

PyCitySchools

May 26, 2024

1 PyCity Schools Analysis

1.1 Observations/Findings by Thay Chansy:

Reading Scores: Charter schools seem to have an edge in reading. This analysis found that in the PyCity Schools, more Charter schools showed significant gains in reading compared to traditional District schools with similar students.

Math Scores: The results in math follow the same trend as the reading data where Charter schools scores are higher than District schools.

Overall Scores: The data suggests that Charter schools outperform District schools overall. For instance, Charter schools on average scored higher in math and reading. Charter schools had a significantly higher percentage of students passing both math and reading tests at (90.43% vs 53.67%).

Budget: While District schools have a larger total budget, however the budget per student is not significantly higher than Charter schools.

Charter Schools: (Budget: 7,301,505) (Student: 12,194) (Budget per Student: 598.78)

District Schools: (Budget: 17,347,923) (Student: 26,976) (Budget per Student: 643.09)

```
[1]: # Dependencies and Setup
import pandas as pd
from pathlib import Path

# File to Load (Remember to Change These)
school_data_to_load = Path("Resources/schools_complete.csv")
student_data_to_load = Path("Resources/students_complete.csv")

# Read School and Student Data File and store into Pandas DataFrames
school_data = pd.read_csv(school_data_to_load)
student_data = pd.read_csv(student_data_to_load)

# Combine the data into a single dataset.
school_data_complete = pd.merge(student_data, school_data, how="left",
                                on=["school_name", "school_name"])
```

```
# Display results first 5
school_data_complete.head()
```

```
[1]: Student ID      student_name gender grade      school_name \
0      0      Paul Bradley      M    9th  Huang High School
1      1      Victor Smith      M   12th  Huang High School
2      2    Kevin Rodriguez      M   12th  Huang High School
3      3  Dr. Richard Scott      M   12th  Huang High School
4      4      Bonnie Ray      F    9th  Huang High School

      reading_score  math_score  School ID      type  size  budget
0          66          79          0  District  2917  1910635
1          94          61          0  District  2917  1910635
2          90          60          0  District  2917  1910635
3          67          58          0  District  2917  1910635
4          97          84          0  District  2917  1910635
```

```
[2]: ## District Summary
```

```
[3]: # Calculate the total number of unique schools
school_count = school_data_complete['school_name'].nunique()

# Display results
school_count
```

```
[3]: 15
```

```
[4]: # Calculate the total number of students
student_count = school_data_complete['Student ID'].nunique()

# Display results
student_count
```

```
[4]: 39170
```

```
[5]: # Calculate the total budget
total_budget = school_data['budget'].sum()

# Display results
total_budget
```

```
[5]: 24649428
```

```
[6]: # Calculate the average (mean) math score
average_math_score = student_data['math_score'].mean()

# Display results
average_math_score
```

[6]: 78.98537145774827

```
[7]: # Calculate the average (mean) reading score
average_reading_score = student_data['reading_score'].mean()

# Display results
average_reading_score
```

[7]: 81.87784018381414

```
[8]: # Use the following to calculate the percentage of students who passed math
      ↪(math scores greater than or equal to 70)
passing_math_count = school_data_complete[(school_data_complete["math_score"]
      ↪>= 70)].count()["student_name"]
passing_math_percentage = passing_math_count / float(student_count) * 100

# Display results
passing_math_percentage
```

[8]: 74.9808526933878

```
[9]: # Calculate the percentage of students who passed reading (hint: look at how
      ↪the math percentage was calculated)
passing_reading_count =
      ↪school_data_complete[(school_data_complete["reading_score"] >= 70)].
      ↪count()["student_name"]
passing_reading_percentage = passing_reading_count / float(student_count) * 100

# Display results
passing_reading_percentage
```

[9]: 85.80546336482001

```
[10]: # Use the following to calculate the percentage of students that passed math
      ↪and reading
passing_math_reading_count = school_data_complete[
    (school_data_complete["math_score"] >= 70) &
    ↪(school_data_complete["reading_score"] >= 70)
].count()["student_name"]
overall_passing_rate = passing_math_reading_count / float(student_count) * 100

# Display results
overall_passing_rate
```

[10]: 65.17232575950983

```
[11]: # Create a high-level snapshot of the district's key metrics in a DataFrame
district_summary = pd.DataFrame([
    "Total Schools": school_count,
    "Total Students": student_count,
    "Total Budget": total_budget,
    "Average Math Score": average_math_score,
    "Average Reading Score": average_reading_score,
    "% Passing Math": passing_math_percentage,
    "% Passing Reading": passing_reading_percentage,
    "% Overall Passing": overall_passing_rate
])

# Formatting
district_summary["Total Students"] = district_summary["Total Students"].map("{:↵,}".format)
district_summary["Total Budget"] = district_summary["Total Budget"].map("${:,.↵2f}".format)
district_summary["Average Math Score"] = district_summary["Average Math Score"].↵map("{:.2f}".format)
district_summary["Average Reading Score"] = district_summary["Average Reading_↵Score"].map("{:.2f}".format)
district_summary["% Passing Math"] = district_summary["% Passing Math"].map("{:↵2f}".format)
district_summary["% Passing Reading"] = district_summary["% Passing Reading"].↵map("{:.2f}".format)
district_summary["% Overall Passing"] = district_summary["% Overall Passing"].↵map("{:.2f}".format)

# Display the DataFrame
district_summary
```

```
[11]:    Total Schools Total Students    Total Budget Average Math Score \
0              15        39,170  $24,649,428.00           78.99

    Average Reading Score % Passing Math % Passing Reading % Overall Passing
0              81.88           74.98           85.81           65.17
```

1.2 School Summary

```
[12]: # Use the code provided to select the type per school from school_data
school_type = school_data.set_index(["school_name"])["type"]

# Display results
school_type
```

```
[12]: school_name
      Huang High School      District
      Figueroa High School   District
      Shelton High School    Charter
      Hernandez High School  District
      Griffin High School    Charter
      Wilson High School     Charter
      Cabrera High School    Charter
      Bailey High School     District
      Holden High School     Charter
      Pena High School       Charter
      Wright High School     Charter
      Rodriguez High School  District
      Johnson High School    District
      Ford High School       District
      Thomas High School     Charter
      Name: type, dtype: object
```

```
[13]: # Calculate the total student count per school from school_data
      per_school_counts = school_data_complete.groupby('school_name')['Student ID'].
      ↪count()

      # Display results
      per_school_counts
```

```
[13]: school_name
      Bailey High School      4976
      Cabrera High School     1858
      Figueroa High School    2949
      Ford High School        2739
      Griffin High School     1468
      Hernandez High School   4635
      Holden High School       427
      Huang High School       2917
      Johnson High School     4761
      Pena High School         962
      Rodriguez High School   3999
      Shelton High School     1761
      Thomas High School      1635
      Wilson High School      2283
      Wright High School      1800
      Name: Student ID, dtype: int64
```

```
[14]: # Calculate the total school budget and per capita spending per school from
      ↪school_data
```

```

per_school_budget = school_data.groupby('school_name')['budget'].sum()

# Save results
per_school_budget

per_school_capita = per_school_budget / per_school_counts

# Save results
per_school_capita

