Catching Up To
College and Career Readiness

ACT®

Introduction

In recent years educators and policymakers have set a goal that students graduate from high school ready for college and careers. However, as a nation we are far from achieving this goal, particularly for low-income and minority students. For example, in states where all eleventh-graders take the ACT®, only 27 percent of low-income students in 2010 met the ACT College Readiness Benchmark in reading, with 16 percent meeting the Benchmark in mathematics, and 11 percent meeting the Benchmark in science.[1]

Efforts to improve students' academic preparation have often been directed at the high-school level, although for many students, gaps in academic preparation begin much earlier. Large numbers of disadvantaged students enter kindergarten behind in early reading and mathematics skills, oral language development, vocabulary, and general knowledge. These gaps are likely to widen over time because of the "Matthew effects," whereby those who start out behind are at a relative disadvantage in acquiring new knowledge.

Policy discussions about preventing and closing academic preparation gaps should be informed by a realistic view of the *difficulty* of closing these gaps. The more difficult and time-consuming it is to close the gaps, the more important it is to start the process earlier. Underestimating the time and effort required could lead educators and policymakers to underfund prevention efforts and choose intervention strategies that are too little and too late. Underestimating the difficulty could also lead policymakers to hold schools to unrealistic accountability targets, creating strong incentives at various levels in the system to lower standards and artificially inflate test scores. On the other hand, overestimating the difficulty could lead educators and policymakers to give up on students.

This report uses information on the percentage of students reaching college and career readiness targets over a four-year period as an indicator of the difficulty of doing so. The report focuses on students who start out far off track—well below the achievement level that those with average growth trajectories need to reach college and career readiness targets in a specified later grade. We focus on closing academic preparation gaps over two four-year periods:

Grades 8-12: How many students who are far off track in eighth grade reach college readiness benchmarks by twelfth grade?

Grades 4-8: How many who are far off track in fourth grade catch up by eighth grade?

[1] These percentages would likely be still lower if the college and career readiness of dropouts was included.

2. Catching Up in Grades 8–12

How many students are far off track in eighth grade?

In the 2009–10 school year EXPLORE® was administered to almost 800,000 eighth-grade students nationwide. For the purposes of this study, we divided students into three academic preparation groups in each subject based on their performance on EXPLORE in that subject:

- *On Track* students met the College Readiness Benchmark on EXPLORE (*Figure 1*) in the subject.

- *Off Track* students missed the Benchmark by one standard deviation or less.

- *Far Off Track* students scored more than a full standard deviation below the Benchmark.

For example, a score of 15 or better in EXPLORE Reading indicated a student was On Track; Off Track students scored from 12 to 14, while students scoring 11 or below were classified as Far Off Track.[2]

Figure 1: **ACT's College Readiness Benchmarks**

	EXPLORE	PLAN	ACT
English	13	15	18
Mathematics	17	19	22
Reading	15	17	21
Science	20	21	24

Figure 2: **Academic Preparation of 2009–10 Eighth-grade EXPLORE Test Takers**

Student Academic Preparation	Reading			Mathematics			Science		
	All Students	African American Students	Hispanic Students	All Students	African American Students	Hispanic Students	All Students	African American Students	Hispanic Students
On Track *Met or exceeded College Readiness Benchmark*	43%	24%	26%	37%	15%	21%	16%	4%	7%
Off Track *No more than one standard deviation below Benchmark*	30%	33%	32%	35%	35%	37%	32%	21%	26%
Far Off Track *More than one standard deviation below Benchmark*	27%	43%	42%	28%	50%	41%	52%	74%	67%

[2] The size of a standard deviation on EXPLORE in 2010 was 3.9 points in reading, 3.9 points in mathematics, 4.2 points in English, and 3.3 points in science. See Dougherty & Fleming (2012).

[3] For example, using "Below Basic" on the National Assessment of Educational Progress (NAEP) as an indicator of "Far Off Track," in 2009 roughly one-fourth of eighth-grade students overall and 40-50 percent of African American and Hispanic students were Below Basic in reading and mathematics. In science, about one-third of students overall but a clear majority of African American and Hispanic students were Below Basic.

The bottom row of *Figure 2* shows that just over one-fourth of all eighth-grade students taking EXPLORE were Far Off Track in reading and mathematics (27 and 28 percent, respectively). The corresponding proportions for African American and Hispanic students were in the 40-50 percent range. These statistics are similar to other estimates of the prevalence of poor academic preparation among eighth-grade students.[3]
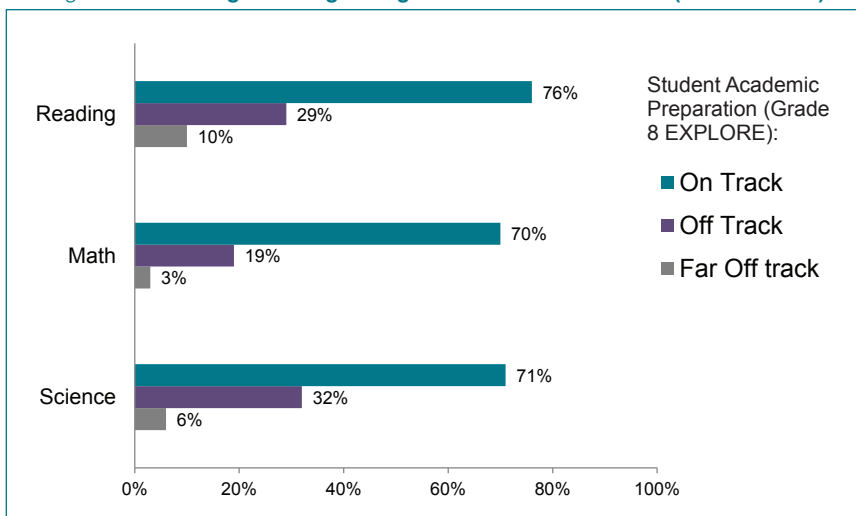
What percentage of Far Off Track eighth-graders catch up in four years?

To address this question, we analyzed data from a nationwide sample of approximately 391,000 students from four cohorts who took EXPLORE in eighth grade, PLAN in tenth grade, and the ACT in twelfth grade.[4] In the

sample, only about 10 percent of Far Off Track eighth-graders reached the College Readiness Benchmark for reading in Grade 12 (*Figure 3*). Similarly, only a small percentage of Far Off Track eighth-graders reached the Grade 12 Benchmarks in mathematics (3 percent) and science (6 percent). A greater percentage of Off Track students reached the Benchmarks in Grade 12, with 29 percent in reading, 32 percent in science, and 19 percent in mathematics. By contrast, the majority of On Track eighth-graders were college and career ready in Grade 12.

It should be noted that the students in the study sample were a relatively select group, staying in high school and taking three different college readiness tests (i.e., EXPLORE, PLAN, and ACT).[5] This could mean that they were academically more motivated than a randomly chosen national sample of eighth-grade students from each academic preparation group. If so, then the results in *Figure 3* are likely to err on the optimistic side.

Figure 3: **Percentage Meeting College Readiness Benchmarks (Grade 12 ACT)**

What percentage of Far Off Track eighth-graders catch up in more successful high schools?

To compare results for Far Off Track students in more successful high schools with those in average performing schools, we ranked schools based on the percentage of Far Off Track eighth-grade students who met College Readiness Benchmarks in twelfth grade. We identified the top 10 percent of schools in each subject and compared their results with the average of all schools in that subject.[6] The results of this analysis are shown on the following page in *Figure 4a*. The more successful schools were able to get 28, 14, and 19 percent of their Far Off Track eighth-graders to College Readiness Benchmarks by twelfth grade in reading, mathematics, and science, respectively.

Schools serving lower poverty (more advantaged) student populations predominated in the top 10 percent of schools in *Figure 4a*. To examine the performance of the more successful schools serving disadvantaged students, we divided high schools into two categories based on student poverty rates: higher poverty schools with more than 50 percent economically disadvantaged students and lower poverty schools with 50 percent or fewer of those students. Economically disadvantaged students were defined as those eligible for the free and reduced price lunch program.[7] We ranked schools within these two income categories based on the percentage of Far

[4] Students in the four cohorts took EXPLORE in the 2002-03, 2003-04, 2004-05, and 2005-06 school years, taking PLAN two years later and the ACT four years later. For convenience, we label the cohorts based on the spring of Grades 8 and 12: the 2003-07, 2004-08, 2005-09, and 2006-10 cohorts. For the analysis in this report, we used the most recent ACT scores of students who took that test at least once in Grade 12. Inclusion of students who took the ACT for the last time in Grade 11 did not significantly change the study results (Dougherty & Fleming, 2012).
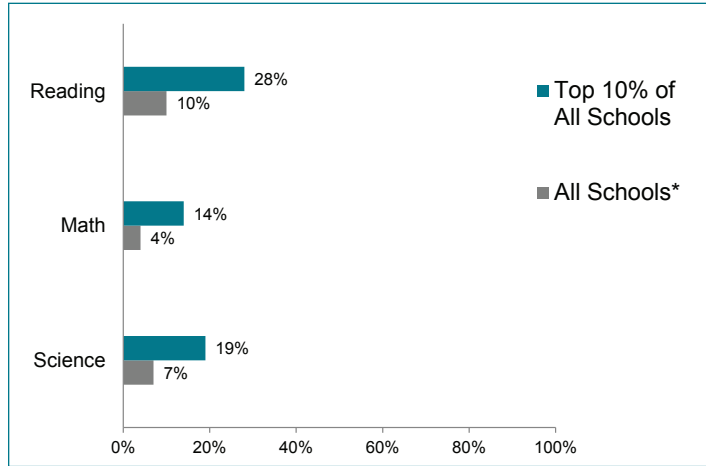
[5] The study sample had a lower percentage of students who were Far Off Track on eighth-grade EXPLORE, compared to the percentage of Far Off Track students found among all eighth-grade EXPLORE takers. This is evidence of the selectivity of the study sample (Dougherty & Fleming, 2012).

[6] Schools were ranked based on the performance of Far Off track students in the most recent two cohorts (2005-09 and 2006-10). Schools were required to have at least 10 Far Off Track students in each cohort and at least 30 such students across both cohorts combined.

[7] Source of this data for the 2008-09 school year came from the U.S. Department of Education's Common Core of Data.

Percentage of **Far Off Track** Eighth-grade Students Meeting College Readiness Benchmarks on Grade 12 ACT
(By School, Poverty and Performance Level)

Figure 4a: **All Schools**

Reading — Top 10% of All Schools: 28%; All Schools*: 10%
Math — Top 10% of All Schools: 14%; All Schools*: 4%
Science — Top 10% of All Schools: 19%; All Schools*: 7%

* These statistics are not identical to those in *Figure 3* because: 1) *Figure 3* covers four student cohorts, whereas *Figure 4a* depicts the two more recent of those cohorts (2005–09 and 2006–10) in order to maximize the number of schools that had data from every cohort; and 2) *Figure 4a* depicts only schools with at least 10 Far Off Track students in each cohort and 30 students in both cohorts.

