Summary of Findings and Implications

While all groups benefit from stronger reading skills, the size and timing of math gains vary significantly. For African American and Hispanic students, early reading interventions can dramatically boost math outcomes. For White and Asian students, achieving high-level reading mastery is the key to ensuring strong math performance.

These findings provide actionable insights for shaping a city-wide reading competition that both raises overall literacy and strategically closes achievement gaps in mathematics.

Baseline Performance and Gaps

- African American and Hispanic students start from lower math mastery rates (<10%) in the Approaches category.
- White and Asian students also have low baselines but show stronger overall reading performance.
- The reading-to-math achievement gap is widest for African American and Hispanic students, especially in middle school grades.
- Asian students show the smallest gap, with consistently high reading and math results.

Magnitude of Gains

Across all racial and ethnic groups, reading proficiency is a strong and significant predictor of math mastery. However, the relationship between reading level and math mastery is not uniform:

- For African American and Asian students, the progression from lower reading levels to exceeding standards produces large, consistent gains in predicted math mastery.
- For White and Hispanic students, math mastery rates remain low or flat until reading performance reaches the highest level (“Exceeds Grade Level”).

These patterns suggest that for some groups, basic reading improvements yield steady math gains (e.g., Asian and African American students), while for others (e.g., White and Hispanic students), only high-level reading mastery translates into strong math performance.

Implications for the Reading Competition

- **African American and Hispanic students:**

- Greatest potential for improvement.

- Moving students from below to meeting or exceeding reading benchmarks could yield math mastery gains of 60–97 percentage points.
- Targeted interventions and incentives for lower-level readers may have the largest city-wide impact.

- **White students:**

- Most gains come from moving students from “Meets” to “Exceeds.”
- Competition challenges should focus on stretch goals for already proficient readers.

- **Asian students:**

- Majority already perform at high reading and math levels.
- Efforts should aim to maintain mastery and challenge top performers rather than broad remediation.

Data and Research Method

This analysis uses publicly available STAAR data from the Texas Education Agency for 2023 and 2024, focusing on Region 20 (San Antonio area). The dataset includes reading and mathematics performance levels for students in grades 3 through 8. Each subject is reported in four categories: Below Grade Level, Approaches, Meets, and Masters.

The data were cleaned and reshaped to calculate the proportion of students in each performance category for both subjects. Separate datasets were constructed for the overall student population and for each racial/ethnic group (African American, Hispanic, White, and Asian American). These racial and ethnic categories are named exactly in the report as provided in the public STAAR records.

Mathematics mastery rates were modeled using beta regression, which is appropriate for analyzing proportions bounded between 0 and 1. Predictors included reading performance levels, grade, and year to account for differences across grades and changes over time.

From these models, predicted probabilities of mastering mathematics were calculated for each reading performance level while holding grade and year constant. Results are presented as percentages and as changes in percentage points relative to students performing below grade level in reading.

Because the dataset is based on aggregated school-level proportions (48 observations), the findings represent group-level associations rather than individual-level causal effects. With aggregated data, results should be interpreted as broad trends in the relationship between reading and math performance, not as precise estimates of individual student outcomes. Additionally, subgroup models (White and Asian students) are less stable due to fewer available aggregated records and high concentrations of students in advanced reading levels.

