**Analysis of District-Wide School Performance**

**Summary of Analysis:**

From the beginning of the analysis, we established the path to access the relevant files using pandas. The data is extracted from two files: one containing school data and the other with student data. These datasets were merged to enable comparisons and derive meaningful conclusions.

To gain an overview of district-wide metrics, we used functions like “nunique”, “sum”, and “mean” to calculate the total number of students and schools, as well as the average math and reading scores. This allowed us to begin filtering the data for a clearer general understanding.

**Using Conditional and Group Functions:**

To analyze passing rates, the “count” function was used to determine how many students scored above 70 in each school. A new “DataFrame” was created to summarize these findings and give a concise representation of the district’s overall performance.

Next, we narrowed the focus by grouping data by school type. Using “set\_index” and “groupby”, we identified the types of schools, their student populations, and the per-student spending. These metrics provide a clearer picture of school operations and budget allocation.

**Detailed Metrics by School:**

By applying the “groupby” function further, we calculated average math and reading scores for each school. Using conditionals, we identified how many students passed math and reading in each school. From this, passing rates for math, reading, and overall performance were determined, highlighting the variations in school performance.

**Highlighting Top and Bottom Performers:**

Using “sort\_values”, the data was sorted to identify the top-performing schools (highest overall passing rates) and the lowest-performing schools (lowest overall passing rates). A notable finding was that charter schools consistently outperformed district schools in terms of passing rates, despite their typically smaller size.

**Grade-Level Analysis:**

To dive deeper, the data was grouped by grade level for each school, analyzing math and reading scores across 9th to 12th grades. While it was difficult to draw firm conclusions, trends indicated that students struggled more in math than in reading.

**Impact of Spending Per Student:**

Using “cut()” and “spending bins”, we categorized schools by their per-student spending ranges. Analyzing average scores and passing percentages revealed an unexpected relationship: schools with higher spending per student tended to have lower math and reading passing rates. This surprising result suggests that factors beyond budget significantly impact student performance.

**School Size and Performance:**

We created a new “DataFrame” to analyze school size (small, medium, large) and its effect on performance. Grouping by size range, we observed that smaller schools consistently outperformed larger schools in math and reading scores, as well as passing rates.

**School Type Analysis:**

Finally, the data was grouped by school type (charter or district). The results reinforced earlier observations: charter schools demonstrated significantly higher performance in math and reading passing rates compared to district schools, despite serving fewer students overall.

**Conclusions**

1. **Optimizing Budget Utilization in Larger Schools:**

The data highlights that larger schools with higher budgets are not achieving the desired academic outcomes. This could be attributed to students facing more distractions in larger classrooms, where engagement may be lower. To address this, we could consider reallocating resources to create smaller class sizes, fostering a more interactive and focused learning environment that better supports individual student needs.

1. **Strategic Allocation of Resources:**

Given that larger schools tend to have bigger budgets, we could strategically allocate funds to programs that directly support student families and enhance learning opportunities. This could include extracurricular activities, tutoring programs, or other initiatives aimed at improving student engagement and academic performance. Additionally, it may be worth exploring whether students in these schools come from low-income families or face challenges such as limited parental support, which could interfere with their educational outcomes. Addressing these underlying issues could help bridge the performance gap.