Figure 4b: **Higher Poverty Schools**
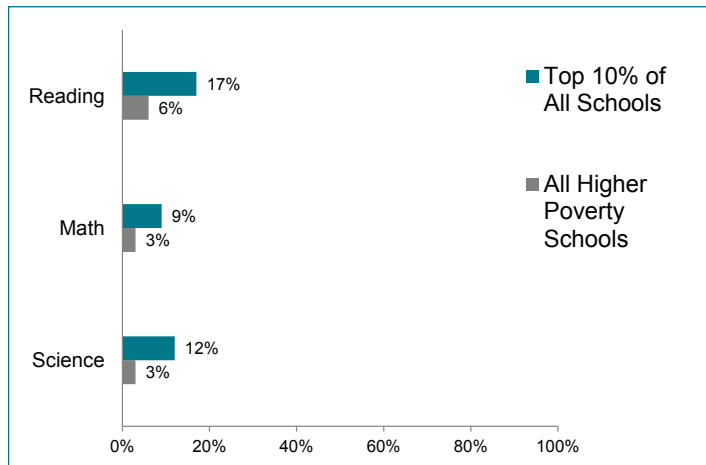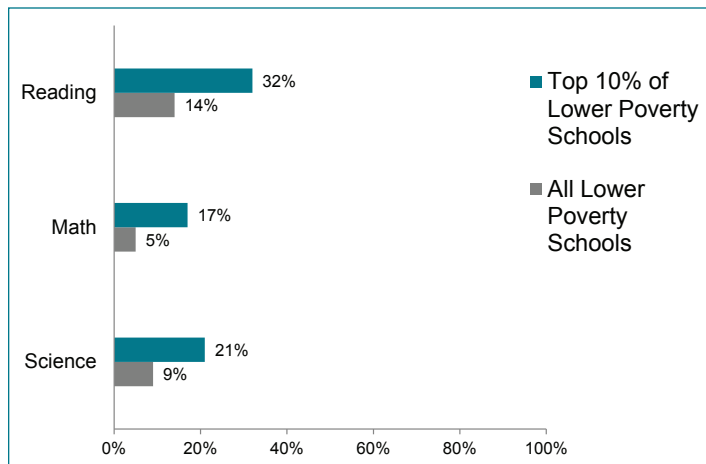(>50-100% Economically Disadvantaged Students)

Reading — Top 10% of All Schools: 17%; All Higher Poverty Schools: 6%
Math — Top 10% of All Schools: 9%; All Higher Poverty Schools: 3%
Science — Top 10% of All Schools: 12%; All Higher Poverty Schools: 3%

Figure 4c: **Lower Poverty Schools**
(0-50% Economically Disadvantaged Students)

Reading — Top 10% of Lower Poverty Schools: 32%; All Lower Poverty Schools: 14%
Math — Top 10% of Lower Poverty Schools: 17%; All Lower Poverty Schools: 5%
Science — Top 10% of Lower Poverty Schools: 21%; All Lower Poverty Schools: 9%

Off Track eighth-graders who met College Readiness Benchmarks in twelfth grade. We identified the top 10 percent of schools in each income category and compared their average results with the average of all schools in the category.

The top 10 percent of higher poverty high schools were able to increase the percentage of students meeting benchmarks from 6 to 17 percent in reading, 3 to 9 percent in mathematics, and 3 to 12 percent in science (*Figure 4b*). It is noteworthy that the more successful higher poverty schools outperformed the average for lower poverty schools, which averaged 14 percent of Far Off Track students meeting the ACT benchmark in reading, 5 percent in mathematics, and 9 percent in science (*Figure 4c*).

These results are consistent with the findings in *The Forgotten Middle* (ACT, 2008) about the importance of preparing students before eighth grade. Waiting until high school to address preparation gaps is too late for the majority of students who have fallen behind, particularly those who are Far Off Track. Catching up those students is a daunting challenge even for the most effective high schools.

3. Catching Up in Grades 4–8

If catching students up in high school is difficult, perhaps it is easier to catch them up earlier. To investigate this question, we identified a state, Arkansas, whose fourth-grade state test results could be matched to the same students' eighth-grade EXPLORE scores. We classified those students as On Track, Off Track, and Far Off Track based on their fourth-grade scores.[8]

How many students were Far Off Track in fourth grade?

In the spring of 2010, the Arkansas Benchmark Exams (ABE) in literacy and mathematics were administered to about 36,000 fourth-grade students. (The literacy test measured a combination of reading and writing.) About one-fifth of students—18 and 22 percent, respectively—were Far Off Track in literacy and mathematics, but these percentages were substantially higher for African American and Hispanic students (*Figure 5*).

Figure 5: **Student Academic Preparation Levels**
2010 Fourth-grade Arkansas Benchmark Exam

Student Academic Preparation	Literacy			Mathematics		
	All Students	African American Students	Hispanic Students	All Students	African American Students	Hispanic Students
On Track	46%	28%	33%	45%	25%	38%
Off Track	37%	43%	43%	33%	37%	36%
Far Off Track	18%	29%	24%	22%	38%	26%

What percentage of Far Off Track fourth-graders catch up in four years?

To examine the percentage of Far Off Track fourth-grade students reaching college and career readiness targets by eighth grade, we used a sample of about 38,000 students who took the fourth-grade ABE in 2004-05 or 2005-06,

[8] This required identifying target scores for On Track students on the fourth-grade Arkansas Benchmark Exams in literacy and mathematics based on a link to the eighth-grade EXPLORE tests in reading and mathematics. See NCEA/ACT (2011) and Dougherty & Fleming (2012).
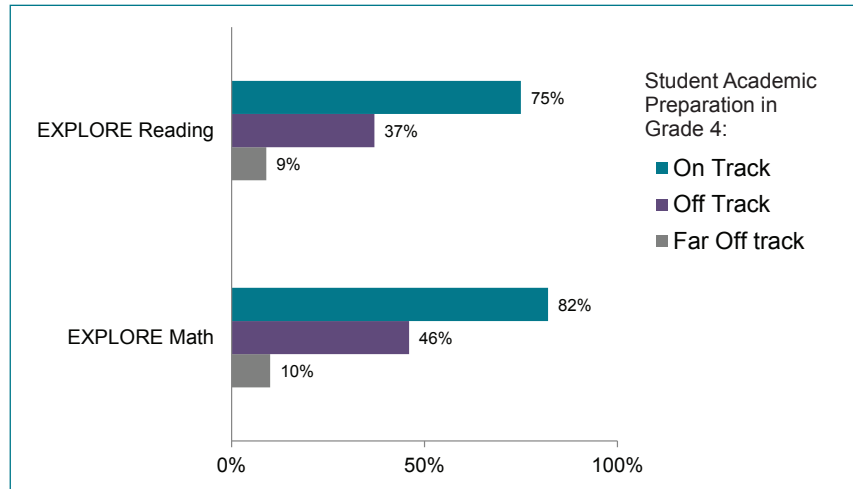
and the eighth-grade EXPLORE four years later. As with the eighth-grade sample followed through twelfth grade, Far Off Track fourth-graders had a low chance of reaching College Readiness Benchmarks in eighth grade—only a 9 percent chance in eighth-grade reading and a 10 percent chance in eighth-grade mathematics *(Figure 6)*. Off Track students had a somewhat higher chance with 37 percent in reading and 46 percent in mathematics, while On Track fourth-graders had a 75 percent probability in reading and 82 percent chance in mathematics of staying On Track in eighth grade.

Comparing *Figures 3* and *6,* success rates with each group of students in mathematics were somewhat higher in grades 4–8 than in grades 8–12, suggesting it may be easier to catch students up in that subject by starting earlier. However, the same pattern did not hold consistently in reading. Data from additional states may shed further light on the relative difficulty of catching up in earlier and later grades.

What percentage of Far Off Track fourth-graders catch up in more successful schools?

To compare results for Far Off Track students in more successful schools with those in average performing schools, we ranked schools with eighth-grade students based on the percentage of Far Off Track fourth-grade students who met College Readiness Benchmarks on EXPLORE in eighth grade. We identified the top 10 percent of schools in each subject and compared their results with the average of all schools in that subject.[9]

More successful schools were able to get 21 and 23 percent of previously Far Off Track Students to College Readiness Benchmarks in eighth grade (*Figure 7a*). As was the case in high school, schools serving more advantaged students were disproportionately well represented in the top 10 percent of schools.

As with the eighth-grade analysis, to examine the performance of the top middle schools and feeder elementary schools serving disadvantaged students, we divided the middle schools into two categories (higher poverty and lower poverty schools) and ranked schools within these two income categories based on the percentage of Far Off Track fourth-graders who met

[9] Schools with eighth-grade students were ranked based on the performance of Far Off Track students in the 2005-2009 and 2006-2010 cohorts. Schools were required to have at least 10 Far Off Track students in each cohort, and at least 30 such students across both cohorts combined. In cases where students spent part of their time in elementary school between fourth and eighth grade, this success measure pertains to a combination of middle or junior high schools and their feeder elementary schools. Thirty percent of the students in this sample transitioned to a new school in sixth grade, 55 percent in seventh grade, 7 percent in eighth grade, and 7 percent stayed in the same school between fifth and eighth grades.
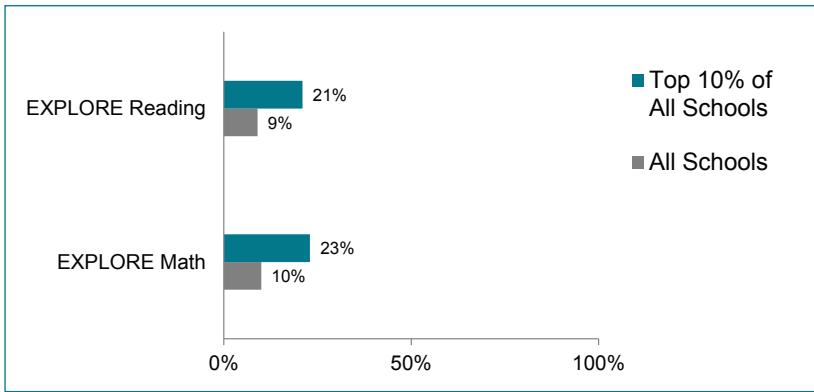
Figure 7a: **All Schools**

EXPLORE Reading
- Top 10% of All Schools: 21%
- All Schools: 9%

EXPLORE Math
- Top 10% of All Schools: 23%
- All Schools: 10%

Legend: ■ Top 10% of All Schools ■ All Schools

Figure 7b: **Higher Poverty Schools** (>50-100% Economically Disadvantaged Students)

EXPLORE Reading
- Top 10% of Higher Poverty Schools: 16%
- All Higher Poverty Schools: 7%

EXPLORE Math
- Top 10% of Higher Poverty Schools: 20%
- All Higher Poverty Schools: 8%

Legend: ■ Top 10% of Higher Poverty Schools ■ All Higher Poverty Schools
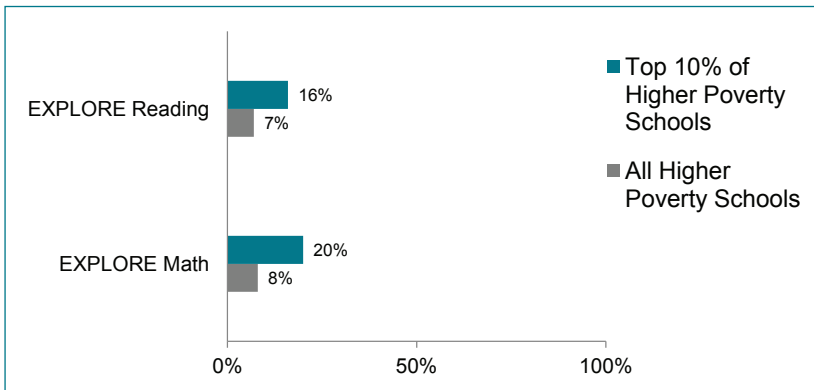
Figure 7c: **Lower Poverty Schools** (0-50% Economically Disadvantaged Students)

EXPLORE Reading
- Top 10% of Lower Poverty Schools: 27%
- All Lower Poverty Schools: 13%

EXPLORE Math
- Top 10% of Lower Poverty Schools: 27%
- All Lower Poverty Schools: 13%

Legend: ■ Top 10% of Lower Poverty Schools ■ All Lower Poverty Schools
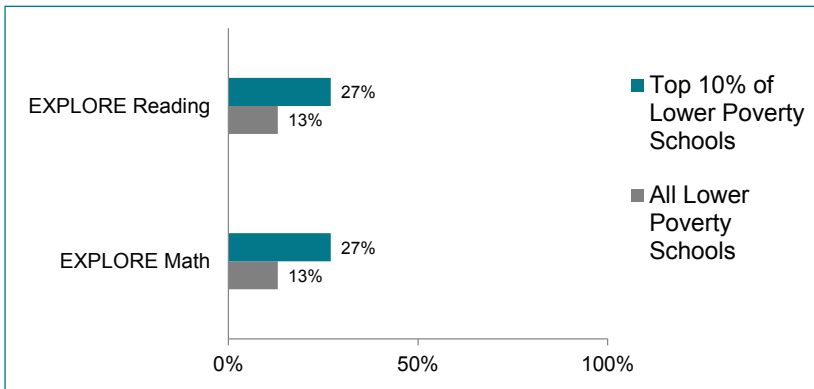
College Readiness Benchmarks in eighth grade. We identified the top 10 percent of schools in each income category and compared their average results with the average of all schools in the category.

The top 10 percent of higher poverty schools were able to increase the percentage of students meeting benchmarks from 7 to 16 percent in literacy/reading and 8 to 20 percent in mathematics (*Figure 7b*). As was the case in high school, the more successful higher poverty elementary-middle school combinations outperformed the average for lower poverty schools. For the latter group, 13 percent of Far Off Track fourth-grade students met benchmarks in eighth-grade reading and mathematics (*Figure 7c*).