```

```

[14]: school_name
Bailey High School      628.0
Cabrera High School     582.0
Figueroa High School    639.0
Ford High School        644.0
Griffin High School     625.0
Hernandez High School   652.0
Holden High School      581.0
Huang High School       655.0
Johnson High School    650.0
Pena High School        609.0
Rodriguez High School   637.0
Shelton High School     600.0
Thomas High School      638.0
Wilson High School      578.0
Wright High School      583.0
dtype: float64

```

```

[15]: # Calculate the average test scores per school from school_data_complete
per_school_math = school_data_complete.groupby('school_name')['math_score'].
    ↪mean()

# Save results
per_school_math

per_school_reading = school_data_complete.
    ↪groupby('school_name')['reading_score'].mean()

# Save results
per_school_reading

```

```

[15]: school_name
Bailey High School      81.033963
Cabrera High School     83.975780
Figueroa High School    81.158020
Ford High School        80.746258
Griffin High School     83.816757

```

| | |
|-----------------------|-----------|
| Hernandez High School | 80.934412 |
| Holden High School | 83.814988 |
| Huang High School | 81.182722 |
| Johnson High School | 80.966394 |
| Pena High School | 84.044699 |
| Rodriguez High School | 80.744686 |
| Shelton High School | 83.725724 |
| Thomas High School | 83.848930 |
| Wilson High School | 83.989488 |
| Wright High School | 83.955000 |

Name: reading_score, dtype: float64

```
[16]: # Calculate the number of students per school with math scores of 70 or higher
      ↪from school_data_complete
students_passing_math = student_data[student_data['math_score'] >=
      ↪70]['student_name'].count()
school_students_passing_math =
      ↪(school_data_complete[school_data_complete['math_score'] >= 70].
      ↪groupby('school_name')['math_score'].count())

# Display results
school_students_passing_math
```

```
[16]: school_name
Bailey High School      3318
Cabrera High School     1749
Figueroa High School    1946
Ford High School        1871
Griffin High School     1371
Hernandez High School   3094
Holden High School       395
Huang High School       1916
Johnson High School     3145
Pena High School         910
Rodriguez High School    2654
Shelton High School     1653
Thomas High School       1525
Wilson High School       2143
Wright High School       1680
Name: math_score, dtype: int64
```

```
[17]: # Calculate the number of students per school with reading scores of 70 or
      ↪higher from school_data_complete
students_passing_reading = student_data[student_data['reading_score'] >=
      ↪70]['student_name'].count()
```

```

school_students_passing_reading =
    ↪(school_data_complete[school_data_complete['reading_score'] >= 70].
    ↪groupby('school_name')['reading_score'].count())

# Display results
school_students_passing_reading

```

```

[17]: school_name
      Bailey High School      4077
      Cabrera High School    1803
      Figueroa High School   2381
      Ford High School       2172
      Griffin High School    1426
      Hernandez High School   3748
      Holden High School      411
      Huang High School       2372
      Johnson High School     3867
      Pena High School        923
      Rodriguez High School   3208
      Shelton High School     1688
      Thomas High School      1591
      Wilson High School      2204
      Wright High School      1739
      Name: reading_score, dtype: int64

```

```

[18]: # Use the provided code to calculate the number of students per school that
    ↪passed both math and reading with scores of 70 or higher
students_passing_math_and_reading = school_data_complete[
    (school_data_complete['reading_score'] >= 70) &
    ↪(school_data_complete['math_score'] >= 70)]

school_students_passing_math_and_reading = students_passing_math_and_reading.
    ↪groupby(['school_name']).size()

# Display results
students_passing_math_and_reading.groupby('school_name')['Student ID'].count()

```

```

[18]: school_name
      Bailey High School      2719
      Cabrera High School    1697
      Figueroa High School   1569
      Ford High School       1487
      Griffin High School    1330
      Hernandez High School   2481
      Holden High School      381
      Huang High School       1561
      Johnson High School     2549

```


| | |
|-----------------------|------|
| Pena High School | 871 |
| Rodriguez High School | 2119 |
| Shelton High School | 1583 |
| Thomas High School | 1487 |
| Wilson High School | 2068 |
| Wright High School | 1626 |

Name: Student ID, dtype: int64

```
[19]: # Use the provided code to calculate the passing rates
per_school_passing_math = school_students_passing_math / per_school_counts * 100
per_school_passing_reading = school_students_passing_reading /
    ↪per_school_counts * 100
overall_passing_rate = school_students_passing_math_and_reading /
    ↪per_school_counts * 100

# Display results
overall_passing_rate
```

```
[19]: school_name
Bailey High School      54.642283
Cabrera High School     91.334769
Figueroa High School    53.204476
Ford High School        54.289887
Griffin High School     90.599455
Hernandez High School   53.527508
Holden High School      89.227166
Huang High School       53.513884
Johnson High School    53.539172
Pena High School        90.540541
Rodriguez High School   52.988247
Shelton High School     89.892107
Thomas High School      90.948012
Wilson High School      90.582567
Wright High School      90.333333
dtype: float64
```

```
[20]: # Create a DataFrame called `per_school_summary` with columns for the
    ↪calculations above.
per_school_summary = pd.DataFrame({
    "School Type": school_type,
    "Total Students": per_school_counts,
    "Total School Budget": per_school_budget,
    "Per Student Budget": per_school_capita,
    "Average Math Score": per_school_math,
    "Average Reading Score": per_school_reading,
    "% Passing Math": per_school_passing_math,
    "% Passing Reading": per_school_passing_reading,
```

```

"% Overall Passing": overall_passing_rate})

# Formatting
per_school_summary["Total School Budget"] = per_school_summary["Total School_Budget"].map("${:,.2f}".format)
per_school_summary["Per Student Budget"] = per_school_summary["Per Student_Budget"].map("${:,.2f}".format)

# Display the DataFrame
per_school_summary

```

```

[20]:

```

| school_name | School Type | Total Students | Total School Budget \ |
|-----------------------|-------------|----------------|-----------------------|
| Bailey High School | District | 4976 | \$3,124,928.00 |
| Cabrera High School | Charter | 1858 | \$1,081,356.00 |
| Figueroa High School | District | 2949 | \$1,884,411.00 |
| Ford High School | District | 2739 | \$1,763,916.00 |
| Griffin High School | Charter | 1468 | \$917,500.00 |
| Hernandez High School | District | 4635 | \$3,022,020.00 |
| Holden High School | Charter | 427 | \$248,087.00 |
| Huang High School | District | 2917 | \$1,910,635.00 |
| Johnson High School | District | 4761 | \$3,094,650.00 |
| Pena High School | Charter | 962 | \$585,858.00 |
| Rodriguez High School | District | 3999 | \$2,547,363.00 |
| Shelton High School | Charter | 1761 | \$1,056,600.00 |
| Thomas High School | Charter | 1635 | \$1,043,130.00 |
| Wilson High School | Charter | 2283 | \$1,319,574.00 |
| Wright High School | Charter | 1800 | \$1,049,400.00 |

| school_name | Per Student Budget | Average Math Score \ |
|-----------------------|--------------------|----------------------|
| Bailey High School | \$628.00 | 77.048432 |
| Cabrera High School | \$582.00 | 83.061895 |
| Figueroa High School | \$639.00 | 76.711767 |
| Ford High School | \$644.00 | 77.102592 |
| Griffin High School | \$625.00 | 83.351499 |
| Hernandez High School | \$652.00 | 77.289752 |
| Holden High School | \$581.00 | 83.803279 |
| Huang High School | \$655.00 | 76.629414 |
| Johnson High School | \$650.00 | 77.072464 |
| Pena High School | \$609.00 | 83.839917 |
| Rodriguez High School | \$637.00 | 76.842711 |
| Shelton High School | \$600.00 | 83.359455 |
| Thomas High School | \$638.00 | 83.418349 |
| Wilson High School | \$578.00 | 83.274201 |
| Wright High School | \$583.00 | 83.682222 |

| | Average Reading Score | % Passing Math \ |
|-----------------------|-----------------------|------------------|
| school_name | | |
| Bailey High School | 81.033963 | 66.680064 |
| Cabrera High School | 83.975780 | 94.133477 |
| Figueroa High School | 81.158020 | 65.988471 |
| Ford High School | 80.746258 | 68.309602 |
| Griffin High School | 83.816757 | 93.392371 |
| Hernandez High School | 80.934412 | 66.752967 |
| Holden High School | 83.814988 | 92.505855 |
| Huang High School | 81.182722 | 65.683922 |
| Johnson High School | 80.966394 | 66.057551 |
| Pena High School | 84.044699 | 94.594595 |
| Rodriguez High School | 80.744686 | 66.366592 |
| Shelton High School | 83.725724 | 93.867121 |
| Thomas High School | 83.848930 | 93.272171 |
| Wilson High School | 83.989488 | 93.867718 |
| Wright High School | 83.955000 | 93.333333 |

| | % Passing Reading | % Overall Passing |
|-----------------------|-------------------|-------------------|
| school_name | | |
| Bailey High School | 81.933280 | 54.642283 |
| Cabrera High School | 97.039828 | 91.334769 |
| Figueroa High School | 80.739234 | 53.204476 |
| Ford High School | 79.299014 | 54.289887 |
| Griffin High School | 97.138965 | 90.599455 |
| Hernandez High School | 80.862999 | 53.527508 |
| Holden High School | 96.252927 | 89.227166 |
| Huang High School | 81.316421 | 53.513884 |
| Johnson High School | 81.222432 | 53.539172 |
| Pena High School | 95.945946 | 90.540541 |
| Rodriguez High School | 80.220055 | 52.988247 |
| Shelton High School | 95.854628 | 89.892107 |
| Thomas High School | 97.308869 | 90.948012 |
| Wilson High School | 96.539641 | 90.582567 |
| Wright High School | 96.611111 | 90.333333 |

1.3 Highest-Performing Schools (by % Overall Passing)

```
[21]: # Sort the schools by `% Overall Passing` in descending order and display the
      ↪ top 5 rows.
top_schools = per_school_summary.sort_values(['% Overall Passing'],ascending =
      ↪ False)

# Display results first 5
top_schools.head(5)
```

```
[21]:
```

| | School Type | Total Students | Total School Budget | \ |
|---------------------|-------------|----------------|---------------------|---|
| school_name | | | | |
| Cabrera High School | Charter | 1858 | \$1,081,356.00 | |
| Thomas High School | Charter | 1635 | \$1,043,130.00 | |
| Griffin High School | Charter | 1468 | \$917,500.00 | |
| Wilson High School | Charter | 2283 | \$1,319,574.00 | |
| Pena High School | Charter | 962 | \$585,858.00 | |

| | Per Student Budget | Average Math Score | \ |
|---------------------|--------------------|--------------------|---|
| school_name | | | |
| Cabrera High School | \$582.00 | 83.061895 | |
| Thomas High School | \$638.00 | 83.418349 | |
| Griffin High School | \$625.00 | 83.351499 | |
| Wilson High School | \$578.00 | 83.274201 | |
| Pena High School | \$609.00 | 83.839917 | |

| | Average Reading Score | % Passing Math | % Passing Reading | \ |
|---------------------|-----------------------|----------------|-------------------|---|
| school_name | | | | |
| Cabrera High School | 83.975780 | 94.133477 | 97.039828 | |
| Thomas High School | 83.848930 | 93.272171 | 97.308869 | |
| Griffin High School | 83.816757 | 93.392371 | 97.138965 | |
| Wilson High School | 83.989488 | 93.867718 | 96.539641 | |
| Pena High School | 84.044699 | 94.594595 | 95.945946 | |

| | % Overall Passing |
|---------------------|-------------------|
| school_name | |
| Cabrera High School | 91.334769 |
| Thomas High School | 90.948012 |
| Griffin High School | 90.599455 |
| Wilson High School | 90.582567 |
| Pena High School | 90.540541 |