Findings – All Students in the San Antonio Area

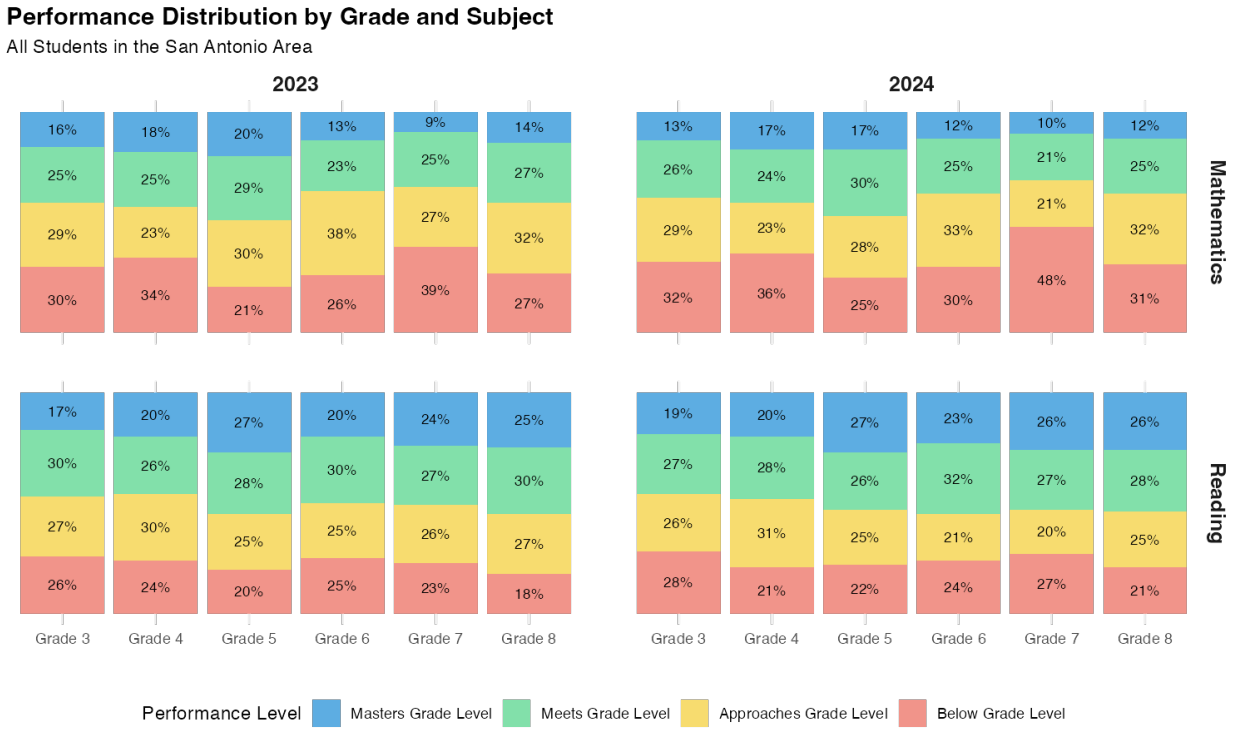

Figure 1. Reading and Math Performance by Grade and Year for All Students in the San Antonio Area

Figure 1 shows reading and math performance for all students in the San Antonio Area, broken down by grade and year. Reading scores are relatively stable across grades and between years 2023 and 2024. About half of the students meet or exceed expectations. In several grades, the percentage of students mastering reading increased slightly over time. In short, students seem to be holding their ground in reading.

Mathematics is a different story. In 2023, math performance drops sharply in middle school. By grade 6, almost 40 percent of students did not meet the standard, and that number stays high in grade 7. In 2024, the pattern gets worse. Nearly half of the seventh graders failed to meet expectations, and only 10 percent mastered the material. Across both years, fewer students reach mastery in math than in reading, especially in the upper grades. The gap grows wider as students move from elementary to middle school.

Table 1. Relationship Between Reading Performance and Math Mastery Among San Antonio Students

Reading Performance Level	Predicted Mathematics Mastery (%)	Compared to "Below Grade Level"
Below Grade Level	0.1	--
Approaches Grade Level	23.3	+23.2 percentage points
Meets Grade Level	44.2	+44.1 percentage points
Exceeds Grade Level	82.0	+81.9 percentage points

Note: Predicted probabilities are derived from a beta regression model.

As with all analyses in this report, results are based on aggregated school-level proportions from STAAR public data and describe group-level trends rather than individual student outcomes.

