well as for “extending the current school year by one month to ensure that all students fully understand the math and science curricula.”<sup>7</sup>

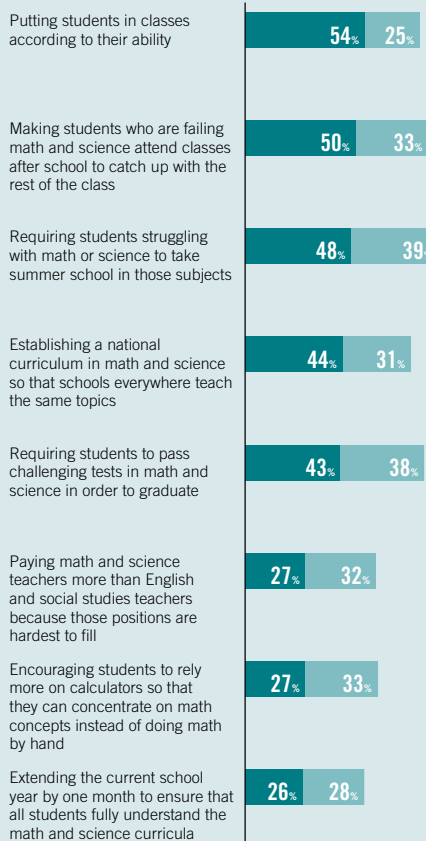
**Parents are especially attracted to ideas that focus on helping struggling students**

### Grouping by ability and extra classwork for students who struggle top the list of possible solutions parents were asked about

Please tell me how much each of the following would improve math and science education in your child's school. Would you say that it would improve math and science education a lot, a little, or would it do nothing at all?

Percent who say:

■ A lot ■ A little



Parents in Kansas and Missouri

<sup>7</sup> This discomfort with calculators is a finding that we have seen in many of our earlier surveys. For instance, in 1994 only 10 percent of parents thought that students “who use calculators and computers from the start learn to understand math concepts even better than those who spend a lot of time memorizing tables and doing math by hand” (“First Things First,” Public Agenda).

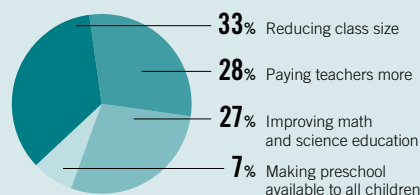
### Establishing urgency is key

Understanding parents' starting-point attitudes on concrete strategies such as these can be important as leaders consider various proposals—simply put, some are more likely to be immediately embraced by parents than others. But given the low saliency of the issue overall, it is also likely, we believe, that people will be open to discussion and possibly even rethinking if they come to decide that the issue is truly critical and worth tackling.

Therefore, we remind readers that, as noted in Finding 2, significantly more parents say that their child's school "has much more basic problems to solve before it can start worrying about improving math and science education" than say they think schools must "improve math and science education as quickly as possible—it cannot afford to wait." Similarly, when asked to choose how they would distribute new resources their district might receive, 33 percent would reduce class size, 28 percent would increase teacher pay, about the same amount (27 percent) would invest the resources in improving math and science education, while 7 percent would opt to make preschool available to all students. MST is clearly in the mix but is not jumping out in front of the pack.

### Improving math and science is neither a clear winner nor a clear loser when it comes to parents' preferences for distribution of resources

Suppose your community got extra money to spend on its schools and you were asked to help decide how to spend that money. Would you prefer the money go toward:



Parents in Kansas and Missouri

## Finding 7: Improving Results, II: Driving Home the Opportunity Equation Can Motivate Students

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While students understand that a strong math, science and technology background can improve their future prospects, this knowledge remains abstract and impersonal.

### Deepening students' understanding of new economic opportunity

When considering what can motivate students, we think it instructive to return to findings from the focus groups (which are a particularly useful tool for observing shifts in people's attitudes as they encounter new information or work through conflicting ideas). While the vast majority of students had come to the focus groups with the attitude that high-level MST could hardly be more irrelevant to their futures, conversations about concrete opportunities in college and the workplace clearly warmed students to the idea of taking more of these courses and taking them more seriously.

We noticed a similar dynamic in one especially interesting "general public" focus group that included several young adults, business-people and one working chemist. As the chemist began to rattle off a variety of career opportunities made possible by

a strong math and science background, the other participants in the group perked up noticeably, and the entire tone of the conversation changed. The younger adults in the group began saying things like "I wish I'd known about all those jobs when I was in school!" and many suggested they would have definitely taken more MST in high school had someone explained the real opportunities to them. It was striking to see how energized people became as they discussed concrete, real-world opportunities.

Our survey data support this finding—even though students responded positively to a wide range of approaches that might motivate them to take more math and science courses, the biggest winners centered squarely on this theme of opportunity. We found that 8 in 10 students said they would be motivated "a lot" to take higher-level math and science if they knew "most good colleges expect you to have advanced math and science courses on your high school transcripts," while about the same (79 percent) said they would be motivated "a lot" if doing so would "open up good job and career opportunities for you."