Conclusion

Even if starting earlier does not reduce the amount of time it takes to catch students up, starting earlier gives students more time to do so.

In the datasets in the study, relatively few Far Off Track students in eighth grade were On Track four years later. Even the more successful higher poverty high schools typically raised fewer than 20 percent of those students to College Readiness Benchmarks by twelfth grade. Results starting in fourth grade were similar, with a hint that catching students up in mathematics may be easier in the middle grades than in high school.

These results are consistent with the general view that catching students up from far behind is difficult and time-consuming. That underscores the importance of an early start and an emphasis on prevention over remediation. Specifically, educators and policymakers should consider the following as they take a long-term approach to preparing students:

1. Efforts to close academic preparation gaps should begin as early as possible, be more intensive, and take as long as necessary. Even if starting earlier does not reduce the amount of time it takes to catch students up, starting earlier gives students more time to do so. Thus, early monitoring of student progress is essential to ensure that needed interventions begin soon enough.

2. School systems should emphasize approaches likely to have a broad positive effect on the entire student population when sustained over multiple years. For example, educators can give all students a content- and vocabulary-rich curriculum beginning in the early years (Common Core State Standards Initiative, 2010; ACT, 2012b). Such a curriculum is the basis for preparing students long-term for college and careers. Educators can also use a comprehensive framework of best practices, such as the Core Practice Framework, to ensure that such a curriculum is effectively taught (ACT, 2012a; ACT, 2012b).

3. School systems should evaluate programs for middle and high school students based on the programs' effectiveness with students with different initial levels of academic preparation. A program that works well with Far Off Track students may be less effective with On Track students, and vice versa. When a new policy or program is proposed, educators and policymakers should inquire about the assumptions made about the academic readiness of students enrolling in the program.

4. In general, policy and practice should be informed by data on the success of real students in actual schools. This applies especially to the requirements that local, state, and federal accountability systems place on schools. For example, reasonable growth goals might be set based on student performance in more successful schools (ACT, 2010; ACT, 2012c), and goals for percentages of students reaching college and career readiness should take into account the students' starting points and the number of years the school has available to catch them up. ■

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College and Career Readiness: The Importance of Early Learning

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As our nation strives to have all students graduate from high school ready for college and other postsecondary learning opportunities, we have to confront the reality that we are far from achieving this goal. The problem is most severe with economically disadvantaged students. For example, in states where all eleventh graders take the ACT® college readiness assessment, only 45% of low-income students in 2012 met the ACT College Readiness Benchmarks in English, 30% in reading, 21% in mathematics, and 13% in science.[1]

For many students, especially those from disadvantaged backgrounds, learning gaps appear in early childhood.[2] Large numbers of disadvantaged students enter kindergarten behind in early reading and mathematics skills, oral language development, vocabulary, and general knowledge. This situation poses a challenge for intervention models that presume that 15% or so of students need short-term additional help, 5% or so need long-term intervention, and the regular academic program will take care of the rest.[3] In cases where the *great majority* of students are academically behind and need major assistance, the regular academic program must be upgraded to deliver a richer curriculum to all students. Such a curriculum is highly beneficial for all students, but is especially critical for disadvantaged students, who often arrive from home with limited knowledge and vocabulary. School districts must develop a system of practices that enable such a curriculum to be taught effectively.[4]

Why Early Learning Is Important

That learning gaps emerge early, particularly among disadvantaged students, is one of the better-documented facts in education.[5] Students who do not have a good start usually do not thrive later on. That is due not only to the fact that students in stressful environments with limited learning opportunities often remain in those environments, but also because early learning itself facilitates later learning—students who already know more about a topic often have an easier time learning additional information on the same topic, and early exposure to knowledge can stimulate students to want to learn more.[6]

Getting students off to a good start in preschool and the elementary grades is vitally important for several reasons:

Learning takes time. Research studies have addressed the value of allowing sufficient time per topic for students to adequately master the topic.[7] This implies that subject-matter learning should be spread out over many years to permit a range of topics to be addressed in adequate depth. For example, one well-known curriculum for the elementary and middle grades spreads the study of US History out over all of those grades, covering fewer topics in greater depth in each grade.[8]

Learning is cumulative. In a well-designed curriculum, learning in the upper grades builds on prior learning in the lower grades.[9] This is most obvious in the case of mathematics, but is also true for other content areas such as science, history, geography, literature, and the arts. For example, students learning about glucose metabolism in high school biology classes benefit from having learned the necessary prior knowledge about chemistry in elementary and middle school.

Student interests often develop at an early age. Students with the good fortune to be exposed to rich content in science, history, and other subjects at a young age may develop an interest in those subjects. Interest, in turn, leads to greater learning.[10] Disadvantaged students often depend on their schools for this exposure, since their access to content outside of school may be limited. Simply having the content available in libraries and on the Internet is not enough, because children need adults to guide them to the content and help them understand it.[11]

Empirical evidence shows the difficulty of catching students up in middle and high school. Several studies have explored the importance of preparation prior to eighth grade for students to have a reasonable chance of meeting college readiness benchmarks by the end of high school.[12] For example, students who were far off track in eighth grade had only a 10% chance in reading, 6% chance in science, and 3% chance in mathematics of reaching the ACT College Readiness Benchmarks by twelfth grade. In higher poverty schools those numbers were 6%, 3%, and 3%, respectively.[13] Results were similar for students catching up between fourth and eighth grade.[14] The harder it is to get off-track students on track in the upper grades, the more important it is to get them on track in the early grades.

Strengthening Early Learning

What kinds of learning are important to emphasize in the early years? The following are components of a strong preschool and elementary school education.

A strong start in reading (decoding) and mathematics. Educators have long emphasized the importance of learning to read well in the early grades, a belief supported by longitudinal research.[15] Reading consists of two abilities: the ability to identify the words on the page (decoding), and the ability to understand the words once they are identified (comprehension). Decoding is the main constraint on reading ability for beginning readers. Fluent decoding depends on mastering letter-sound relationships and becoming familiar with spelling patterns in the English language. Ensuring that students learn to decode well depends, among other things, on using activities and methods in preschool, kindergarten, and first grade that develop children's phonological (sound) awareness and their knowledge of the relationship between letters and sounds.[16] Meanwhile, children's comprehension can be developed in the early grades by reading aloud to them from books that develop their knowledge and vocabulary.

In mathematics, the ability to do simple arithmetic and place numbers on the number line by first grade predicts mathematics performance in fifth grade.[17] Involving preschool and kindergarten students in games that involve number comparisons, counting, and adding can help prevent mathematics difficulties from emerging in the early elementary grades.[18]

A content-rich curriculum. A large part of the achievement gap between advantaged and disadvantaged students may be due to greater vocabulary and content learning by students in advantaged home environments.[19] One study found that kindergarteners' general knowledge of the world was a better predictor of those students' eighth-grade reading ability than were early reading skills.[20] This is consistent with research showing that reading comprehension, particularly in the upper grades, depends heavily on students' vocabulary and background knowledge.[21] To develop this knowledge, students need a curriculum rich in content not only in English language arts and mathematics, but also in science, history, geography, civics, and the arts.[22]

Development of wide vocabulary and background knowledge takes time.[23] This helps to explain why reading gaps don't close quickly, and why programs that have been successful in closing math skills gaps have had greater difficulty closing reading gaps.[24] The time required to develop students' knowledge and vocabulary is one reason why content-rich curriculum should begin in early childhood. Early content learning can also stimulate curiosity and interest in subjects such as science, history, and art. Content knowledge is also important for abstract reasoning—an abundance of concrete examples make reasoning easier.[25]

By contrast, explicit instruction in comprehension strategies such as "finding the main idea" and "questioning the author" makes only a limited contribution to students' reading comprehension.[26] Therefore, instruction in these strategies should not be allowed to take large amounts of time away from content area learning.[27] A content-rich curriculum can also enhance the effectiveness of a major comprehension strategy—"activating the student's prior knowledge"—by increasing the amount of prior knowledge possessed by students.

Activities that develop students' academic and social behaviors. Behaviors such as paying attention, completing assignments, persisting in difficult tasks, and regulating one's own actions (thinking before acting) play a large role in students' success in school and later on in life.[28] Educators can lay the foundation for these behaviors in preschool, kindergarten, and first grade by classroom activities that develop children's "executive function"—their ability to direct their own attention and activity.[29] Programs that target specific desired student behaviors and explicitly teach those behaviors through active learning (students act out or practice the behavior, rather than just being told about it) are effective at improving both behavior and academic achievement.[30]

Barriers to Strengthening Early Learning

Three important barriers to strengthening the early curriculum may be summarized under the heading of **A-B-C**: accountability system design, beliefs about early learning, and capacity limitations.

Accountability system design.

Accountability systems have been designed to create a sense of urgency about improving test scores. However, this has often had the undesirable effect of shortening educators' time horizons so that they emphasize changes aimed at improving accountability ratings over the short run. These changes can include narrowing the curriculum to deemphasize subjects not tested in the current grade and spending inordinate amounts of time coaching students on how to answer sample test questions.[31]

By contrast, many steps to improve academic learning and behaviors take time to bear fruit and may not immediately result in higher test scores. For example, implementing an excellent kindergarten and first-grade reading, mathematics, science, social studies, or fine arts program will not immediately affect test results in the older grades. Neither will field trips to science and art museums, nature areas, and historical sites—all of which develop knowledge of the world. Accountability incentives should be modified to recognize efforts that increase student learning over the longer run and promote learning in grades and subject areas not covered on state tests.

Beliefs about early learning. Some

educators and policymakers have resisted the introduction of a content-rich curriculum in the early grades because they do not think that it is the right thing to do. Examples of these beliefs include:

- *The belief that content learning will be boring to young children.* Whether content

is meaningful and interesting to students depends largely on how it is taught and on whether students have the prior knowledge needed to appreciate the new information.[32] Good teachers present information in a way that appeals to students' experience and imagination, and good curriculum developers pay attention to building necessary prior knowledge before introducing new information. Thus, the concern that content learning will be boring is largely a concern about the capacity of the school system to provide sound curriculum and effective teaching.

- *The belief that young students should mainly learn content close to their everyday experience.* This belief has held sway mainly in social studies, where a common curricular approach, "Expanding Environments," focuses on students' families in kindergarten and first grade, neighborhoods in second grade, and community in third grade, before expanding to state history in fourth grade and US history in fifth grade.[33] This approach can sacrifice four years of student learning about the larger world outside their own communities.[34]

- *The belief that students can learn everything they need later by looking up information online.* Understanding and evaluating the cacophony of information and opinion on the Internet—or even knowing what to look up—requires prior knowledge of the subject area being addressed.[35] Further, the ability to look things up does not substitute for prior knowledge when people think or make judgments—learning enough to make informed decisions usually requires sustained study, not just the acquisition of a few isolated pieces of information.[36] Thus, the ready availability of so much information has probably *increased* the value of early exposure to knowledge.

- *The belief that teaching academic content in science, social studies, and fine arts in the early grades will crowd out essential learning in reading, mathematics, and academic and social behaviors.* One promising approach to avoid this problem is to integrate learning in the other subject areas into the reading and writing program, using read-alouds to expose beginning readers to content knowledge and vocabulary. The approach treats content learning as an essential part of the comprehension strand of reading instruction.[37] A pilot program using this approach was found to outperform conventional approaches to teaching reading.[38]

Capacity limitations. Teachers in the

early grades may not be well equipped with training, instructional materials, and ongoing professional support to teach all of the necessary content in their classrooms. Addressing this problem requires school districts to upgrade their systems that support teaching and learning, as discussed in the next section.

Importance of a System to Support Early Learning

Improving teaching and learning in the early grades involves not a flurry of disconnected initiatives, but a sustained, coherent, coordinated effort by district and school leaders to provide the necessary support for improving practices at the classroom level. Educator practices learned from research on effective schools can be grouped under five major themes, described in more detail in the ACT Core Practice™ Framework.[39]

Curriculum and academic goals. School districts can support their teachers by developing a clear and specific written curriculum that describes what must be taught in each grade and subject and provides examples of what mastery of

each learning objective looks like. Such a curriculum can address the likely amount of time required to teach each topic and the integration of content across subject areas, issues that are especially important in the early grades.