This section examines whether grade-level reading performance is related to math mastery rates in San Antonio (without considering students' racial/ethnic groups). The results (**Table 1**) show strong relationships between reading and mathematics achievement by looking at model-based predictions for hypothetical scenarios rather than individual students.

The model predicts that if all students were at the "Approaches Grade Level" in reading, the math mastery rate would be 23.3%. This is 23.2 percentage points higher than if all students were "Below Grade Level" in reading. A 23.3% predicted probability means that, under this scenario, about 23 out of every 100 students would be expected to master mathematics.

The differences are even larger for higher reading performance levels. If all students were at the "Meets Grade Level" benchmark in reading, about 44 out of 100 students would be expected to master mathematics. This is 44.1 percentage points higher than when all students are below grade level in reading.

Finally, if all students were at the "Exceeds Grade Level" in reading, the model predicts that 82 out of 100 students would master mathematics. This represents an 81.9 percentage point increase compared to the scenario where all students are below grade level in reading.

Findings – African American Students in the San Antonio Area

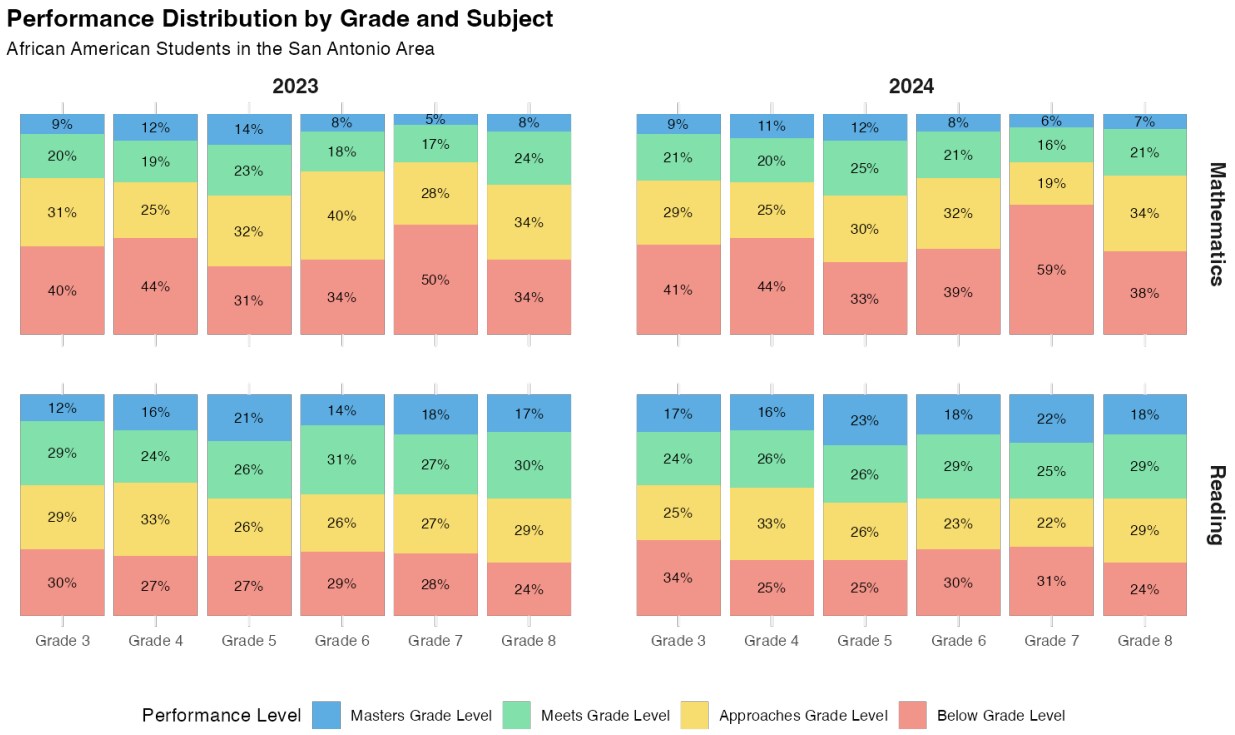

Figure 2. Reading and Math Performance by Grade and Year for African American Students in the San Antonio Area

The achievement gap between reading and mathematics exists for all students, but it widens dramatically for African American students. **Figure 2** shows reading and math performance for African American students in the San Antonio area, by grade and year. Reading scores are relatively consistent across grades and between 2023 and 2024. About half of the students meet or exceed expectations, with some signs of growth in reading mastery over time. Overall, students appear to be maintaining their footing in reading.