**Learning about concrete opportunities in college and the workplace warmed students to the idea of taking more math and science courses and taking them more seriously**

## Students are most motivated by arguments that relate to future opportunities for young people in higher education or in the job market

If you knew the following, would that encourage you to take advanced math and science courses?

Percent of students who say:

■ A lot   ■ A little

Most good colleges expect you to have advanced math and science courses on your high school transcripts



Advanced math and science skills will open up good job and career opportunities for you



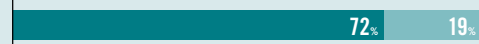
More college scholarships are available to students with advanced math and science skills



You will have to show your high school transcript in order to get a job



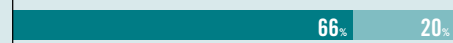
You must pass rigorous tests in math and science to graduate from high school



Performing poorly in math and science will cause you to be left back a grade



Performing poorly in math and science will mean you will have to go to summer school



Performing poorly in math and science will mean you cannot participate in sports or other extracurricular activities



Our nation is falling behind other countries economically because we're not producing people with strong math, science and technology skills



Students in Kansas and Missouri



## Methodology

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The findings in “Important, but Not for Me” are based on 2,767 telephone interviews with a representative sample of parents and students in Kansas and Missouri. Interviews were conducted between April 16 and June 10, 2007. The survey was preceded by 12 focus groups and 15 expert interviews. In addition, email surveys were completed by 10 members of the faculty and staff of the University of Missouri Kansas City School of Computing and Engineering.

### The Telephone Survey

The study was conducted by telephone among a representative sample of 2,767 telephone interviews with a representative sample of parents and students in Kansas and Missouri, with special emphasis on respondents in the Kansas City metropolitan area. Of those, 1,472 were with parents in households where a child was in grades 6 through 12 and attending public school and 1,295 were public school students in grades 6 through 12. In addition, oversamples were conducted to ensure 180 interviews each with African-American parents, African-American students, Hispanic parents and Hispanic students. The margin of error for parents is plus or minus 2.55 percentage points, and it is 2.72 for the sample of students. Please note that the margin of error is higher when comparing percentages across subgroups.

An age-targeted listed sample was used in this study to achieve a crosssection of respondents. This sample came from two sources. For the main samples, sample was generated using an RDD technique and then scrubbed across public data to flag pieces that were identified as a household with a member 11–18 years of age. For the oversamples of Hispanics, the sample was further limited to records with a known Hispanic surname. For the African-American oversample, each telephone exchange in the Kansas City area was examined and divided into two strata,

one with high African-American incidence exchanges and one with low-incidence exchanges. The high-incidence exchanges were then disproportionately dialed to attain a higher incidence of African-Americans. Again, such sample was scrubbed to include only households with a member ages 11 through 18. This entire sample was then screened to ensure the household had a member who was in public school grades 6 through 12.

Data were weighted by gender, age, race, region and education. QBal, an industry-standard weighting program that employs a ranking procedure to simultaneously equate weights by each variable, was used to create the final weights. Counts for the weights were obtained through an aggregation of multiple years of the U.S. Census Current Population Survey, March Supplement. In addition, a preweight was developed to rebalance the disproportionality of the high to low African-American strata as well as the general oversampling done in the Kansas City area as compared with the rest of Kansas and Missouri. Then the post-stratification balancing was conducted using QBal.

Respondents were asked over 50 items relating to math, science and technology education. We asked fewer questions regarding technology than math and science because our qualitative research suggested that people’s understanding of what constitutes technology education is so fragmentary and ill formed that survey results on the topic could yield misleading or inconclusive results. While experts and leaders define technology education with terms such as “design,” “innovation,” “engineering” and the “built environment,” we found in our focus groups that parents and students think of technology education primarily in terms of computer literacy. The survey also included screener questions to ensure our respondents were indeed parents of or students in grades 6 through 12, demographic questions to describe

the survey participants and closed-ended opinion questions. The full questionnaire is available at [publicagenda.org](https://publicagenda.org).

As in all surveys, question-order effects and other nonsampling sources of error can sometimes affect results. Steps were taken to minimize these issues, including pretesting the survey instrument and randomizing the order in which some questions were asked.

The survey instrument was designed by Public Agenda, and Public Agenda is solely responsible for all analysis and interpretation of the data. Surveys were fielded by International Communications Research.