Staff selection, leadership, and capacity building. Teaching a content-rich curriculum across the subject areas places a large premium on teachers' knowledge and skills, especially for those who teach multiple subjects. This requires the careful selection of school and district leaders who can help teachers improve these skills, as well as the provision of frequent common planning times built into the school's master schedule where teachers can discuss their students' learning in an environment of collaboration and trust. Professional development should be carefully chosen to develop the most critical knowledge and skills needed to teach the district's curriculum in each subject.

Instructional tools: programs and strategies. School and district leaders should carefully pilot and evaluate instructional materials they are considering for purchase to make sure those materials address the learning goals in the district's written curriculum. A similar process based on evaluation, data, and prior research should be used to make decisions about instructional strategies and arrangements— for example, the extent to which teachers in the early grades should specialize in different subjects.

Monitoring performance and progress. Monitoring student learning is vital for helping educators make instructional decisions: to identify which students need extra help; to place students in learning groups or intervention programs; to know which concepts need to be retaught; and to

identify which lessons, teaching strategies, or instructional materials are working. This requires schools and districts to use assessments in the early grades that are based on the district's written curriculum. Frequent formative assessment is needed throughout the year in order for teachers to respond quickly to student needs and keep parents informed about how their children are doing.

Intervention and adjustment. School leaders need to work with teacher teams to identify and assist students who need extra help. Timely assessments make it easier to identify those students early when assistance can have the greatest impact. The same logic applies to identifying and assisting teachers and entire schools in need of support.

A school district can be said to have a *system* to improve early learning when changes in any one of these five areas are accompanied by related changes in the other four areas. For example, changes in the district's written curriculum should be accompanied by matching changes in staff development, instructional resources, assessment, and interventions.[40]

Conclusion

Implementing all of the components of a strong early learning program is difficult and requires a sustained district-wide effort to improve teaching and learning in the early grades. Maintaining such an effort requires school leaders and policymakers to promote public awareness of:

1. **The importance of early learning.** Educators and policymakers must help the public understand the reasons why early learning is so important: that later learning builds on early learning; that learning about a sufficiently broad

range of topics takes time, and cannot be accomplished exclusively in the later grades; that catching students up from far behind is difficult in the upper grades; and that early learning develops students' interests and intellectual curiosity, influencing whether they become lifelong learners.

2. **The components of a strong early learning program.** These components include a strong early reading and mathematics program; a content-rich curriculum not only in English language arts and mathematics, but also in science, history, geography, civics, and the arts; and activities designed to develop students' academic and social behaviors.

3. **The obstacles to strengthening early learning programs.** These obstacles include accountability incentives that encourage educators to focus on short-term results on a few measures; beliefs that an increased emphasis on early content learning is not desirable or necessary; and limitations in the training and support for educators in the early grades.

4. **The importance of a system to improve early learning.** School districts should focus on steadily improving practices at the district, school, and classroom levels in five areas: (a) curriculum and academic goals; (b) staff selection, leadership, and capacity building; (c) instructional programs and strategies; (d) monitoring performance and progress; and (e) intervention and adjustment. They can use information derived from the study of effective schools, such as that contained in the ACT Core Practice Framework, as a guide to their improvement effort. ■

Notes

1   Those states were Colorado, Illinois, Kentucky, Michigan, North Dakota, Tennessee, and Wyoming. The data set consisted of the most recent ACT score for each student set to graduate in 2012. For students who retook the ACT their senior year, the scores are from the 2011–2012 school year; otherwise, they are from the spring of 2011 when the students were in 11th grade.

2   Betty Hart and Todd R. Risley, *Meaningful Differences in the Everyday Experience of Young American Children* (Baltimore: Paul H. Brookes, 1995).

3   See the description of Response to Intervention models in National Association of State Directors of Special Education (NASDSE) and Council of Administrators of Special Education (CASE), *Response to Intervention: NASDSE and CASE White Paper on RtI* (Washington, DC: National High School Center, 2006), http://www.betterhighschools.org/docs/NASDSE_RtI_AnAdministratorsPerspective_1-06.pdf.

4   ACT, *The Core Practice Framework: A Guide to Sustained School Improvement* (Iowa City, IA: ACT, 2012); and ACT, *Rising to the Challenge of College and Career Readiness: A Framework for Effective Practices* (Iowa City, IA: ACT, 2012).

5   Hart and Risley, *Meaningful Differences*; Rachel E. Durham, George Farkas, Carol Scheffner Hammer, J. Bruce Tomblin, and Hugh W. Catts, "Kindergarten Oral Language Skill: A Key Variable in the Intergenerational Transmission of Socioeconomic Status," *Research in Social Stratification and Mobility* 25 (2007): 294–305; and Jerry West, Kristin Denton, and Elvira Germino-Hausken, *America's Kindergartners* (Washington, DC: National Center for Education Statistics, 2000), http://nces.ed.gov/pubs2000/2000070.pdf.

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is learned in context, not memorized from word lists. Knowledge acquisition is essential for helping students understand the context. In addition, many words and phrases (e.g., "democracy") are tied to whole bodies of knowledge, only a small fraction of which is conveyed by their dictionary definitions.

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32 Daniel T. Willingham, "What Is Developmentally Appropriate Practice?," *American Educator* 32, no. 2 (Summer 2008): 34–39.

33 Diane Ravitch, "Tot Sociology: Or What Happened to History in the Grade Schools," *American Scholar*, 56, no. 3 (Summer 1987); Diane Ravitch, *Left Back: A Century of Failed School Reforms* (New York: Simon & Schuster, 2000); and Brian Frazee and Samuel Ayres, "Garbage In, Garbage Out: Expanding Environments, Constructivism, and Content Knowledge in Social Studies," in *Where Did Social Studies Go Wrong?*, ed. James Leming, Lucien Ellington, and Kathleen Porter-Magee (Washington, DC: Thomas B. Fordham Institute, 2003), 111–123.

34 If science content were similarly restricted, then the study of dinosaurs, ocean life, volcanoes, and other things not in the students' immediate environment would be removed from the curriculum in kindergarten through third grade.

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Catching Up to College and Career Readiness: The Challenge Is Greater for At-Risk Students

CHRYS DOUGHERTY

Introduction

Educators and policymakers have set a goal that all students graduate from high school ready for college and careers. As a nation, however, we are falling short of achieving this goal, particularly for students from at-risk groups. In 2013, in states with the highest percentages of students taking the ACT® college readiness assessment, 41% of students from the two lowest family income categories met ACT College Readiness Benchmarks[1] in English, 19% in mathematics, 23% in reading, and 17% in science.[2]

A substantial body of research supports the idea that the path to college and career readiness begins well before middle and high school. Gaps in vocabulary development begin in very early childhood.[3] Large numbers of disadvantaged students enter kindergarten behind in early reading and mathematics skills, oral language development, vocabulary, and general knowledge.[4] In turn, early reading and mathematics skills and general knowledge predict student success in the later grades. [5] Learning gaps are likely to widen over time because of "Matthew effects," whereby those who start out ahead are at a relative advantage in acquiring new knowledge.[6]

As a result of these effects, many middle and high schools inherit large numbers of students who are academically far off track—well below the level that predicts they are likely to graduate college and career ready. This is especially true for schools serving at-risk student populations. Substantial resources and energy have been invested into increasing the capacity of high schools to address the needs of those students.[7] But if it's difficult for middle and high schools to close these students' academic preparation gaps despite the extra attention, perhaps more should be invested in narrowing the gaps earlier.

In an earlier policy report,[8] ACT examined the percentage of academically far off track students in grade 8 from multiple states who were able to reach ACT College Readiness Benchmarks on the ACT in grade 12, as an indicator of the challenges school systems face in closing academic preparation gaps at the high school level. We also looked at the percentage of far off track students in grade 4 in a single state, Arkansas, who reached the corresponding Benchmarks on ACT Explore® in eighth grade. This served to indicate the difficulty of closing students' preparation gaps in the middle grades. In all cases, we found that relatively few far off track students caught up in four years—typically fewer than 10%. We also noted that our high school student sample in particular was subject to selection bias in favor of more motivated students who stayed in school and took three college readiness tests. Therefore, we concluded, a more representative sample would probably show even lower catching-up rates for high school students who were behind academically.

1514

This report extends our earlier research by analyzing student catch-up rates in grades 4–8 (middle grades) and 8–11 or 8–12 (high school) by student demographic subgroup.[9] Two states, Arkansas and Kentucky, supplied the data needed to link student enrollment and test records across those grade spans and to disaggregate students into the following demographic groups:

- All students
- Low-income students[10]
- Non–low-income students
- African American students
- Hispanic students
- Other students (not African American or Hispanic)[11]
- English language learners[12]
- Special education students

Disaggregating the data by demographic group is important because at-risk demographic groups are likely not only to have higher percentages of students who are academically far off track, but also have lower percentages of far off track students who catch up.

Catching Up in High School

How many students from different demographic groups were Far Off Track in eighth grade?

Our analysis covered multiple cohorts of Arkansas and Kentucky students who took ACT Explore as eighth graders and the ACT in grade 11 or 12.[13] For purposes of this study, we divided eighth-grade students from each demographic group into three *academic preparation groups* in each subject based on their performance on ACT Explore in that subject:

- *On Track* students met the ACT College Readiness Benchmark on ACT Explore (Table 1) in the subject.
- *Off Track* students missed the Benchmark by one standard deviation or less.

Table 1. ACT College Readiness Benchmarks[15]

Subject Area Test	ACT Explore Benchmark Grade 8	ACT Plan® Benchmark	ACT Benchmark
English	13	15	18
Reading	16	18	22
Mathematics	17	19	22
Science	18	20	23

Table 2. Percentages of Students Who Were Far Off Track on Grade 8 ACT Explore

Category	Mathematics	Reading	Science
All students	32	39	31
Low-income*	43	51	40
Non–low-income	21	28	21
African American	51	61	48
Hispanic	40	50	38
Other*	28	35	28
English language learners	57	70	52
Special education	72	70	63

* Low-income students were defined as those eligible for the free and reduced price lunch program. "Other" students were those who are not African American or Hispanic. In Arkansas and Kentucky, the greater majority of Other students were White.

At-risk student groups are highlighted.

- *Far Off Track* students scored more than a full standard deviation below the Benchmark. These are the students treated as "academically far behind" in this report.

For example, a score of 16 or better on the ACT Explore Reading assessment indicated that a student was On Track; Off Track students scored from 13 to 15, while students scoring 12 or below were classified as Far Off Track.[14]

As shown in Table 2, substantial percentages of eighth graders from all demographic groups were Far Off Track in mathematics, reading, and science in 2006–07, 2007–08, and 2008–09, the starting years for

the longitudinal grades 8–11 and 8–12 cohorts in the study.[16] [17] Students in at-risk demographic groups (highlighted in Table 2) were Far Off Track at higher rates than their less-at-risk counterparts. Using reading as an example, 28% of non–low-income but 51% of low-income eighth graders were Far Off Track. Compared with the low-income student group, similar percentages of Hispanic students were Far Off Track in each subject, while the percentages for African American, English language learners, and special education students were higher. These percentages underscore the challenges faced by many high schools in educating students from at-risk groups.[18]

What percentage of eighth graders from the three academic preparation groups (On Track, Off Track, and Far Off Track) met ACT College Readiness Benchmarks in grade 11 or 12?

As Figure 1 illustrates, it was difficult for students starting Off Track or Far Off Track to catch up in high school. For example, in mathematics, only 2% of Far Off Track eighth graders in longitudinal cohorts in the study reached the ACT College Readiness Benchmarks in grade 11 or 12 (Figure 1). The corresponding percentages were 14% for Off Track students and 64% for On Track students. The results were similar in reading and science.

As Figures 2 and 3 illustrate, catching up (for Off Track and Far Off Track students) or staying on track (for On Track students) was more difficult for low-income than for non–low-income students. Using reading as an example, 4% of low-income Far Off Track eighth graders met the ACT Benchmarks in grades 11 or 12 (Figure 2), compared with 8% for their non–low-income counterparts (Figure 3). In general, low-income students in each of the three academic preparation groups reached the ACT Benchmarks at lower rates than their non–low-income counterparts in every subject.