Math performance, on the other hand, declines more steeply. In 2023, the share of students not meeting expectations rises in middle school, and fewer than 10 percent of sixth and seventh graders demonstrate mastery. In 2024, outcomes worsen. Only 6 percent of seventh graders master math, while nearly 60 percent fall short of the standard. Compared to reading, fewer students reach math mastery at every grade level. As students move into middle school, the gap between reading and math achievement becomes especially stark.

Table 2. Relationship Between Reading Performance and Math Mastery Among African American Students in the San Antonio Area

Reading Performance Level	Predicted Mathematics Mastery (%)	Compared to "Below Grade Level"
Below Grade Level	0.0	--
Approaches Grade Level	8.9	+8.9 percentage points
Meets Grade Level	58.4	+58.4 percentage points
Exceeds Grade Level	96.8	+96.8 percentage points

Note: Predicted probabilities are derived from a beta regression model.

As with all analyses in this report, results are based on aggregated school-level proportions from STAAR public data and describe group-level trends rather than individual student outcomes.

This section examines whether grade-level reading performance is associated with math mastery rates specifically for African American students in the San Antonio area. The results in **Table 2** show a strong relationship between reading and mathematics achievement, based on model-predicted group-level outcomes under hypothetical scenarios, not individual predictions.

If all students are assumed to be at the "Approaching Grade Level" in reading, the model predicts an 8.9% probability of mastering mathematics. This is 8.9 percentage points higher than the scenario in which all students are "Below Grade Level" in reading. In other words, about 9 out of every 100 students would be expected to master math under this assumption.

The gap becomes much larger at higher reading performance levels. If all students are at the "Meets Grade Level" benchmark, the predicted math mastery rate increases to 58.4%, which is 58.4 percentage points higher than the below-grade-level scenario.

Among African American students who are assumed to be entirely in the "Exceeds Grade Level" reading group, the model predicts a 96.8% chance of mastering math, which is 96.8 percentage points higher than the below-grade-level scenario. These estimates highlight the strong relationship between reading proficiency and math success in this group.