### The Focus Groups

Focus groups allow for an in-depth, qualitative exploration of the dynamics underlying the public's attitudes toward complex issues. Insights from participants in these focus groups were important to the survey design, and actual quotes were drawn from the focus groups to give voice to attitudes captured statistically through the surveys. All focus groups were moderated by Public Agenda senior staff. Twelve focus groups were conducted as follows:

- Three suburban groups, one each with parents of school-age children, high school students and math, science and technology teachers. These groups were recruited from three school districts in Johnson County, KS: Blue Valley, Shawnee Mission and Olathe;
- Three urban groups, one each with parents of school-age children, high school students and math, science and technology teachers, recruited from the Kansas City, MO school district;
- Three exurban groups, one each with parents of school-age children, high school students and math, science and technology teachers. These were recruited from four districts in Clay County, MO: Excelsior Springs 40, Kearney R-I, Liberty 53 and Missouri City 56;
- And three heterogeneous groups were conducted to help us develop and refine a Public Agenda Choicework discussion guide. These groups comprised parents of school-age children, teachers, high school students and a cross-section of members of the general public.

### The Expert Interviews

Fifteen 30-45 minute in-depth interviews were conducted with business, education and community leaders in the Kansas City region by senior staff at Public Agenda. Some of the individuals interviewed have held or currently hold state-level positions. In addition, email surveys were completed by 10 members of the faculty and staff of the University of Missouri Kansas City School of Computing and Engineering.

## Appendix

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## The Study in National Perspective

### High-level concerns about math and science are national as well as regional

While the research summarized in this report is regional in scope, its significance is national. Not only do the findings echo the results of national research on public attitudes toward math, science and technology education, but they resonate with concerns raised by national leaders. For example, “obsolete” is the word Microsoft Chairman Bill Gates used to describe the nation’s high schools in his speech to the nation’s governors and education leaders at the 2005 National Education Summit. Gates explained his concerns crisply: “By obsolete, I mean that our high schools—even when they’re working exactly as designed—cannot teach our kids what they need to know today....Our high schools were designed fifty years ago to meet the needs of another age. Until we design them to meet the needs of the 21st century, we will keep limiting—even ruining—the lives of millions of Americans every year.”<sup>1</sup>

Gates is, of course, just one of many national leaders advocating for major reform in recent years. According to many elected officials, corporate CEOs and education experts, today’s schools aren’t as challenging as they need to be and students just aren’t learning enough—especially in the areas of math, science and technology.<sup>2</sup>

<sup>1</sup> Gates, Bill. Prepared remarks to the National Education Summit on High Schools, February 26, 2005. Published on the website of the Bill & Melinda Gates Foundation.

<sup>2</sup> Examples include: Business Roundtable press release “Business Roundtable Encourages Focus on Math and Science in Initiative for Teacher Excellence.” June 6, 2005. Also, the official statement on “Math & Science” on the website of the Center for Corporate Citizenship of the United States Chamber of Commerce, available on the website of the Business Education Network as of January 19, 2006.

<sup>3</sup> “Reality Check: Are Parents and Students Ready for More Math and Science,” Public Agenda 2006 and “First Things First,” Public Agenda 1994.

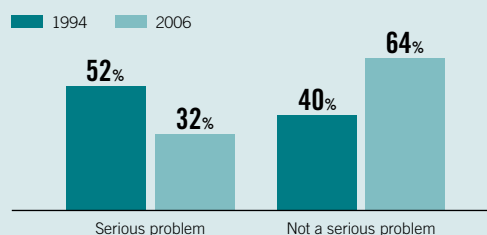
### The “urgency gap” is a national phenomenon, as well

Similarly, parents in Kansas and Missouri are hardly unique in their complacency with the job their kids’ schools are doing. As noted in the introduction, national research shows that most parents are convinced their own children will be well-prepared following high school graduation—61 percent of parents say their child will have the skills they need to succeed in college and 69 percent think they will be prepared for the work world. In national surveys of parents, the number who worry about whether local schools are teaching enough math and science has declined since the mid-nineties (see table below).<sup>3</sup>

This means that the region is not alone in needing to better engage stakeholders in working to meet the challenges of a 21st Century education. It also means that local efforts to do so can not only improve prospects for local students and the regional economy, they can serve to inform national efforts to help American families understand the economic and educational challenges the country faces and involve them in strategies to find effective solutions.

#### Parents’ concerns about math and science education have fallen since the mid-1990s

Is it a serious problem in your own community’s public schools that kids are not taught enough math and science?\*



\* Source: “Reality Check: Are Parents and Students Ready for More Math and Science,” Public Agenda 2006 and “First Things First,” Public Agenda 1994.

## Acknowledgments

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### About Public Agenda

Founded in 1975 by social scientist and author Daniel Yankelovich and former U.S. Secretary of State Cyrus Vance, Public Agenda works to help the nation’s leaders better understand the public’s point of view and to help average citizens better understand critical policy issues. Our in-depth research on how citizens think about policy has won praise for its credibility and fairness from elected officials from both political parties and from experts and decision makers across the political spectrum. Our citizen education materials and award-winning website, **www.publicagenda.org**, offer unbiased information about the challenges the country faces. Twice nominated for the prestigious Webby award for best political site, Public Agenda Online provides comprehensive information on a wide range of policy issues.

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