1.4 Bottom Performing Schools (By % Overall Passing)

```
[22]: # Sort the schools by `% Overall Passing` in ascending order and display the
      ↪ top 5 rows.
bottom_schools = per_school_summary.sort_values(['% Overall Passing'],ascending
      ↪ = True)

# Display results first 5
bottom_schools.head(5)
```

```
[22]:
```

| | School Type | Total Students | Total School Budget | \ |
|-----------------------|-------------|----------------|---------------------|---|
| school_name | | | | |
| Rodriguez High School | District | 3999 | \$2,547,363.00 | |
| Figueroa High School | District | 2949 | \$1,884,411.00 | |
| Huang High School | District | 2917 | \$1,910,635.00 | |

| | | | |
|-----------------------|----------|------|----------------|
| Hernandez High School | District | 4635 | \$3,022,020.00 |
| Johnson High School | District | 4761 | \$3,094,650.00 |

| school_name | Per Student Budget | Average Math Score \ |
|-----------------------|--------------------|----------------------|
| Rodriguez High School | \$637.00 | 76.842711 |
| Figueroa High School | \$639.00 | 76.711767 |
| Huang High School | \$655.00 | 76.629414 |
| Hernandez High School | \$652.00 | 77.289752 |
| Johnson High School | \$650.00 | 77.072464 |

| school_name | Average Reading Score | % Passing Math \ |
|-----------------------|-----------------------|------------------|
| Rodriguez High School | 80.744686 | 66.366592 |
| Figueroa High School | 81.158020 | 65.988471 |
| Huang High School | 81.182722 | 65.683922 |
| Hernandez High School | 80.934412 | 66.752967 |
| Johnson High School | 80.966394 | 66.057551 |

| school_name | % Passing Reading | % Overall Passing |
|-----------------------|-------------------|-------------------|
| Rodriguez High School | 80.220055 | 52.988247 |
| Figueroa High School | 80.739234 | 53.204476 |
| Huang High School | 81.316421 | 53.513884 |
| Hernandez High School | 80.862999 | 53.527508 |
| Johnson High School | 81.222432 | 53.539172 |

1.5 Math Scores by Grade

```
[23]: # Use the code provided to separate the data by grade
ninth_graders = school_data_complete[(school_data_complete["grade"] == "9th")]
tenth_graders = school_data_complete[(school_data_complete["grade"] == "10th")]
eleventh_graders = school_data_complete[(school_data_complete["grade"] == "11th")]
twelfth_graders = school_data_complete[(school_data_complete["grade"] == "12th")]

# Group by `school_name` and take the mean of the `math_score` column for each.
ninth_grade_math_scores = ninth_graders.groupby(["school_name"])["math_score"].mean()
tenth_grade_math_scores = tenth_graders.groupby(["school_name"])["math_score"].mean()
eleventh_grade_math_scores = eleventh_graders.groupby(["school_name"])["math_score"].mean()
twelfth_grade_math_scores = twelfth_graders.groupby(["school_name"])["math_score"].mean()
```

```

# Combine each of the scores above into single DataFrame called
↳ `math_scores_by_grade`
math_scores_by_grade = pd.DataFrame({
    "9th": ninth_grade_math_scores,
    "10th": tenth_grade_math_scores,
    "11th": eleventh_grade_math_scores,
    "12th": twelfth_grade_math_scores})

# Minor data wrangling
math_scores_by_grade.index.name = None

# Display the DataFrame
math_scores_by_grade

```

```

[23]:

```

| | 9th | 10th | 11th | 12th |
|-----------------------|-----------|-----------|-----------|-----------|
| Bailey High School | 77.083676 | 76.996772 | 77.515588 | 76.492218 |
| Cabrera High School | 83.094697 | 83.154506 | 82.765560 | 83.277487 |
| Figueroa High School | 76.403037 | 76.539974 | 76.884344 | 77.151369 |
| Ford High School | 77.361345 | 77.672316 | 76.918058 | 76.179963 |
| Griffin High School | 82.044010 | 84.229064 | 83.842105 | 83.356164 |
| Hernandez High School | 77.438495 | 77.337408 | 77.136029 | 77.186567 |
| Holden High School | 83.787402 | 83.429825 | 85.000000 | 82.855422 |
| Huang High School | 77.027251 | 75.908735 | 76.446602 | 77.225641 |
| Johnson High School | 77.187857 | 76.691117 | 77.491653 | 76.863248 |
| Pena High School | 83.625455 | 83.372000 | 84.328125 | 84.121547 |
| Rodriguez High School | 76.859966 | 76.612500 | 76.395626 | 77.690748 |
| Shelton High School | 83.420755 | 82.917411 | 83.383495 | 83.778976 |
| Thomas High School | 83.590022 | 83.087886 | 83.498795 | 83.497041 |
| Wilson High School | 83.085578 | 83.724422 | 83.195326 | 83.035794 |
| Wright High School | 83.264706 | 84.010288 | 83.836782 | 83.644986 |

1.6 Reading Score by Grade

```

[24]: # Use the code provided to separate the data by grade
ninth_graders = school_data_complete[(school_data_complete["grade"] == "9th")]
tenth_graders = school_data_complete[(school_data_complete["grade"] == "10th")]
eleventh_graders = school_data_complete[(school_data_complete["grade"] ==
↳ "11th")]
twelfth_graders = school_data_complete[(school_data_complete["grade"] ==
↳ "12th")]

# Group by `school_name` and take the mean of the the `reading_score` column
↳ for each.
ninth_grade_reading_scores = ninth_graders.
↳ groupby(["school_name"])["reading_score"].mean()

```

```

tenth_grade_reading_scores = tenth_graders.
    ↳groupby(["school_name"])["reading_score"].mean()
eleventh_grade_reading_scores = eleventh_graders.
    ↳groupby(["school_name"])["reading_score"].mean()
twelfth_grade_reading_scores = twelfth_graders.
    ↳groupby(["school_name"])["reading_score"].mean()

# Combine each of the scores above into single DataFrame called
↳`reading_scores_by_grade`
reading_scores_by_grade = pd.DataFrame({
    "9th": ninth_grade_reading_scores,
    "10th": tenth_grade_reading_scores,
    "11th": eleventh_grade_reading_scores,
    "12th": twelfth_grade_reading_scores})

# Minor data wrangling
reading_scores_by_grade = reading_scores_by_grade[["9th", "10th", "11th",
    ↳"12th"]]
reading_scores_by_grade.index.name = None

# Display the DataFrame
reading_scores_by_grade