Findings – White Students in the San Antonio Area

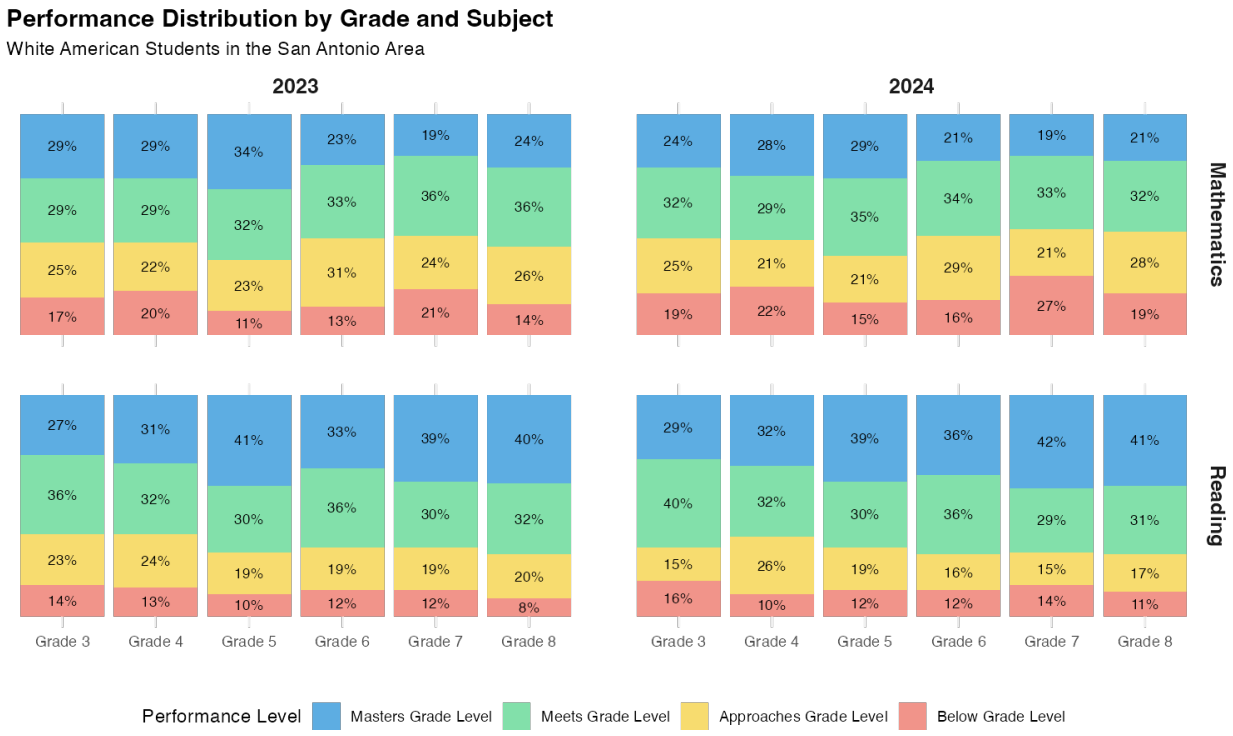

Figure 3. Reading and Math Performance by Grade and Year for White Students in the San Antonio Area

Figure 3 shows reading and math performance for White students in the San Antonio area, broken down by grade and year. Reading scores are relatively consistent across grades and between 2023 and 2024. In both years, about half of White students meet or exceed reading expectations, with fewer than 15% performing below grade level. Reading performance improves slightly in 2024, especially in Grades 7 and 8, where more than 40% of students master reading.

Mathematics shows a different trend. In 2023, math mastery rates decline in middle school, with fewer than 25% of eighth graders demonstrating mastery. The share of students not meeting expectations increases in Grades 7 and 8, reaching more than one quarter of students. In 2024, math performance in upper grades worsens further. Only about 20% of seventh and eighth graders master math, while nearly 30% fall below grade level. Across both years, fewer students achieve math mastery compared to reading, and the gap grows wider in the upper grades.

Table 3. Relationship Between Reading Performance and Math Mastery Among White Students in the San Antonio Area

Reading Performance Level	Predicted Mathematics Mastery (%)	Compared to "Below Grade Level"
Below Grade Level	0.1	--
Approaches Grade Level	21.0	+20.9 percentage points
Meets Grade Level	23.0	+22.9 percentage points
Exceeds Grade Level	86.0	+85.9 percentage points

Note: Predicted probabilities are derived from a beta regression model.

As with all analyses in this report, results are based on aggregated school-level proportions from STAAR public data and describe group-level trends rather than individual student outcomes.

This section examines whether grade-level reading performance is associated with math mastery rates specifically for White students in the San Antonio area. The results in **Table 3** show that while there is an overall upward trend between reading and mathematics achievement, the relationship is less consistent compared to other groups.
If all White students were assumed to be at the "Approaching Grade Level" in reading, the model predicts a 21.0% probability of mastering mathematics. This is 20.9 percentage points higher than if all students were "Below Grade Level" in reading. Students meeting the reading benchmark are predicted to have a 23.0% math mastery rate, only a slight improvement over the Approaches level.