These longitudinal cohorts included only students who stayed in school and followed a normal grade progression. The inclusion of dropouts and students who were held back a grade would likely reduce the percentages of students reaching ACT Benchmarks and widen the observed disparity between low-income and non–low-income students.[19]

Figure 1. Percentage Meeting ACT College Readiness Benchmarks (Grades 11 and 12 ACT) **All Students** Disaggregated by Grade 8 Academic Preparation Level
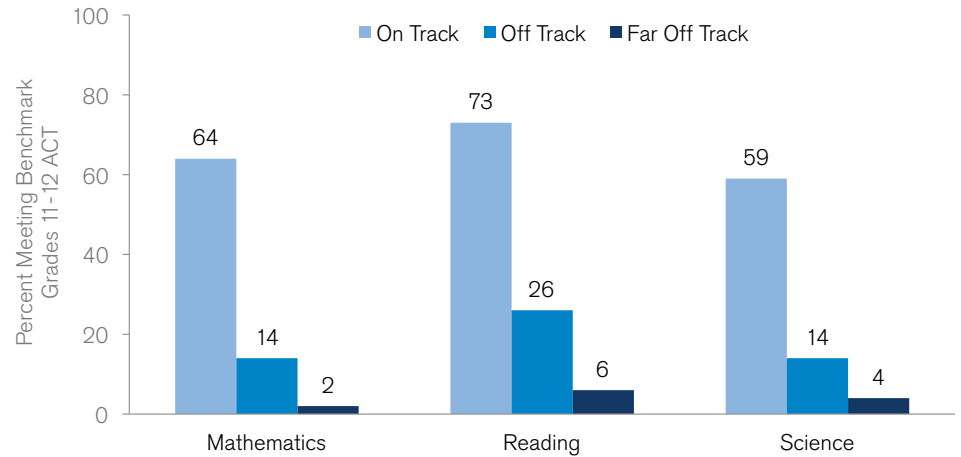
Figure 2. Percentage Meeting College Readiness Benchmarks (Grades 11 and 12 ACT) **Low-Income Students** Disaggregated by Grade 8 Academic Preparation Level
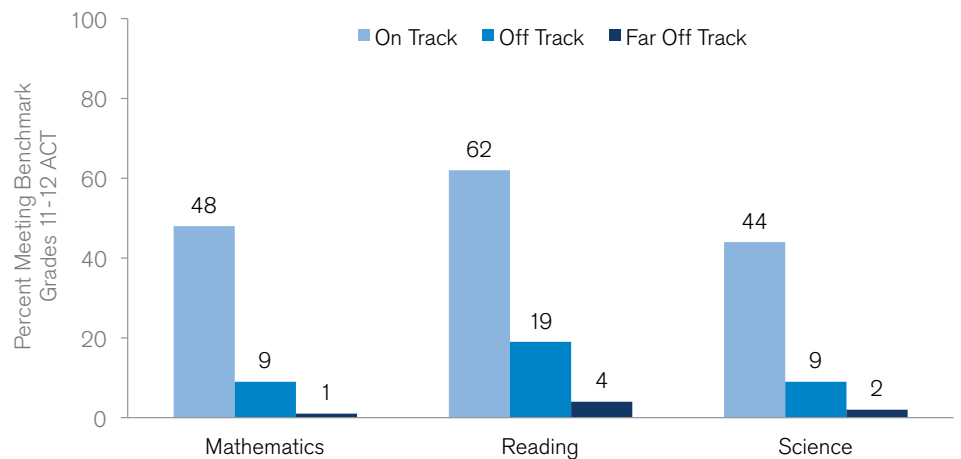
Figure 3. Percentage Meeting College Readiness Benchmarks (Grades 11 and 12 ACT) **Non–Low-Income Students** Disaggregated by Grade 8 Academic Preparation Level
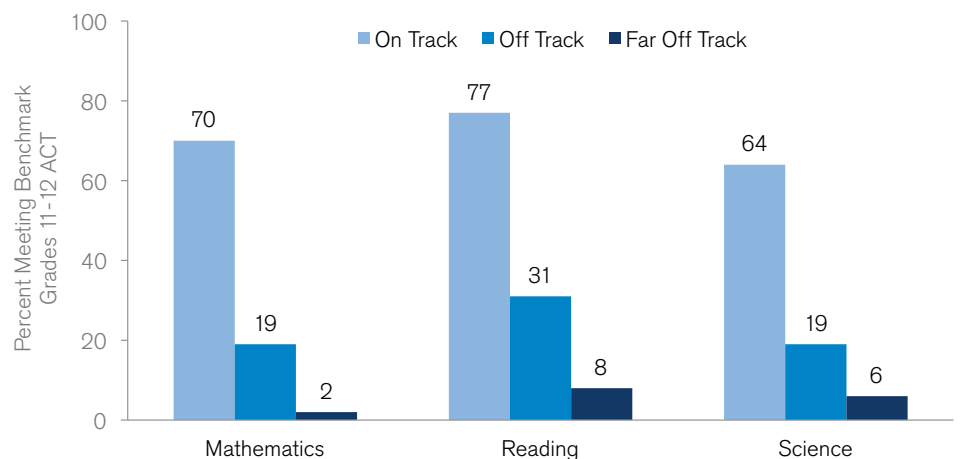
What percentage of Far Off Track eighth graders from different student demographic groups caught up or nearly caught up by grade 11 or 12?

In addition to calculating the percentage of Far Off Track eighth graders who reached the ACT Benchmarks, we also examined the percentage of Far Off Track students who nearly reached the Benchmarks. In this analysis, we defined "nearly reached the ACT Benchmark" as scoring a half standard deviation or less below the Benchmark—in the top half of the Off Track achievement level.

Figure 4 shows the percentage of Far Off Track eighth-grade students in each subject who either reached or nearly reached the ACT Benchmark, disaggregated by student family income. Using reading as an example, 4% of low-income students (bottom bar segment) who were Far Off Track in eighth grade reached the ACT Benchmark in grade 11 or 12—the same information shown in Figure 2. Adding in students who nearly reached the ACT Benchmark (top bar segment) brings the total to 15%. Conversely, 85% of low-income eighth graders who

were Far Off Track in reading did not come close to reaching the ACT Benchmark by grade 11 or 12. For non–low-income students, 24% reached or nearly reached the reading Benchmark, leaving 76% who did not. This was the highest percentage of Far Off Track students from any demographic group who reached or nearly reached the ACT Benchmark in any subject. In all cases, low-income Far Off Track students reached or nearly reached Benchmarks at lower rates than their non–low-income counterparts.

Figure 4. Percentage of Far Off Track Eighth-Grade Students Reaching or Nearly Reaching ACT Benchmarks in Grade 11 or 12, By **Student Income**
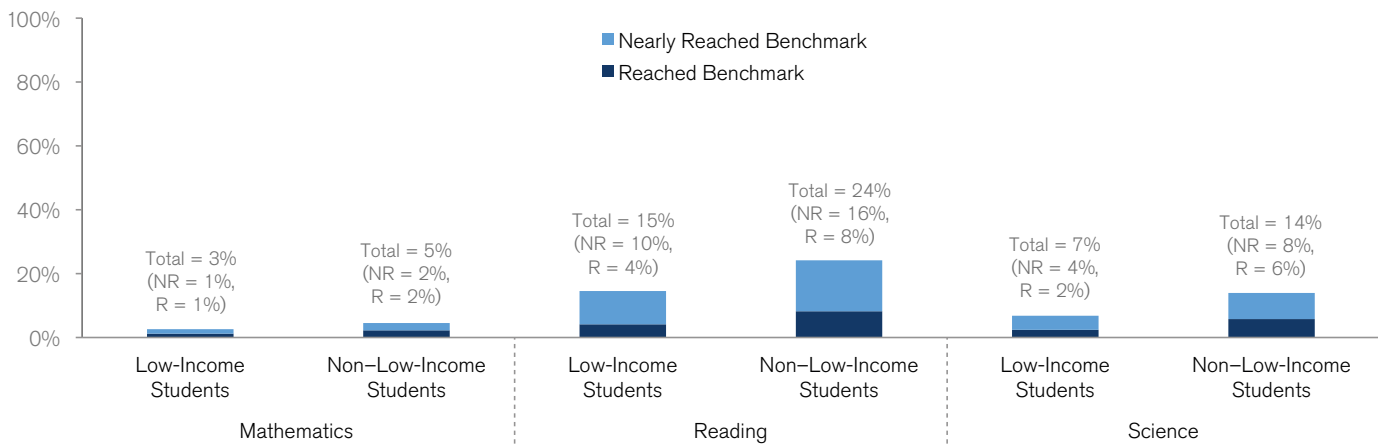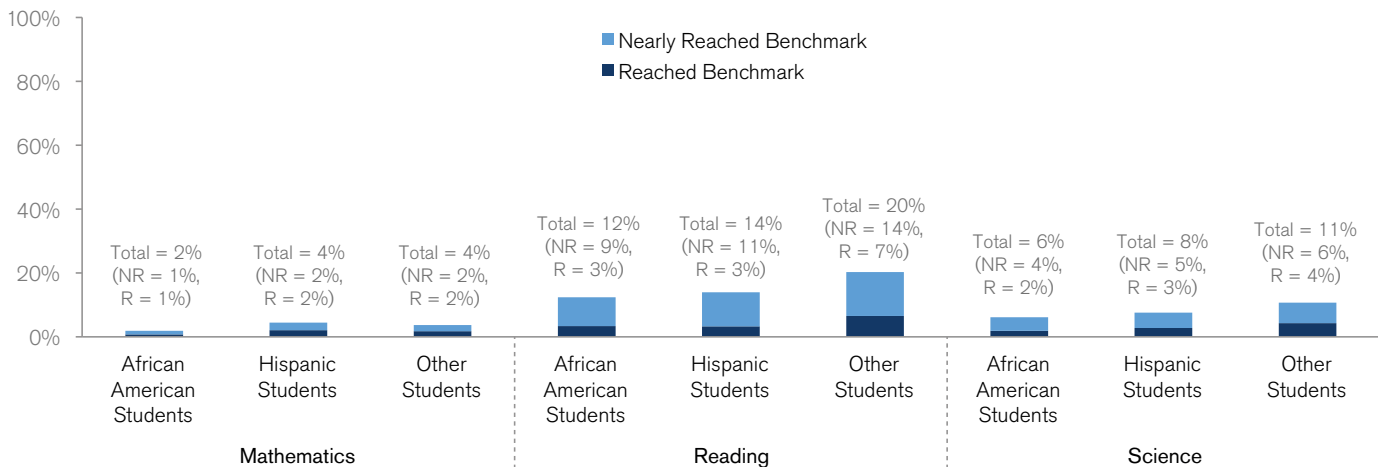

Figure 5. Percentage of Far Off Track Eighth-Grade Students Reaching or Nearly Reaching ACT Benchmarks in Grade 11 or 12, By **Student Ethnicity**

Note: Subtotals may not add to totals due to rounding.

Figure 6. Percentage of Far Off Track Eighth-Grade Students Reaching or Nearly Reaching
ACT Benchmarks in Grade 11 or 12, for **English Language Learners and Special Education Students**
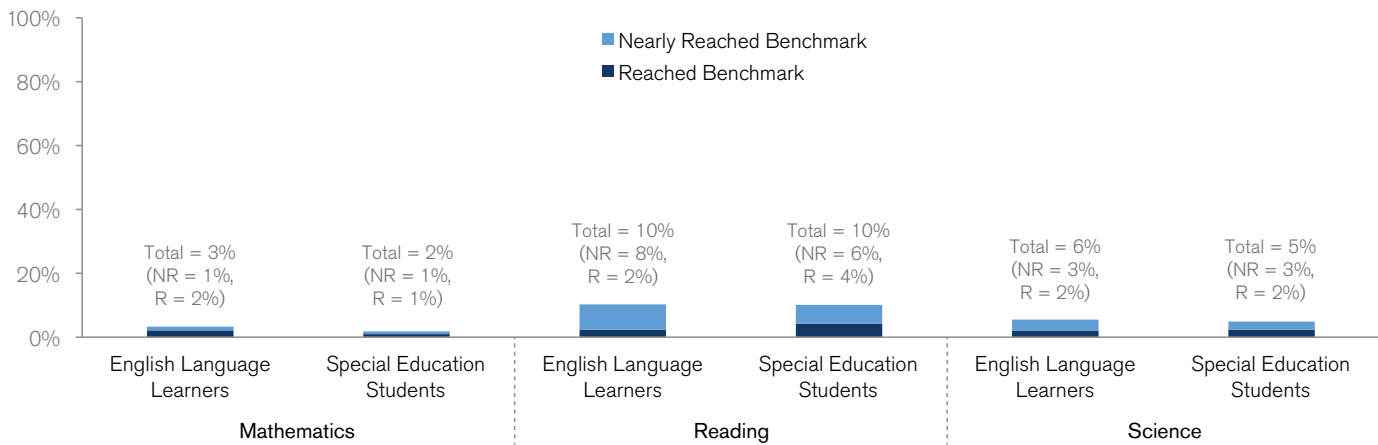
Figures 5 and 6 provide similar information by student ethnic category and for English language learners and special education students. In nearly all cases, Far Off Track students from at-risk groups reached or nearly reached the Benchmarks at lower rates than did their less-at-risk counterparts—the sole exception was for Hispanic versus Other students in mathematics. The picture was slightly more favorable in reading than in mathematics and science. Taking African American students as an example, 12% of Far Off Track students reached or nearly reached the Benchmark in reading by grade 11 or 12, compared with 2% in mathematics and 6% in science. This leaves 88% of Far Off Track African American students who did not come close in reading, 98% in mathematics, and 94% in science. Low catch-up rates by students from at-risk groups are of special concern since students from those groups are more likely to be Far Off Track in the first place (Table 2).