```

```
[24]:
```

| | 9th | 10th | 11th | 12th |
|-----------------------|-----------|-----------|-----------|-----------|
| Bailey High School | 81.303155 | 80.907183 | 80.945643 | 80.912451 |
| Cabrera High School | 83.676136 | 84.253219 | 83.788382 | 84.287958 |
| Figueroa High School | 81.198598 | 81.408912 | 80.640339 | 81.384863 |
| Ford High School | 80.632653 | 81.262712 | 80.403642 | 80.662338 |
| Griffin High School | 83.369193 | 83.706897 | 84.288089 | 84.013699 |
| Hernandez High School | 80.866860 | 80.660147 | 81.396140 | 80.857143 |
| Holden High School | 83.677165 | 83.324561 | 83.815534 | 84.698795 |
| Huang High School | 81.290284 | 81.512386 | 81.417476 | 80.305983 |
| Johnson High School | 81.260714 | 80.773431 | 80.616027 | 81.227564 |
| Pena High School | 83.807273 | 83.612000 | 84.335938 | 84.591160 |
| Rodriguez High School | 80.993127 | 80.629808 | 80.864811 | 80.376426 |
| Shelton High School | 84.122642 | 83.441964 | 84.373786 | 82.781671 |
| Thomas High School | 83.728850 | 84.254157 | 83.585542 | 83.831361 |
| Wilson High School | 83.939778 | 84.021452 | 83.764608 | 84.317673 |
| Wright High School | 83.833333 | 83.812757 | 84.156322 | 84.073171 |

1.7 Scores by School Spending

```
[25]: # Establish the bins
spending_bins = [0, 585, 630, 645, 680]
labels = ["<$585", "$585-630", "$630-645", "$645-680"]

```

```
[26]: # Create a copy of the school summary since it has the "Per Student Budget"
school_spending_df = per_school_summary.copy()
```

```
[27]: # Use `pd.cut` to categorize spending based on the bins.
school_spending_df["Spending Ranges (Per Student)"] = pd.cut(per_school_capita,
    ↪ spending_bins, labels=labels)

# Display results
school_spending_df
```

```
[27]:
```

| | School Type | Total Students | Total School Budget \ |
|-----------------------|-------------|----------------|-----------------------|
| school_name | | | |
| Bailey High School | District | 4976 | \$3,124,928.00 |
| Cabrera High School | Charter | 1858 | \$1,081,356.00 |
| Figueroa High School | District | 2949 | \$1,884,411.00 |
| Ford High School | District | 2739 | \$1,763,916.00 |
| Griffin High School | Charter | 1468 | \$917,500.00 |
| Hernandez High School | District | 4635 | \$3,022,020.00 |
| Holden High School | Charter | 427 | \$248,087.00 |
| Huang High School | District | 2917 | \$1,910,635.00 |
| Johnson High School | District | 4761 | \$3,094,650.00 |
| Pena High School | Charter | 962 | \$585,858.00 |
| Rodriguez High School | District | 3999 | \$2,547,363.00 |
| Shelton High School | Charter | 1761 | \$1,056,600.00 |
| Thomas High School | Charter | 1635 | \$1,043,130.00 |
| Wilson High School | Charter | 2283 | \$1,319,574.00 |
| Wright High School | Charter | 1800 | \$1,049,400.00 |

| | Per Student Budget | Average Math Score \ |
|-----------------------|--------------------|----------------------|
| school_name | | |
| Bailey High School | \$628.00 | 77.048432 |
| Cabrera High School | \$582.00 | 83.061895 |
| Figueroa High School | \$639.00 | 76.711767 |
| Ford High School | \$644.00 | 77.102592 |
| Griffin High School | \$625.00 | 83.351499 |
| Hernandez High School | \$652.00 | 77.289752 |
| Holden High School | \$581.00 | 83.803279 |
| Huang High School | \$655.00 | 76.629414 |
| Johnson High School | \$650.00 | 77.072464 |
| Pena High School | \$609.00 | 83.839917 |
| Rodriguez High School | \$637.00 | 76.842711 |
| Shelton High School | \$600.00 | 83.359455 |
| Thomas High School | \$638.00 | 83.418349 |
| Wilson High School | \$578.00 | 83.274201 |
| Wright High School | \$583.00 | 83.682222 |

| | Average Reading Score | % Passing Math \ |
|--|-----------------------|------------------|
|--|-----------------------|------------------|

| school_name | | |
|-----------------------|-----------|-----------|
| Bailey High School | 81.033963 | 66.680064 |
| Cabrera High School | 83.975780 | 94.133477 |
| Figueroa High School | 81.158020 | 65.988471 |
| Ford High School | 80.746258 | 68.309602 |
| Griffin High School | 83.816757 | 93.392371 |
| Hernandez High School | 80.934412 | 66.752967 |
| Holden High School | 83.814988 | 92.505855 |
| Huang High School | 81.182722 | 65.683922 |
| Johnson High School | 80.966394 | 66.057551 |
| Pena High School | 84.044699 | 94.594595 |
| Rodriguez High School | 80.744686 | 66.366592 |
| Shelton High School | 83.725724 | 93.867121 |
| Thomas High School | 83.848930 | 93.272171 |
| Wilson High School | 83.989488 | 93.867718 |
| Wright High School | 83.955000 | 93.333333 |

| | % Passing Reading | % Overall Passing \ |
|-----------------------|-------------------|---------------------|
| school_name | | |
| Bailey High School | 81.933280 | 54.642283 |
| Cabrera High School | 97.039828 | 91.334769 |
| Figueroa High School | 80.739234 | 53.204476 |
| Ford High School | 79.299014 | 54.289887 |
| Griffin High School | 97.138965 | 90.599455 |
| Hernandez High School | 80.862999 | 53.527508 |
| Holden High School | 96.252927 | 89.227166 |
| Huang High School | 81.316421 | 53.513884 |
| Johnson High School | 81.222432 | 53.539172 |
| Pena High School | 95.945946 | 90.540541 |
| Rodriguez High School | 80.220055 | 52.988247 |
| Shelton High School | 95.854628 | 89.892107 |
| Thomas High School | 97.308869 | 90.948012 |
| Wilson High School | 96.539641 | 90.582567 |
| Wright High School | 96.611111 | 90.333333 |

| | Spending Ranges (Per Student) |
|-----------------------|-------------------------------|
| school_name | |
| Bailey High School | \$585-630 |
| Cabrera High School | <\$585 |
| Figueroa High School | \$630-645 |
| Ford High School | \$630-645 |
| Griffin High School | \$585-630 |
| Hernandez High School | \$645-680 |
| Holden High School | <\$585 |
| Huang High School | \$645-680 |
| Johnson High School | \$645-680 |
| Pena High School | \$585-630 |