The largest increase occurs for students who exceed the reading benchmark. If all students were at the "Exceeds Grade Level" level, the model predicts an 86.0% math mastery rate, 85.9 percentage points higher than the below-grade-level scenario.

Note: For White students, many observations are concentrated in the highest reading level. This makes it difficult for the model to distinguish differences among lower reading categories, so predictions for intermediate levels are less precise. The overall trend, however, remains clear: exceeding reading standards strongly predicts higher math mastery.

Findings – Hispanic Students in the San Antonio Area

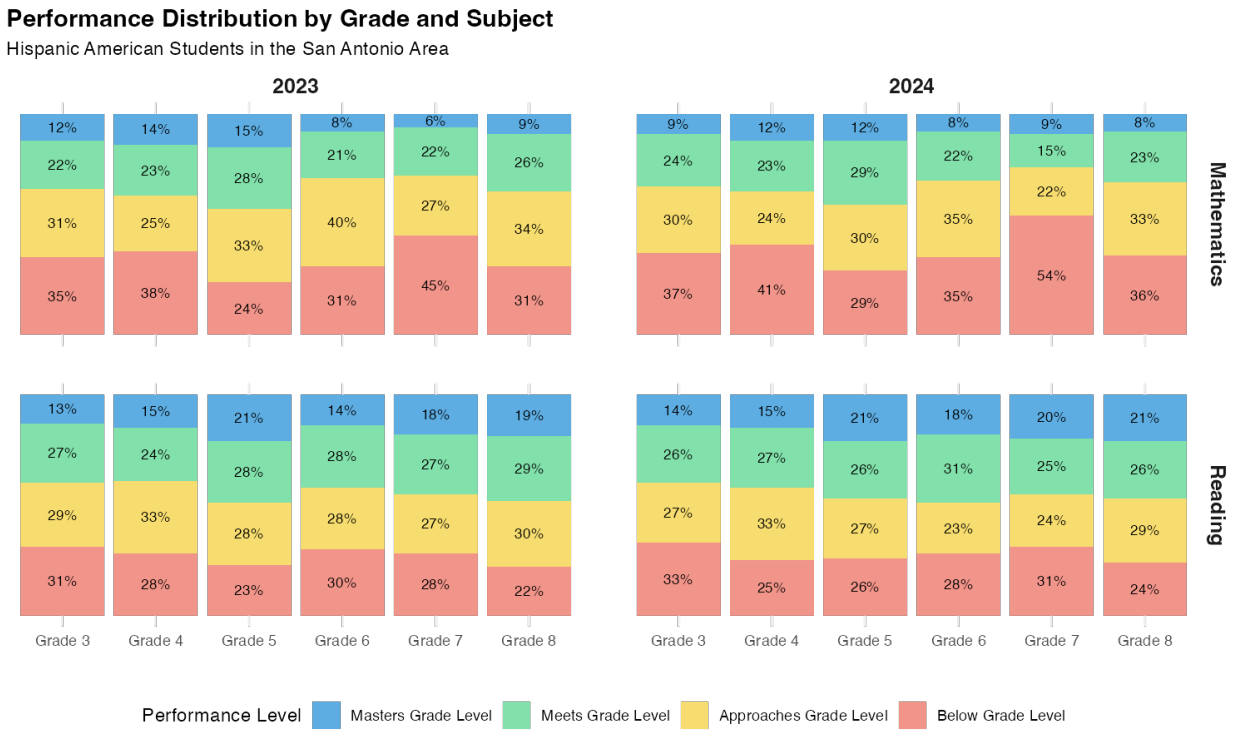

Figure 4. Reading and Math Performance by Grade and Year for Hispanic Students in the San Antonio Area

Figure 4 shows reading and math performance for Hispanic students in the San Antonio area, broken down by grade and year. Reading scores are relatively stable across grades and between 2023 and 2024. About one third of students are below grade level in reading, with slightly fewer performing at or above mastery. In 2024, reading outcomes remain similar, though some middle grades show minor improvement, with up to 31% of students mastering reading.

