PyCitySchool Analysis:

This analysis is based on the data provided in two CSV files for schools and students for the district. The data analysis is performed by using Pandas and Jupyter Notebooks. Following are some summary points and conclusions that can be drawn from the analysis:

- A general assumption would be that if more resources are spent on something, the better its performance should be. This dataset, however, presents an opposite finding. The schools with the lowest spending ranges (less than $585 per student) delivered better average math and reading scores as well as better passing rates for students overall and in both math and reading. These schools not only had lower per student budget, but their overall total budgets were also lesser compared to other schools in the district.

- Small-sized (less than 1000 students) and medium-sized (1000 to 2000 students) had almost similar average scores (about 83 for both math and reading) and passing rates (about 93% for math, 96% for reading, and 90% overall). These schools outperformed the large-sized schools (2000 to 5000 students) especially in terms of passing scores.

- Charter schools clearly outperformed the district schools by having higher average scores as well as passing rates. The top 5 best performing schools based on overall scores are Charter whereas the bottom 5 are District. This could be attributable to the fact that charter schools have lesser number of students but no significant correlation can be drawn from the provided data to support this reasoning.

- Students in all grades had almost similar academic performance across all categories.

- Overall, students tend to perform better in reading (79%-97%) as compared to math (65%-94%) in terms of passing scores. The overall passing rates (52%-91%) are comparatively lower than the average of passing rates for math and reading. This implies that not all the students scoring 70 or higher in math are scoring the same in reading and vice versa.

The above conclusions are induced based on the detailed analysis of different summaries of datasets which are explained in the subsequent sections of the report.

District Summary:

- There are 15 schools in the district
- The total number of students in all schools is 39,170
- The total budget for the district is $24,649,428
- The average math score in the district schools is 79.985
- The average reading score in the district schools is 81.878
- 74.981% of students in the district passed math by obtaining a score of 70 or higher
- 85.805% of students in the district passed reading by obtaining a score of 70 or higher
- 65.172% of students in the district passed both math and reading by obtaining a score of 70 or higher in both the subjects

School Summary:

- Charter schools have fewer students ranging between 427 to 2283 students for eight schools in the district.
- District schools have more students ranging between 2739 to 4976 students for seven schools in the district.
- The total budget for Charter schools is lower ranging between $0.25 to $1.32 million.
- The total budget for District schools is higher ranging between $1.76 to $3.12 million.
- The budget per student for Charter schools ranges between $578 to $638 per student.
- The budget per student for District schools ranges between $628 to $655 per student.
- The total budget for schools is usually higher for the schools with more students (which is true for most District schools). However, the budget per student does not follow the same trend for all schools. There are some Charter schools with lesser students but have a higher budget resulting in higher per student budget.
- The students enrolled in Charter schools have higher math scores on average (83) compared to the students enrolled in District schools (76-77). The percentage of students passing math by getting a score of 70 or higher is also higher in Charter schools (92%-94%) as compared to District schools (65%-68%).
- The students enrolled in Charter schools have higher reading scores on average (83-84) compared to the students enrolled in District schools (80-81). The percentage of students passing reading by getting a score of 70 or higher is also higher in Charter schools (95%-97%) as compared to District schools (79%-82%).
- The overall passing rate (students passing both math and reading) is also higher in Charter schools (89%-91%) relative to District schools (52%-54%).
- The students enrolled in Charter schools outperform the students enrolled in District schools in both math and reading by getting higher average scores as well as higher passing percentages. The overall passing rate is also substantially higher for Charter school students.
- The passing rates are usually higher for reading (79%-97%) as compared to math (65%-94%).

Highest Performing Schools (by % Overall Passing):

- All the main 5 highest performing schools based on overall passing rate are Charter schools with over about 90% students obtaining a score of 70 or higher in both math and reading.
- The per student budget is not necessarily higher for the school with the best overall score. This might imply that the total spending per student might not have a direct impact on the performance of students.

Bottom Performing Schools (by % Overall Passing):

- All the main 5 bottom performing schools based on overall passing rate are District schools with less than about 53% students obtaining a score of 70 or higher in both math and reading.
- The per student budget is relatively higher for the school with the worst overall scores. This might imply that the total spending per student might not have a direct impact on the performance of students.

Math Scores by Grade:

- Math scores for 9^{th} graders range between 76.40 to 83.79
- Math scores for 10^{th} graders range between 75.91 to 84.23
- Math scores for 11^{th} graders range between 76.40 to 85.00
- Math scores for 12^{th} graders range between 76.18 to 84.12
- Overall, the students enrolled in all grades had similar performance in math and have average grades in the same range between 76 to 85

Reading Scores by Grade:

- Reading scores for 9^{th} graders range between 80.63 to 84.12
- Reading scores for 10^{th} graders range between 80.63 to 84.25
- Reading scores for 11^{th} graders range between 80.40 to 84.37
- Reading scores for 12^{th} graders range between 80.31 to 84.70
- Overall, the students enrolled in all grades had similar performance in reading and have average grades in the same range between 80 to 85

Scores by School Spending:

- The data in this summary illustrates that the average scores and passing rates are inversely proportional to the spending per student.
- Schools with lowest spending per student (less than $585) had the best average math and reading scores as well as the best overall passing rates including math and reading
- Schools with highest spending per student between $645-$680 had the lowest average math and reading scores as well as the lowest overall passing rates including math and reading

Scores by School Size:

- Large-size schools with students ranging between 2000 to 5000 had the lowest average scores for both math and reading. Large-sized schools also had the lowest overall passing rates as well as lowest passing rates for math and reading.
- Small-sized schools (less than 1000 students) and medium sized schools (1000-2000 students) had almost similar performance which was better than large-sized schools.
- Small-sized schools had a very slightly higher average math and reading score compared to medium-sized schools. Medium-sized schools had a very slightly higher passing rate for math and reading as well as overall results. However, these differences are not substantial to draw a conclusion between small and medium sized schools. This does indicate that some students in small schools scored higher in both math and reading driving the average scores to a higher number, however, the number of students scoring higher scores (70 or more) for small schools was slightly less compared to medium schools. These differences are not significant to draw a conclusive statement.

Scores by School Type:

- Students enrolled in Charter schools outperformed the students enrolled in District schools in all categories. They had higher average scores as well as better passing rates.
- Students in both Charter and District schools had relatively better performance in reading as compared to math especially in terms of the passing rates.
- Overall passing rates for both Charter and District schools are lower than the passing rates in math and reading. This indicates that not all students getting a passing score in math are getting the same for reading and vice versa.