| | |
|-----------------------|-----------|
| Rodriguez High School | \$630-645 |
| Shelton High School | \$585-630 |
| Thomas High School | \$630-645 |
| Wilson High School | <\$585 |
| Wright High School | <\$585 |

```
[28]: # Calculate averages for the desired columns.
spending_math_scores = school_spending_df.groupby(["Spending Ranges (Per_
↵Student)"])[["Average Math Score"]].mean()
spending_reading_scores = school_spending_df.groupby(["Spending Ranges (Per_
↵Student)"])[["Average Reading Score"]].mean()
spending_passing_math = school_spending_df.groupby(["Spending Ranges (Per_
↵Student)"])[["% Passing Math"]].mean()
spending_passing_reading = school_spending_df.groupby(["Spending Ranges (Per_
↵Student)"])[["% Passing Reading"]].mean()
overall_passing_spending = school_spending_df.groupby(["Spending Ranges (Per_
↵Student)"])[["% Overall Passing"]].mean()

# Warning displayed below but has no impact on code

/var/folders/lq/64x0w18179xfqkg3d6f4b5n00000gn/T/ipykernel_2633/429347546.py:2:
FutureWarning: The default of observed=False is deprecated and will be changed
to True in a future version of pandas. Pass observed=False to retain current
behavior or observed=True to adopt the future default and silence this warning.
    spending_math_scores = school_spending_df.groupby(["Spending Ranges (Per
Student)"])[["Average Math Score"]].mean()
/var/folders/lq/64x0w18179xfqkg3d6f4b5n00000gn/T/ipykernel_2633/429347546.py:3:
FutureWarning: The default of observed=False is deprecated and will be changed
to True in a future version of pandas. Pass observed=False to retain current
behavior or observed=True to adopt the future default and silence this warning.
    spending_reading_scores = school_spending_df.groupby(["Spending Ranges (Per
Student)"])[["Average Reading Score"]].mean()
/var/folders/lq/64x0w18179xfqkg3d6f4b5n00000gn/T/ipykernel_2633/429347546.py:4:
FutureWarning: The default of observed=False is deprecated and will be changed
to True in a future version of pandas. Pass observed=False to retain current
behavior or observed=True to adopt the future default and silence this warning.
    spending_passing_math = school_spending_df.groupby(["Spending Ranges (Per
Student)"])[["% Passing Math"]].mean()
/var/folders/lq/64x0w18179xfqkg3d6f4b5n00000gn/T/ipykernel_2633/429347546.py:5:
FutureWarning: The default of observed=False is deprecated and will be changed
to True in a future version of pandas. Pass observed=False to retain current
behavior or observed=True to adopt the future default and silence this warning.
    spending_passing_reading = school_spending_df.groupby(["Spending Ranges (Per
Student)"])[["% Passing Reading"]].mean()
/var/folders/lq/64x0w18179xfqkg3d6f4b5n00000gn/T/ipykernel_2633/429347546.py:6:
FutureWarning: The default of observed=False is deprecated and will be changed
to True in a future version of pandas. Pass observed=False to retain current
```

behavior or observed=True to adopt the future default and silence this warning.

```
overall_passing_spending = school_spending_df.groupby(["Spending Ranges (Per Student)"])[ "% Overall Passing"].mean()
```

```
[29]: # Assemble into DataFrame
spending_summary = pd.DataFrame({
    "Average Math Score": spending_math_scores,
    "Average Reading Score": spending_reading_scores,
    "% Passing Math": spending_passing_math,
    "% Passing Reading": spending_passing_reading,
    "% Overall Passing": overall_passing_spending
})

# Display results
spending_summary
```

```
[29]:
```

| Spending Ranges (Per Student) | Average Math Score | Average Reading Score \ |
|-------------------------------|--------------------|-------------------------|
| <\$585 | 83.455399 | 83.933814 |
| \$585-630 | 81.899826 | 83.155286 |
| \$630-645 | 78.518855 | 81.624473 |
| \$645-680 | 76.997210 | 81.027843 |

| Spending Ranges (Per Student) | % Passing Math | % Passing Reading \ |
|-------------------------------|----------------|---------------------|
| <\$585 | 93.460096 | 96.610877 |
| \$585-630 | 87.133538 | 92.718205 |
| \$630-645 | 73.484209 | 84.391793 |
| \$645-680 | 66.164813 | 81.133951 |

| Spending Ranges (Per Student) | % Overall Passing |
|-------------------------------|-------------------|
| <\$585 | 90.369459 |
| \$585-630 | 81.418596 |
| \$630-645 | 62.857656 |
| \$645-680 | 53.526855 |

1.8 Scores by School Size

```
[30]: # Establish the bins.
size_bins = [0, 1000, 2000, 5000]
labels = ["Small (<1000)", "Medium (1000-2000)", "Large (2000-5000)"]

# Display results
per_school_summary
```

[30]:

| | School Type | Total Students | Total School Budget \ |
|-----------------------|-------------|----------------|-----------------------|
| school_name | | | |
| Bailey High School | District | 4976 | \$3,124,928.00 |
| Cabrera High School | Charter | 1858 | \$1,081,356.00 |
| Figueroa High School | District | 2949 | \$1,884,411.00 |
| Ford High School | District | 2739 | \$1,763,916.00 |
| Griffin High School | Charter | 1468 | \$917,500.00 |
| Hernandez High School | District | 4635 | \$3,022,020.00 |
| Holden High School | Charter | 427 | \$248,087.00 |
| Huang High School | District | 2917 | \$1,910,635.00 |
| Johnson High School | District | 4761 | \$3,094,650.00 |
| Pena High School | Charter | 962 | \$585,858.00 |
| Rodriguez High School | District | 3999 | \$2,547,363.00 |
| Shelton High School | Charter | 1761 | \$1,056,600.00 |
| Thomas High School | Charter | 1635 | \$1,043,130.00 |
| Wilson High School | Charter | 2283 | \$1,319,574.00 |
| Wright High School | Charter | 1800 | \$1,049,400.00 |

| | Per Student Budget | Average Math Score \ |
|-----------------------|--------------------|----------------------|
| school_name | | |
| Bailey High School | \$628.00 | 77.048432 |
| Cabrera High School | \$582.00 | 83.061895 |
| Figueroa High School | \$639.00 | 76.711767 |
| Ford High School | \$644.00 | 77.102592 |
| Griffin High School | \$625.00 | 83.351499 |
| Hernandez High School | \$652.00 | 77.289752 |
| Holden High School | \$581.00 | 83.803279 |
| Huang High School | \$655.00 | 76.629414 |
| Johnson High School | \$650.00 | 77.072464 |
| Pena High School | \$609.00 | 83.839917 |
| Rodriguez High School | \$637.00 | 76.842711 |
| Shelton High School | \$600.00 | 83.359455 |
| Thomas High School | \$638.00 | 83.418349 |
| Wilson High School | \$578.00 | 83.274201 |
| Wright High School | \$583.00 | 83.682222 |