Mathematics performance is consistently weaker than reading. In 2023, mastery rates decline through middle school, dropping to only 6% in eighth grade. The percentage of students not meeting math expectations increases in higher grades, reaching 45% in Grade 7 and 31% in Grade 8. In 2024, math results worsen further in middle school, with more than half of seventh graders and over a third of eighth graders failing to meet expectations. Across both years, Hispanic students achieve significantly lower mastery rates in math compared to reading, and the gap becomes more pronounced in the upper grades.

Table 4. Relationship Between Reading Performance and Math Mastery Among Hispanic Students in the San Antonio Area

Reading Performance Level	Predicted Mathematics Mastery (%)	Compared to "Below Grade Level"
Below Grade Level	0.1	--
Approaches Grade Level	39.0	+38.9 percentage points
Meets Grade Level	1.7	+1.6 percentage points
Exceeds Grade Level	96.3	+96.2 percentage points

Note: Predicted probabilities are derived from a beta regression model.

As with all analyses in this report, results are based on aggregated school-level proportions from STAAR public data and describe group-level trends rather than individual student outcomes.

This section examines whether grade-level reading performance is associated with math mastery rates specifically for Hispanic students in the San Antonio area. The results in **Table 4** show an unusual pattern at the middle reading level but overall confirm that exceeding reading standards strongly predicts higher math mastery.
If all Hispanic students were assumed to be at the "Approaching Grade Level" in reading, the model predicts a 39.0% probability of mastering mathematics. This is 38.9 percentage points higher than the scenario in which all students were "Below Grade Level."

Unexpectedly, students meeting reading standards are predicted to have only a 1.7% math mastery rate, which is 1.6 percentage points higher than the below-grade-level scenario. However, when students exceed the reading benchmark, the model predicts a 96.3% math mastery rate, a 96.2 percentage point increase compared to the below-grade-level scenario.

Note: The drop in predicted mastery for students meeting reading standards is likely due to data limitations and statistical instability caused by small sample size. While this result should be interpreted cautiously, the overall trend remains strong: students who exceed reading standards have a dramatically higher likelihood of mastering mathematics.