Catching Up in Grades 4–8

How many students from different demographic groups were Far Off Track in fourth grade?

To classify fourth-grade students into the three academic preparation groups (On Track, Off Track, and Far Off Track) in each subject, we used longitudinal student data from the two states in the study to match fourth-grade state test and eighth-grade ACT Explore scores for the same students. We identified the lowest fourth-grade score in each subject in each state associated with a 50% or better chance of reaching the ACT Explore benchmark in the same subject; fourth-grade students scoring at or above this target score were categorized as On Track in the subject.[20] Using a similar definition as in eighth grade, Off Track fourth-grade students scored no more than one standard deviation below the target score,

and Far Off Track students missed the target by more than one standard deviation.[21]

As shown in Table 3, substantial percentages of fourth graders from all demographic groups were Far Off Track in mathematics, reading, and science in 2006–07 and 2007–08, the starting years for the longitudinal grades 4–8 cohorts in the study.[22] Students in at-risk demographic groups (highlighted in Table 3) were Far Off Track at higher rates than their less-at-risk counterparts. Using reading as an example, 29% of non–low-income but 53% of

Table 3. Percentages of Students Who Were Far Off Track in Grade 4

Category	Mathematics	Reading	Science
All students	38%	43%	44%
Low-income*	49%	53%	55%
Non–low-income	25%	29%	32%
African American	59%	64%	69%
Hispanic	47%	56%	58%
Other*	33%	38%	40%
English language learners	54%	65%	69%
Special education	62%	67%	61%

* Low-income students were defined as those eligible for the free and reduced price lunch program. "Other" students were those who are not African American or Hispanic. In Arkansas and Kentucky, the greater majority of those students were White.

At-risk student groups are highlighted. Science results were from Kentucky, as Arkansas did not test science in fourth grade. Fourth-grade reading results for Arkansas were those on the Literacy test, which also covers writing.

low-income fourth graders were Far Off Track. Similar disparities existed between those two groups in mathematics and science. As was the case in eighth grade, Far Off Track rates for Hispanic students were similar to those in the low-income group, while African American students, English language learners, and special education students were Far Off Track at higher rates. As is the case for high school, these percentages underscore the challenges faced by many elementary and middle schools in educating students from at-risk groups.

What percentage of fourth graders from the three academic preparation groups (On Track, Off Track, and Far Off Track) met the ACT Explore Benchmarks in grade 8?

Figure 7 shows how the percentage of students meeting the ACT Explore Benchmarks in grade 8 was related to students' academic preparation level in fourth grade. In mathematics, for example, 6% of Far Off Track and 31% of Off Track students caught up in grades 4–8, while 69% of previously On Track students stayed on track. The pattern was similar for reading and science.

As Figures 8 and 9 indicate, catching up (for Off Track and Far Off Track students) or staying on track (for On Track students) in the middle grades was more difficult for low-income than for non–low-income students. Using reading as an example, 6% of Far Off Track low-income fourth graders met the ACT Explore Benchmark in grade 8 (Figure 8), versus 10% for their non–low-income counterparts (Figure 9). For the Off Track group, 27% of low-income and 40% of non–low-income students reached the Benchmark, while the corresponding percentages for fourth-grade On Track students were 53% for low-income and 71% for non–low-income students.

Figure 7. Percentage Meeting ACT College Readiness Benchmarks (Grade 8 ACT Explore) **All Students** Disaggregated by Grade 4 Academic Preparation Level
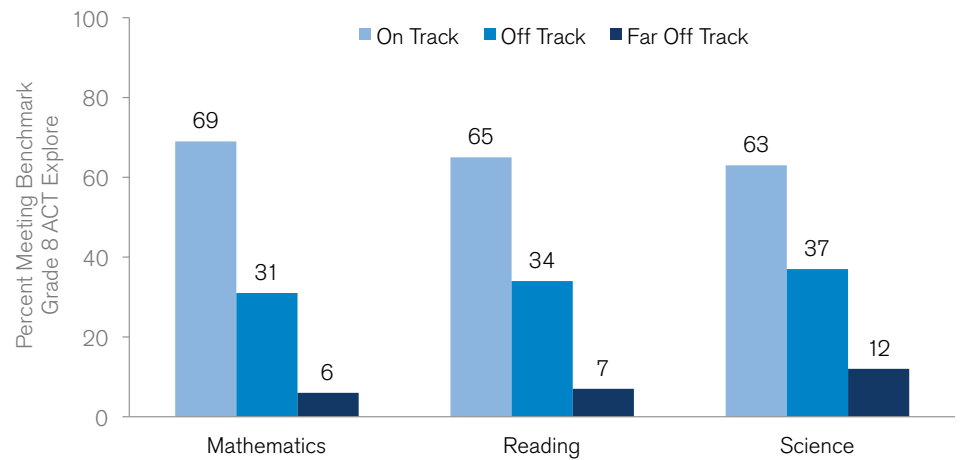
Figure 8. Percentage Meeting College Readiness Benchmarks (Grade 8 ACT Explore) **Low-Income Students** Disaggregated by Grade 4 Academic Preparation Level
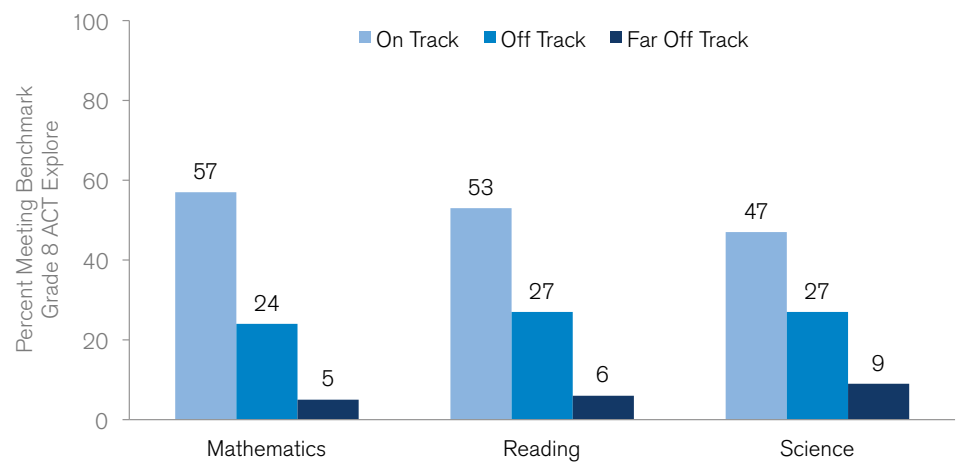
Figure 9. Percentage Meeting ACT College Readiness Benchmarks (Grade 8 ACT Explore) **Non–Low-Income Students** Disaggregated by Grade 4 Academic Preparation Level
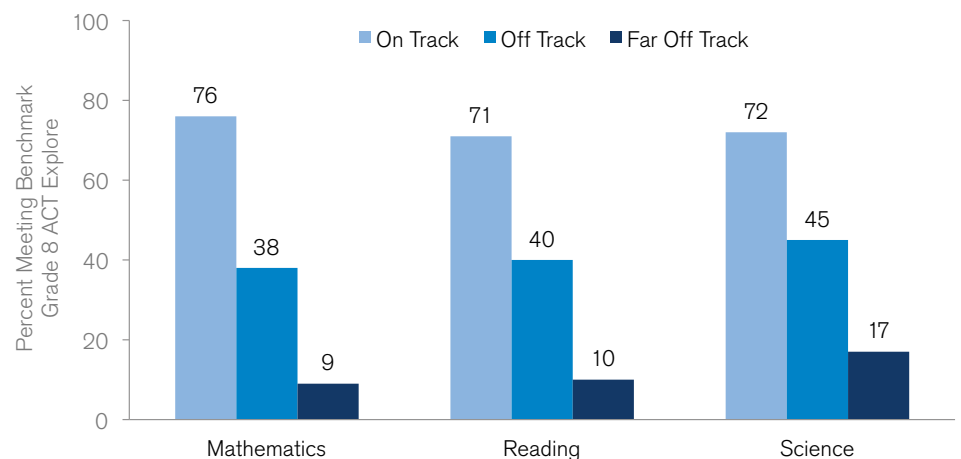
What percentage of Far Off Track fourth graders from different student demographic groups caught up or nearly caught up by eighth grade?

Figure 10 shows the percentage of Far Off Track fourth-grade students in each subject who reached or nearly reached the ACT Explore Benchmark, disaggregated by student family income. As was the case in high school, we defined "nearly reached the ACT Explore Benchmark" as scoring a half standard deviation or less below the Benchmark—in the top half of the Off Track achievement level in grade 8.

Using mathematics as an example, 5% of low-income students (bottom bar segment) who were Far Off Track in fourth grade reached the ACT Explore Benchmark in grade 8—the same information shown in Figure 8. Adding students who nearly reached the Benchmark (top bar segment) brings the total to 13%. Conversely, 87% of Far Off Track low-income fourth graders did not come close to reaching the ACT Explore Benchmark. For non–low-income students, 22% reached or nearly reached the Benchmark, leaving 78% who did not.

The highest percentage for any subject and demographic group was for non–low-income students in science, where 36% of Far Off Track students met or nearly met the Benchmark, leaving 64% who did not.

Figures 11 and 12 provide similar information by student ethnic category and for English language learners and special education students. The picture was slightly more favorable in science than in mathematics and reading. Taking African American students as an example, 16% of Far Off Track fourth-grade students reached or nearly reached