| | Average Reading Score | % Passing Math \ |
|-----------------------|-----------------------|------------------|
| school_name | | |
| Bailey High School | 81.033963 | 66.680064 |
| Cabrera High School | 83.975780 | 94.133477 |
| Figueroa High School | 81.158020 | 65.988471 |
| Ford High School | 80.746258 | 68.309602 |
| Griffin High School | 83.816757 | 93.392371 |
| Hernandez High School | 80.934412 | 66.752967 |
| Holden High School | 83.814988 | 92.505855 |
| Huang High School | 81.182722 | 65.683922 |
| Johnson High School | 80.966394 | 66.057551 |

| | | |
|-----------------------|-----------|-----------|
| Pena High School | 84.044699 | 94.594595 |
| Rodriguez High School | 80.744686 | 66.366592 |
| Shelton High School | 83.725724 | 93.867121 |
| Thomas High School | 83.848930 | 93.272171 |
| Wilson High School | 83.989488 | 93.867718 |
| Wright High School | 83.955000 | 93.333333 |

| | % Passing Reading | % Overall Passing |
|-----------------------|-------------------|-------------------|
| school_name | | |
| Bailey High School | 81.933280 | 54.642283 |
| Cabrera High School | 97.039828 | 91.334769 |
| Figueroa High School | 80.739234 | 53.204476 |
| Ford High School | 79.299014 | 54.289887 |
| Griffin High School | 97.138965 | 90.599455 |
| Hernandez High School | 80.862999 | 53.527508 |
| Holden High School | 96.252927 | 89.227166 |
| Huang High School | 81.316421 | 53.513884 |
| Johnson High School | 81.222432 | 53.539172 |
| Pena High School | 95.945946 | 90.540541 |
| Rodriguez High School | 80.220055 | 52.988247 |
| Shelton High School | 95.854628 | 89.892107 |
| Thomas High School | 97.308869 | 90.948012 |
| Wilson High School | 96.539641 | 90.582567 |
| Wright High School | 96.611111 | 90.333333 |

```
[31]: # Categorize the spending based on the bins
# Use `pd.cut` on the "Total Students" column of the `per_school_summary`
      ↪ DataFrame.

per_school_summary["School Size"] = pd.cut(per_school_summary['Total_
      ↪ Students'], size_bins, labels=labels)
# Display results
per_school_summary
```

```
[31]: School Type  Total Students  Total School Budget \
school_name
Bailey High School    District         4976      $3,124,928.00
Cabrera High School    Charter         1858      $1,081,356.00
Figueroa High School   District         2949      $1,884,411.00
Ford High School       District         2739      $1,763,916.00
Griffin High School     Charter         1468        $917,500.00
Hernandez High School   District         4635      $3,022,020.00
Holden High School      Charter          427      $248,087.00
Huang High School       District         2917      $1,910,635.00
Johnson High School     District         4761      $3,094,650.00
Pena High School        Charter          962      $585,858.00
Rodriguez High School    District        3999      $2,547,363.00
```

| | | | |
|---------------------|---------|------|----------------|
| Shelton High School | Charter | 1761 | \$1,056,600.00 |
| Thomas High School | Charter | 1635 | \$1,043,130.00 |
| Wilson High School | Charter | 2283 | \$1,319,574.00 |
| Wright High School | Charter | 1800 | \$1,049,400.00 |

| | Per Student Budget | Average Math Score \ |
|-----------------------|--------------------|----------------------|
| school_name | | |
| Bailey High School | \$628.00 | 77.048432 |
| Cabrera High School | \$582.00 | 83.061895 |
| Figueroa High School | \$639.00 | 76.711767 |
| Ford High School | \$644.00 | 77.102592 |
| Griffin High School | \$625.00 | 83.351499 |
| Hernandez High School | \$652.00 | 77.289752 |
| Holden High School | \$581.00 | 83.803279 |
| Huang High School | \$655.00 | 76.629414 |
| Johnson High School | \$650.00 | 77.072464 |
| Pena High School | \$609.00 | 83.839917 |
| Rodriguez High School | \$637.00 | 76.842711 |
| Shelton High School | \$600.00 | 83.359455 |
| Thomas High School | \$638.00 | 83.418349 |
| Wilson High School | \$578.00 | 83.274201 |
| Wright High School | \$583.00 | 83.682222 |

| | Average Reading Score | % Passing Math \ |
|-----------------------|-----------------------|------------------|
| school_name | | |
| Bailey High School | 81.033963 | 66.680064 |
| Cabrera High School | 83.975780 | 94.133477 |
| Figueroa High School | 81.158020 | 65.988471 |
| Ford High School | 80.746258 | 68.309602 |
| Griffin High School | 83.816757 | 93.392371 |
| Hernandez High School | 80.934412 | 66.752967 |
| Holden High School | 83.814988 | 92.505855 |
| Huang High School | 81.182722 | 65.683922 |
| Johnson High School | 80.966394 | 66.057551 |
| Pena High School | 84.044699 | 94.594595 |
| Rodriguez High School | 80.744686 | 66.366592 |
| Shelton High School | 83.725724 | 93.867121 |
| Thomas High School | 83.848930 | 93.272171 |
| Wilson High School | 83.989488 | 93.867718 |
| Wright High School | 83.955000 | 93.333333 |

| | % Passing Reading | % Overall Passing \ |
|----------------------|-------------------|---------------------|
| school_name | | |
| Bailey High School | 81.933280 | 54.642283 |
| Cabrera High School | 97.039828 | 91.334769 |
| Figueroa High School | 80.739234 | 53.204476 |
| Ford High School | 79.299014 | 54.289887 |

| | | |
|-----------------------|-----------|-----------|
| Griffin High School | 97.138965 | 90.599455 |
| Hernandez High School | 80.862999 | 53.527508 |
| Holden High School | 96.252927 | 89.227166 |
| Huang High School | 81.316421 | 53.513884 |
| Johnson High School | 81.222432 | 53.539172 |
| Pena High School | 95.945946 | 90.540541 |
| Rodriguez High School | 80.220055 | 52.988247 |
| Shelton High School | 95.854628 | 89.892107 |
| Thomas High School | 97.308869 | 90.948012 |
| Wilson High School | 96.539641 | 90.582567 |
| Wright High School | 96.611111 | 90.333333 |