Findings – Asian Students in the San Antonio Area

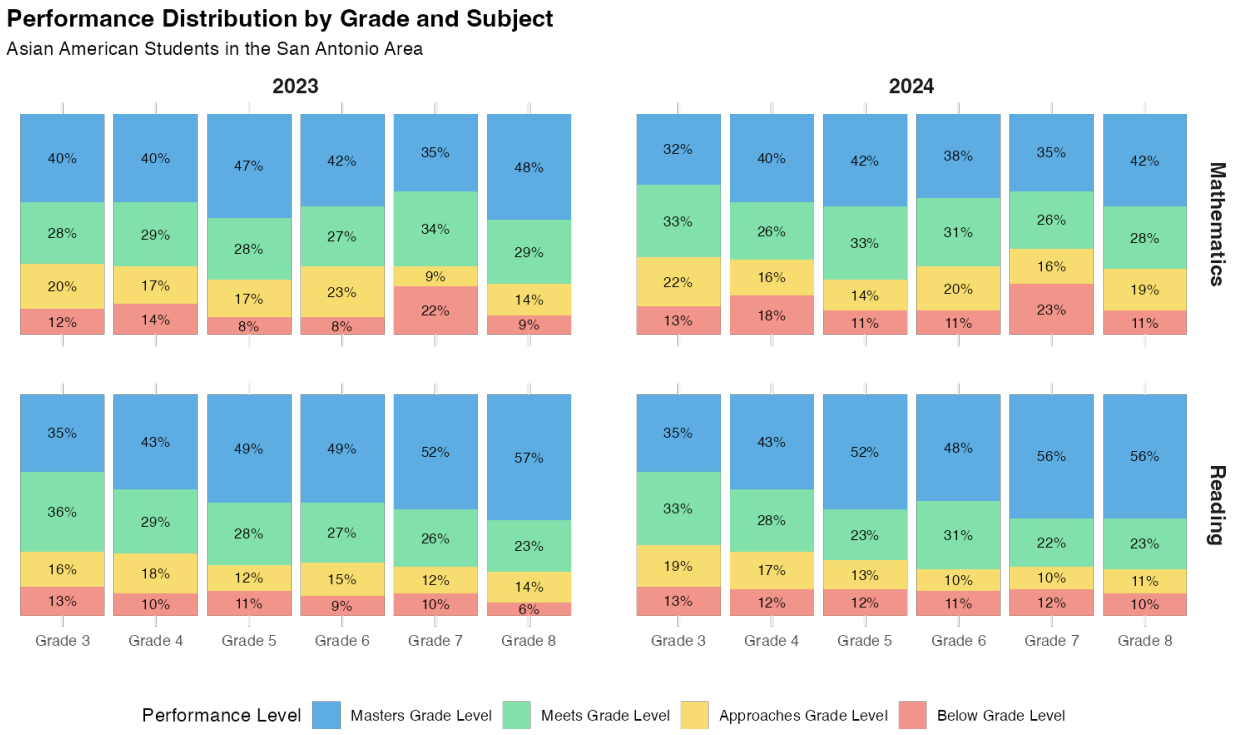

Figure 5. Reading and Math Performance by Grade and Year for Asian Students in the San Antonio Area

Figure 5 shows reading and math performance for Asian students in the San Antonio area, broken down by grade and year. Reading scores are consistently strong across all grades and both years. In 2023, over 60% of Asian students meet or exceed reading expectations in every grade, with mastery rates reaching over 50% by Grade 7 and Grade 8. In 2024, reading results remain high and even improve in some middle school grades, where more than half of students demonstrate mastery. Fewer than 15% of students fall below reading standards in any grade or year, indicating strong overall literacy performance.

Mathematics performance is also high for Asian students, with more than 35% of students in most grades achieving mastery in 2023. Mastery rates remain relatively stable through middle school, with fewer than 15% of students failing to meet math standards in most grades. In 2024, math results stay strong, with up to 42% of students mastering math and very few performing below grade level. Overall, Asian students maintain high performance in both reading and math, with consistently low rates of students not meeting expectations compared to other groups.

Table 5. Relationship Between Reading Performance and Math Mastery Among Asian Students in the San Antonio Area

Reading Performance Level	Predicted Mathematics Mastery (%)	Compared to "Below Grade Level"
Below Grade Level	0.1	--
Approaches Grade Level	2.6	+2.5 percentage points
Meets Grade Level	62.0	+61.9 percentage points
Exceeds Grade Level	94.0	+93.9 percentage points

Note: Predicted probabilities are derived from a beta regression model.

As with all analyses in this report, results are based on aggregated school-level proportions from STAAR public data and describe group-level trends rather than individual student outcomes.

This section examines whether grade-level reading performance is associated with math mastery rates specifically for Asian students in the San Antonio area. The results in **Table 5** show that mathematics mastery rates remain very low for lower reading levels but increase sharply once reading standards are met.

If all Asian students were assumed to be at the "Approaching Grade Level" in reading, the model predicts a 2.6% probability of mastering mathematics. This is 2.5 percentage points higher than the scenario in which all students were "Below Grade Level."

At higher reading performance levels, the gains are substantial. Students meeting reading standards are predicted to have a 62.0% math mastery rate, which is 61.9 percentage points higher than the below-grade-level scenario. For those exceeding reading benchmarks, the model predicts a 94.0% math mastery rate, a 93.9 percentage point increase compared to below-grade level.

Note: For Asian students, most are already performing at high reading levels, which limits the model's ability to separate lower categories. Predictions for intermediate levels are therefore less precise, but the findings clearly show that reaching or surpassing reading benchmarks greatly improves math mastery outcomes.