Figure 10. Percentage of Far Off Track Fourth-Grade Students Reaching or Nearly Reaching Grade 8 ACT Explore Benchmarks, By **Student Income**
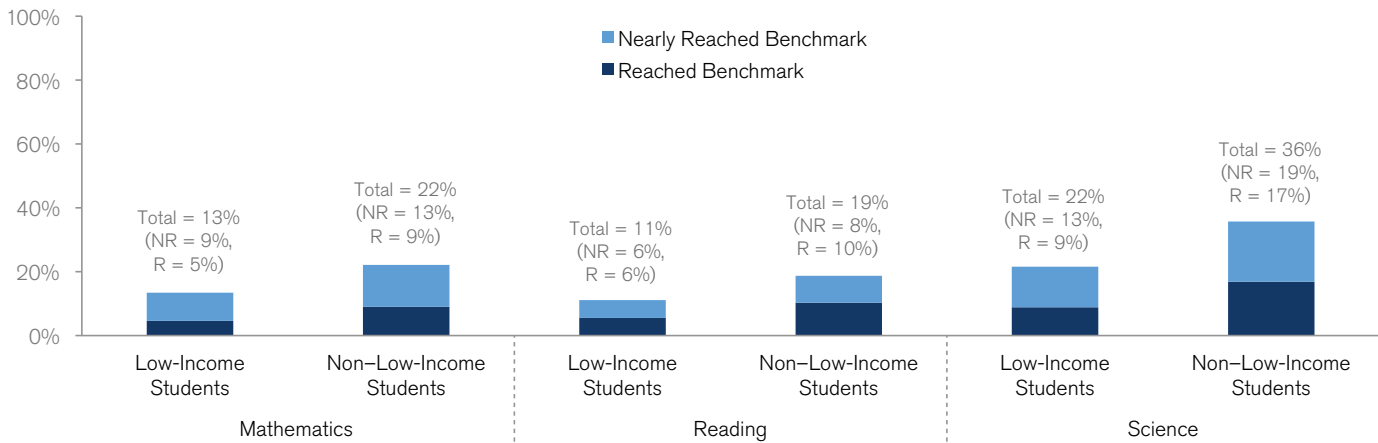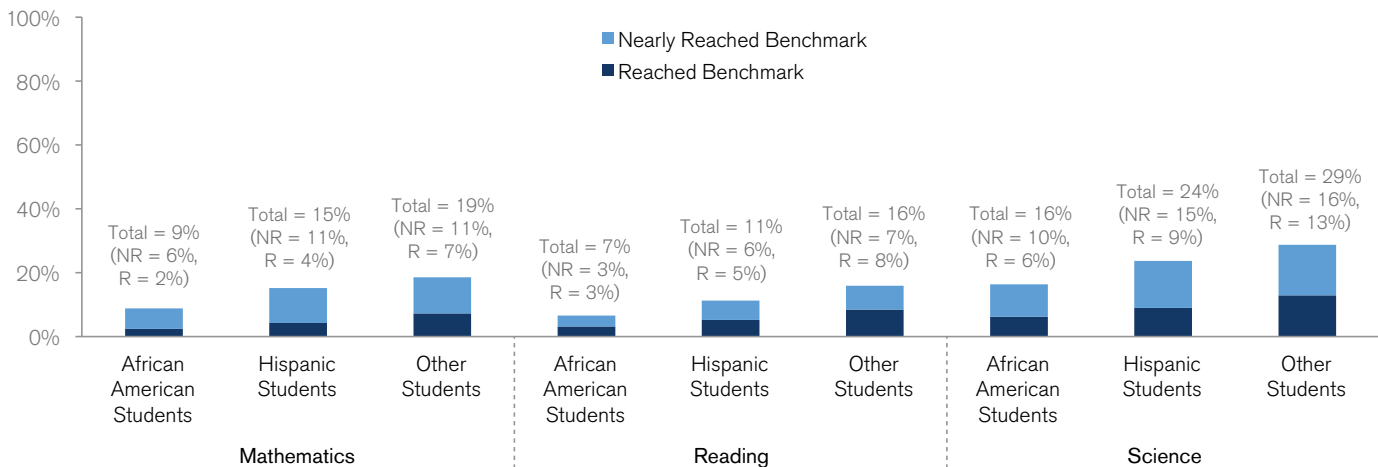

Figure 11. Percentage of Far Off Track Fourth-Grade Students Reaching or Nearly Reaching Grade 8 ACT Explore Benchmarks, By **Student Ethnicity**

Note: Subtotals may not add to totals due to rounding.

Figure 12. Percentage of Far Off Track Fourth-Grade Students Reaching or Nearly Reaching
Grade 8 ACT Explore Benchmarks, for **English Language Learners and Special Education Students**
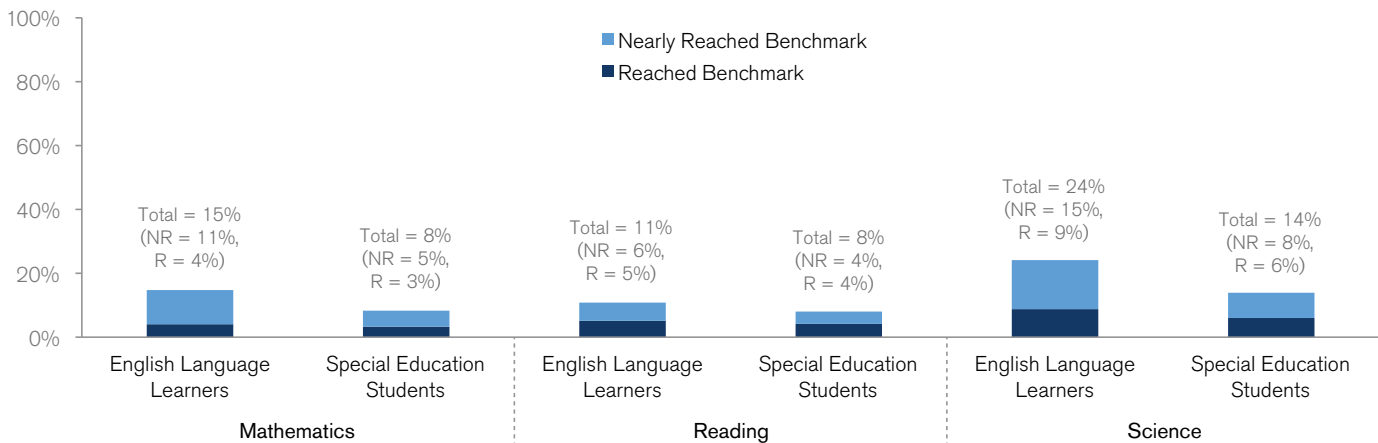
the science Benchmark in eighth grade, compared with 9% in mathematics and 7% in reading. This still left 84% who did not come close to the science Benchmark.

In general, Far Off Track students from at-risk groups reached or nearly reached Benchmarks at lower rates in the same subject than their less-at-risk counterparts, a matter of concern given that students from at-risk groups were more likely to be Far Off Track in fourth grade (Table 3).

How did growth by Far Off Track students in the middle grades compare with growth by Far Off Track students in high school?

A comparison of grades 8 to high school (Figures 1–6) with grades 4–8 (Figures 7–12) provides evidence that students caught up at higher rates in the middle grades than in high school, especially in mathematics and science. However, growth comparisons between grades 4–8 and 8–11 or 12 can be difficult to interpret for various reasons. One is differences in selection effects between the two levels. These effects ought to favor growth by students in high

school cohorts, as attrition of less-prepared and more poorly motivated students is likely to be greater in high school than in the middle grades. To the extent that we nonetheless observe more students catching up in the middle grades, this could strengthen the argument that catching students up is easier in those grades.

A second issue is differences in the content alignment of the fourth-grade state test with the eighth-grade ACT Explore, compared with the alignment of ACT Explore with the ACT. A more closely aligned prior test is better able to identify which students are Far Off Track with regard to the content measured on the later test, producing lower catching-up rates for the better-identified Far Off Track students. To the extent that ACT Explore is better aligned with the ACT than a fourth-grade state test is with ACT Explore, this effect would work in the opposite direction from selection effects, making catching up appear to be easier in the middle grades.[23]

Regardless of whether catching up students turns out to be easier in earlier grades, starting earlier gives students more time to do so.

Conclusion

The results of this study extend the findings of our previous research to show the additional difficulty of catching up Far Off Track students from at-risk demographic groups. Our recommendations in this section should be of great interest to educators and policymakers concerned about meeting the needs of at-risk students. Each recommendation should be implemented not in isolation, but accompanied by all of the supporting changes needed to make it work.

At the local level, **school and district leaders** should consider the following strategies:

▪ *Teach a content-rich curriculum in the early grades.* Ensure that all students receive a content- and vocabulary-rich curriculum beginning in the early years, spanning a range of subject areas including not only English language arts and mathematics, but also science, history, geography, civics, foreign language, and the arts.[24] [25] Such a curriculum— the basis for preparing students long term for college, careers, and informed citizenship—is valuable for all students but is likely to be especially beneficial for

students from at-risk demographic groups, who are more likely to arrive from home with limited knowledge and vocabulary.[26] Thus, teaching a rich curriculum to all students is likely to help counteract Matthew effects and narrow achievement gaps. In addition, educators can work to strengthen the reading and mathematics program in preschool through third grade and implement programs and strategies that improve students' attendance and academic behaviors.[27] [28] [29]

- *Conduct a "gap analysis" of the district's current practices.* To perform such an analysis, educators can use the ACT Core Practice™ Framework, which provides a detailed list of district-, school-, and classroom-level practices organized into five areas: [30]

  – Curriculum and Academic Goals—What do we expect all students to know and be able to do in each course, grade, and subject?

  – Staff Selection, Leadership, and Capacity Building—How do we select and develop the leaders and teachers needed to ensure every student in the system meets these expectations?

  – Instructional Tools: Programs and Strategies—What programs, strategies, materials, and time allocation do we use to teach the necessary content and skills?

  – Monitoring Performance and Progress—How do we know if students learned what they should?

  – Intervention and Adjustment—If students are not learning what they should, what do we do about it?

Teams of educators at the school and district levels can use the framework's self-evaluation rubrics to compare local practices with those described in the framework and identify where they should focus their improvement efforts.

- *Monitor and intervene early.* Use multiple indicators to monitor whether students are on track, beginning in the early grades. Monitor student engagement as well as student learning. The early emergence of preparation gaps and their tendency to widen over time underscore the importance of monitoring student progress in the early years. Monitoring should guide decisions about how to improve the regular academic program as well as the choice of interventions. Combining data on student academic progress with information on the interventions students receive can provide evidence on which interventions are most effective for students.[31]

- *Use data on students' prior achievement in planning and evaluating secondary school programs.* Educators and researchers should use data to identify what levels of prior achievement put students in a strong position to succeed in specific middle and high school programs, such as Advanced Placement or early-college high schools. When monitoring the impact of programs implemented in the later grades, ask *for which students* (based on prior academic preparation) is this program producing good results? For example, a high school program might turn out to be suitable for On Track students but inadequate for Far Off Track students. Changes might need to be made in earlier grades to enable more students to benefit from advanced academic programs in the middle and upper grades.[32]

State and local policymakers, for their part, should consider the following:

- *Focus on the long term in school accountability.* Redesign accountability systems to encourage actions taken to produce long-term gains in student learning. Educators and policymakers should look not only at short-term test

score trends but at whether the school system is putting in place practices that are likely, based on sound research, to bear fruit over the long term. For example, adopting a content-rich curriculum that builds knowledge and vocabulary in the early grades is likely to pay off with better reading comprehension in the upper grades.[33]

- *Use data to inform the setting of accountability goals.* Use data on historically observed student growth to identify realistic goals that schools might be expected to accomplish. For example, reasonable growth goals might be set based on student performance in more successful schools,[34] and goals for percentages of students reaching college and career readiness should take into account students' starting points and the number of years the school has available to catch them up.

Federal policymakers should consider the following:

- *Encourage the use of statewide longitudinal data systems for research studies.* Continue to fund the development of statewide longitudinal data systems that make possible research on long-term student progress such as that featured in this report. Encourage states to facilitate access to the data by third-party researchers under appropriate privacy protections.[35]

- *Fund evaluation research on teaching a content-rich curriculum in the early grades.* Fund research through the Institute for Education Sciences to evaluate programs and strategies aimed at reducing achievement gaps by promoting a content-rich curriculum. ■

Endnotes

1   The ACT College Readiness Benchmarks on the ACT represent scores in each subject—English, mathematics, reading, and science—that indicate that a student has a 50% or better chance of earning a B and a 75% or better chance of earning a C in corresponding entry-level college courses. For example, student scores on the ACT Mathematics test were matched to the same students' grades in College Algebra, and ACT Science scores were matched to college grades in Biology. On the ACT Explore and ACT Plan tests, the Benchmarks represent scores associated with at least a 50% probability that the student will later score at or above the ACT College Readiness Benchmark on the ACT. See ACT, "What Are the ACT College Readiness Benchmarks?" (Iowa City, IA: ACT, 2013), http://www.act.org/research/policymakers/pdf/benchmarks.pdf.

2   The states with the highest percentages of students taking the ACT were Colorado, Illinois, Kentucky, Michigan, North Carolina, North Dakota, Tennessee, and Wyoming. These states generally have all eleventh graders take the ACT; many students retake the test in grade 12. The data file contained the most recent ACT scores of students who were twelfth graders in 2013; ACT scores for students who did not take the ACT in twelfth grade came from earlier grades and years. The two family income categories in combination consisted of students with a self-reported family income of less than $36,000 a year.

3   Betty Hart and Todd R. Risley, *Meaningful Differences in the Everyday Experience of Young American Children* (Baltimore: Paul H. Brookes, 1995).

4   George Farkas and Kurt Beron, "The Detailed Age Trajectory of Oral Vocabulary Knowledge: Differences by Class and Race," *Social Science Research* 33 (2004): 464-497; Rachel E. Durham, George Farkas, Carol Scheffner Hammer, J. Bruce Tomblin, and Hugh W. Catts, "Kindergarten Oral Language Skills: A Key Variable in the Intergenerational Transmission of Socioeconomic Status," *Research in Social Stratification and Mobility* 25 (2007): 294-305; Jerry West, Kristin Denton, and Elvira Germino-Hausken, *America's Kindergartners* (Washington, D.C.: National Center for Education Statistics, 2000, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000070.