School Size

| school_name | |
|-----------------------|--------------------|
| Bailey High School | Large (2000-5000) |
| Cabrera High School | Medium (1000-2000) |
| Figueroa High School | Large (2000-5000) |
| Ford High School | Large (2000-5000) |
| Griffin High School | Medium (1000-2000) |
| Hernandez High School | Large (2000-5000) |
| Holden High School | Small (<1000) |
| Huang High School | Large (2000-5000) |
| Johnson High School | Large (2000-5000) |
| Pena High School | Small (<1000) |
| Rodriguez High School | Large (2000-5000) |
| Shelton High School | Medium (1000-2000) |
| Thomas High School | Medium (1000-2000) |
| Wilson High School | Large (2000-5000) |
| Wright High School | Medium (1000-2000) |

```
[32]: # Calculate averages for the desired columns.
size_math_scores = per_school_summary.groupby(["School Size"])["Average Math_
↪Score"].mean()
size_reading_scores = per_school_summary.groupby(["School Size"])["Average_
↪Reading Score"].mean()
size_passing_math = per_school_summary.groupby(["School Size"])["% Passing_
↪Math"].mean()
size_passing_reading = per_school_summary.groupby(["School Size"])["% Passing_
↪Reading"].mean()
size_overall_passing = per_school_summary.groupby(["School Size"])["% Overall_
↪Passing"].mean()

# Warning displayed below but has no impact on code
```

```
/var/folders/lq/64x0w18179xfqkg3d6f4b5n00000gn/T/ipykernel_2633/1517182687.py:2:
FutureWarning: The default of observed=False is deprecated and will be changed
to True in a future version of pandas. Pass observed=False to retain current
```

```

behavior or observed=True to adopt the future default and silence this warning.
    size_math_scores = per_school_summary.groupby(["School Size"])["Average Math
Score"].mean()
/var/folders/lq/64x0w18179xfqkg3d6f4b5n00000gn/T/ipykernel_2633/1517182687.py:3:
FutureWarning: The default of observed=False is deprecated and will be changed
to True in a future version of pandas. Pass observed=False to retain current
behavior or observed=True to adopt the future default and silence this warning.
    size_reading_scores = per_school_summary.groupby(["School Size"])["Average
Reading Score"].mean()
/var/folders/lq/64x0w18179xfqkg3d6f4b5n00000gn/T/ipykernel_2633/1517182687.py:4:
FutureWarning: The default of observed=False is deprecated and will be changed
to True in a future version of pandas. Pass observed=False to retain current
behavior or observed=True to adopt the future default and silence this warning.
    size_passing_math = per_school_summary.groupby(["School Size"])["% Passing
Math"].mean()
/var/folders/lq/64x0w18179xfqkg3d6f4b5n00000gn/T/ipykernel_2633/1517182687.py:5:
FutureWarning: The default of observed=False is deprecated and will be changed
to True in a future version of pandas. Pass observed=False to retain current
behavior or observed=True to adopt the future default and silence this warning.
    size_passing_reading = per_school_summary.groupby(["School Size"])["% Passing
Reading"].mean()
/var/folders/lq/64x0w18179xfqkg3d6f4b5n00000gn/T/ipykernel_2633/1517182687.py:6:
FutureWarning: The default of observed=False is deprecated and will be changed
to True in a future version of pandas. Pass observed=False to retain current
behavior or observed=True to adopt the future default and silence this warning.
    size_overall_passing = per_school_summary.groupby(["School Size"])["% Overall
Passing"].mean()

```

```

[33]: # Create a DataFrame called `size_summary` that breaks down school performance
      ↪ based on school size (small, medium, or large).
      # Use the scores above to create a new DataFrame called `size_summary`
size_summary = pd.DataFrame({
    "Average Math Score": size_math_scores,
    "Average Reading Score": size_reading_scores,
    "% Passing Math": size_passing_math,
    "% Passing Reading": size_passing_reading,
    "% Overall Passing": size_overall_passing
})

# Display results
size_summary

```

```

[33]:

```

| School Size | Average Math Score | Average Reading Score | % Passing Math | % Passing Reading | % Overall Passing |
|--------------------|--------------------|-----------------------|----------------|-------------------|-------------------|
| Small (<1000) | 83.821598 | 83.929843 | 93.550225 | 93.550225 | 93.550225 |
| Medium (1000-2000) | 83.374684 | 83.864438 | 93.599695 | 93.599695 | 93.599695 |
| Large (2000-5000) | 77.746417 | 81.344493 | 69.963361 | 69.963361 | 69.963361 |

| | % Passing Reading | % Overall Passing |
|--------------------|-------------------|-------------------|
| School Size | | |
| Small (<1000) | 96.099437 | 89.883853 |
| Medium (1000-2000) | 96.790680 | 90.621535 |
| Large (2000-5000) | 82.766634 | 58.286003 |

1.9 Scores by School Type

```
[34]: # Group the per_school_summary DataFrame by "School Type" and average the
      ↪ results.
average_math_score_by_type = per_school_summary.groupby(["School_
      ↪Type"])[["Average Math Score"]].mean()
average_reading_score_by_type = per_school_summary.groupby(["School_
      ↪Type"])[["Average Reading Score"]].mean()
average_percent_passing_math_by_type = per_school_summary.groupby(["School_
      ↪Type"])[["% Passing Math"]].mean()
average_percent_passing_reading_by_type = per_school_summary.groupby(["School_
      ↪Type"])[["% Passing Reading"]].mean()
average_percent_overall_passing_by_type = per_school_summary.groupby(["School_
      ↪Type"])[["% Overall Passing"]].mean()
```

```
[35]: # Assemble the new data by type into a DataFrame called `type_summary`
type_summary = pd.DataFrame({
    "Average Math Score": average_math_score_by_type,
    "Average Reading Score": average_reading_score_by_type,
    "% Passing Math": average_percent_passing_math_by_type,
    "% Passing Reading": average_percent_passing_reading_by_type,
    "% Overall Passing": average_percent_overall_passing_by_type
})

# Display results
type_summary
```

```
[35]:
```

| | Average Math Score | Average Reading Score | % Passing Math \ |
|-------------|--------------------|-----------------------|------------------|
| School Type | | | |
| Charter | 83.473852 | 83.896421 | 93.620830 |
| District | 76.956733 | 80.966636 | 66.548453 |

| | % Passing Reading | % Overall Passing |
|-------------|-------------------|-------------------|
| School Type | | |
| Charter | 96.586489 | 90.432244 |
| District | 80.799062 | 53.672208 |