5   Greg J. Duncan, Amy Claessens, Aletha C. Huston, Linda S. Pagani, Mimi Engel, Holly Sexton, Chentelle J. Dowsett, Katherine Magnuson, Pamela Klebanov, Leon Feinstein, Jeanne Brooks-Gunn, Kathryn Duckworth, and Crista Japel, "School Readiness and Later Achievement," *Developmental Psychology* 43, no. 6 (2007): 1428-1446; Amy Claessens and Mimi Engel, "How Important Is Where You Start? Early Mathematics Knowledge and Later School Success," *Teachers College Record* 115 (2013): 1-29; David Grissmer, Kevin Grimm, Sophie M. Aiyer, William M. Murrah, and Joel S. Steele, "Fine Motor Skills and Early Comprehension of the World: Two New School Readiness Indicators," *Developmental Psychology* 46, no. 5 (2010): 1008-1017; David C. Geary, "Cognitive Predictors of Achievement Growth in Mathematics: A 5-Year Longitudinal Study," *Developmental Psychology* 47, no. 6 (2011): 1539-1552, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3210883/.

6   For a discussion of Matthew effects in the context of early reading, see Keith Stanovich, "Matthew Effects in Reading: Some Consequences of Individual Differences in the Acquisition of Literacy," *Reading Research Quarterly* 31, no. 4 (1986), 360-407, http://www.psychologytoday.com/files/u81/Stanovich__1986_.pdf.

7   For discussions of ways to better address the needs of high school students, see http://www.betterhighschools.org.

8   ACT, *Catching Up to College and Career Readiness* (Iowa City, IA: ACT, 2012), http://www.act.org/research/policymakers/reports/catchingup.html. See also Chrys Dougherty and Steve Fleming, "Getting Students on Track to College and Career Readiness: How Many Catch Up from Far Behind?" ACT Research Report Series 2012-9 (Iowa City, IA: ACT, 2012), http://media.act.org/documents/ACT_RR2012-9.pdf.

9   The earlier report examined results by *school* demographics (for example, students in schools with more than 50% low-income students) based on schoolwide information available from the US Department of Education's Common Core of Data. However, we did not have separate information on low-income and non–low-income students in those schools.

10 Low-income students are defined as those eligible for the free and reduced-price lunch program. The numbers of low-income and non–low-income students add up to the number of "All Students."

11 In Arkansas and Kentucky, the great majority of these students were White. The numbers of African American, Hispanic, and "Other" students add up to the number of "All Students."

12 English language learners were those designated as such in the state enrollment or test database (for fourth graders) or the state enrollment database alone (for eighth graders). The same rule was applied for the student's low-income and special education status. In the cohort data, students were classified based on their status in the cohort's beginning year, e.g., fourth grade in a grades 4–8 cohort.

13 In Arkansas, we followed students who took ACT Explore as eighth graders in 2006–07 or 2007–08 and who took the ACT in eleventh or twelfth grade in the 2009–10, 2010–11, or 2011–12 school years. In Kentucky, we followed eighth-grade ACT Explore test takers from 2006–07, 2007–08, or 2008–09 and who took the ACT three years later in grade 11 in 2009–10, 2010–11, or 2011–12. For a more detailed description of the Arkansas and Kentucky cohorts in the study, see Chrys Dougherty, Linda Hiserote, and Teresa Shaw, "Catching Up to College and Career Readiness in Arkansas," (Iowa City, IA: ACT, 2014) and Dougherty, Hiserote, and Shaw, "Catching Up to College and Career Readiness in Kentucky," (Iowa City, IA: ACT, 2014).

14 The size of a standard deviation on ACT Explore (based on national data) was 4.2 points in English, 3.5 in mathematics, 3.9 in reading, and 3.3 in science.

15 Table 1 and the analysis in this study use the updated ACT Reading and Science Benchmarks released in 2013: 22 (vs. the earlier 21) in ACT Reading, and 23 (vs. the earlier 24) in ACT Science, with the ACT Explore and ACT Plan Benchmarks adjusted accordingly. The 2012 *Catching Up* report used the older Benchmarks. For details on the updated Benchmarks, see Jeff Allen, "Updating the ACT College Readiness Benchmarks," ACT Research Report 2013-6 (Iowa City, IA: ACT, 2013), http://www.act.org/research/researchers/reports/pdf/ACT_RR2013-6.pdf.

16 The starting years were 2006–07 and 2007–08 for the Arkansas cohorts and 2006–07, 2007–08, and 2008–09 for the Kentucky cohorts. Thus, Table 2 aggregates two years of eighth-grade data from Arkansas with three years of eighth-grade data from Kentucky. In all, 39,352 eighth-grade students (55% of total enrollment of 71,674 students) took ACT Explore in the two starting years in Arkansas and 128,511 students (91% of total enrollment of 140,827 students as determined by the Kentucky Core Competency Test database) took ACT Explore in the three starting years in Kentucky.

17 Much lower percentages from all demographic student groups scored at the Far Off Track level of 8 or below on the ACT Explore English test. For example, those percentages were 5% for low-income students, 7% for African Americans, 6% for Hispanics, 12% for English language learners, and 15% for special education students. Thus, we focused our analysis on Far Off Track students in the other three subjects.

18 Student groups disaggregated by income, ethnicity, English language learner, and special education status overlap, and it is also possible to disaggregate by more finely divided non-overlapping groups, e.g., low-income African American students. Some of this was done in the Appendix to the two papers by Dougherty, Hiserote, and Shaw cited earlier.

19 This is based on the assumptions that retained students and dropouts have lower academic achievement and are more likely to be low income than their peers who follow a normal grade progression.

20 In Arkansas, the fourth-grade Literacy test was matched to the eighth-grade ACT Explore Reading test. The logistic regression approach used to associate probabilities with each prior test score is described in Jeff Allen, "Updating the ACT College Readiness Benchmarks."

21 In both states, we followed students who took the state test in fourth grade in 2006–07 or 2007–08 and ACT Explore in eighth grade in 2010–11 or 2011–12.

22 All fourth-grade science scores were from Kentucky, as Arkansas tested science in fifth grade but not fourth grade.

23 A regression analysis that controlled both for how far behind students were and for the length of time between tests indicated that catching up by Far Off Track students in all three subjects was greater in the middle grades than in high school. However, this analysis did not address the test alignment issue. See the two papers cited earlier by Dougherty, Hiserote, and Shaw.

24 This approach is strongly recommended in the Common Core State Standards, which state that "while the Standards make references to some particular forms of content, including mythology, foundational US documents, and Shakespeare, they do not—indeed, cannot—enumerate all or even most of the content that students should learn. The Standards must therefore be complemented by a well-developed, content-rich curriculum consistent with the expectations laid out in this document" and that "By reading texts in history/social studies, science, and other disciplines, students build a foundation of knowledge in those fields that will also give them the background to be better readers in all content areas. Students can only gain this foundation when the curriculum is intentionally and coherently structured to develop rich content knowledge within and across grades." Common Core State Standards Initiative, *Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects* (2010), pp. 6 and 10, http://www.corestandards.org/.

25 Teaching all of these subjects in the early grades typically requires a carefully designed curriculum that is integrated across subjects. State standards are typically written subject-by-subject and do not provide this integration. School districts can develop such a curriculum on their own and/or use an existing integrated curriculum. For a description of such a curriculum, see Jennifer Dubin, "More Than Words: An Early Grades Reading Program Builds Skills and Knowledge," *American Educator*, Fall 2012, pp. 34-40, http://www.aft.org/pdfs/americaneducator/fall2012/Dubin.pdf.

26 For further discussion of the importance of a rich curriculum in the early grades, especially for disadvantaged students, see Chrys Dougherty, *College and Career Readiness: The Importance of Early Learning* (Iowa City, IA: ACT, 2013), http://www.act.org/research/policymakers/pdf/ImportanceofEarlyLearning.pdf.

27 Reading consists of two abilities: the ability to identify the words on the page (decoding), and the ability to understand the words once they are identified (comprehension). Decoding is the main constraint on reading ability for beginning readers. Fluent decoding depends on mastering letter-sound relationships and becoming familiar with spelling patterns in the English language. Comprehension, on the other hand, depends heavily on the development of vocabulary and background knowledge. See E.D. Hirsch, "Reading Comprehension Requires Knowledge—of Words and the World," *American Educator,* Spring 2003, pp. 10-29 and 48-49, https://www.aft.org/pdfs/americaneducator/spring2003/AE_SPRNG.pdf; and E.D. Hirsch and Robert Pondiscio, "There's No Such Thing as a Reading Test," *The American Prospect*, June, 2010, http://prospect.org/article/theres-no-such-thing-reading-test.

28 In mathematics, the ability to do simple arithmetic and place numbers on the number line by first grade predicts mathematics performance in fifth grade. Involving preschool and kindergarten students in games that involve number comparisons, counting, and adding can help prevent mathematics difficulties from emerging in the early elementary grades. See David C. Geary, "Cognitive Predictors of Achievement Growth in Mathematics: A 5-Year Longitudinal Study," *Developmental Psychology* 47 (2011): 1539-1552, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3210883/ and National Research Council, *Mathematics Learning in Early Childhood: Paths Towards Excellence and Equity* (Washington, DC: National Academies Press, 2009), http://www.nap.edu/catalog.php?record_id=12519.

29 In the behavioral area, one review of multiple studies found that programs that target specific desired student behaviors and explicitly teach those behaviors through active learning (students act out or practice the behavior, rather than just being told about it) are effective at improving both behavior and academic achievement. See Joseph A. Durlak, Roger P. Weissberg, Allison B. Dymnicki, Rebecca D. Taylor, and Kriston B. Schellinger, "The Impact of Enhancing Students' Social and Emotional Learning: A Meta-Analysis of School-Based Early Interventions," *Child Development* 82 (2011): 405-432, http://www.mentalhealthexcellence.org/wp-content/uploads/2013/10/SEL-MetaAnalysis.pdf.

30 For a discussion of these practices, see ACT, *Rising to the Challenge of College and Career Readiness: A Framework for Effective Practices* (Iowa City, IA: ACT, 2012), http://www.nc4ea.org/nc4ea/assets/File/RisingToChallenge_Aug2012_FINAL.pdf.

31 For a discussion of such a database in the context of high schools, see Chrys Dougherty, "Using the Right Data to Determine if High School Interventions are Working to Prepare Students for College and Careers," National High School Center, 2010, http://www.betterhighschools.org/docs/NCEA_CollegeCareerReadiness.pdf. The analysis in that paper found that simply completing and earning credit for mathematics courses at the Algebra II level and beyond was not sufficient to catch up Far Off Track students. Most likely, those students received passing grades in those courses without having mastered the content implied by the course titles. See Chrys Dougherty, Lynn Mellor, and Shuling Jian, "Orange Juice or Orange Drink? Ensuring that 'Advanced Courses' Live Up to Their Labels," 2006, http://files.eric.ed.gov/fulltext/ED519415.pdf.

32 Chrys Dougherty and Lynn T. Mellor, "Preparing Students for Advanced Placement: It's a PreK–12 Issue," in Philip M. Sadler, Gerhard Sonnert, Robert H. Tai, and Kristin Klopfenstein, ed., *AP: A Critical Examination of the Advanced Placement Program* (Cambridge: Harvard Education Press, 2010): 219-232.

33 See the articles by E.D. Hirsch and Hirsch and Pondiscio in note 27.

34 ACT, *How Much Growth Toward College Readiness is Reasonable to Expect in High School?* (Iowa City, IA: ACT, 2010), http://www.act.org/research/policymakers/pdf/ReasonableGrowth.pdf; ACT, *Principles for Measuring Growth Towards College and Career Readiness* (Iowa City, IA: ACT, 2012), http://media.act.org/documents/GrowthModelingReport.pdf.

35 For a brief discussion of facilitating research with longitudinal education data, see Institute for Education Sciences, "Forming Research Partnerships with State and Local Education Agencies," SLDS (Statewide Longitudinal Data Systems) Issue Brief 2, July 2012, http://nces.ed.gov/programs/slds/pdf/Data-Use-Issue-Brief-2_Research-Partnerships.pdf.