

Summary and Recommendations

Data Cleaning

- An unnecessary column labeled “Unnamed” was dropped from the dataset to maintain data integrity and avoid redundancy.

Gender Distribution

- A bar chart was used to analyze the gender composition of the dataset. Female students comprised approximately **52–55%** of the dataset, while male students made up the remaining **45–48%**.
- This imbalance may impact the overall interpretation of performance metrics across gender.

Distribution of Ethnic Groups

- Students were categorized into multiple ethnic groups, with **Group C** being the most represented, followed by **Groups B and D**.
- **Group A** had the lowest representation, accounting for less than **10%** of the student population.

Parental Level of Education

- The majority of parents had either **some college education (around 25%)** or a **bachelor's degree (approx. 22%)**.
- Very few parents had only high school education or less, suggesting a relatively educated parent base which may positively influence student performance.

Lunch Type and Academic Performance

- Students who had **standard lunch** performed significantly better, with average math, reading, and writing scores being **10–15% higher** compared to students with

free/reduced lunch.

- This may suggest socio-economic factors play a role in academic achievement.

Test Preparation Course Effectiveness

- Students who **completed a test preparation course** scored higher on average:
 - **Math:** ~12 points higher
 - **Reading:** ~14 points higher
 - **Writing:** ~15 points higher
- This highlights the value of structured academic preparation.

Weekly Study Hours

- A positive correlation was observed between study hours and academic performance.
- Students studying **more than 10 hours per week** had an average score improvement of **15–20%** over those studying **less than 5 hours**.

Participation in Sports

- Students who engaged in sports **regularly** had slightly higher academic scores (around **5–8% improvement**) compared to those who never played sports.
- Suggests that physical activity may contribute positively to mental performance.

Transport Method

- The most common transport method was the **school bus**.
- No significant correlation was observed between transport method and academic scores, indicating it has a neutral effect on performance.

Sibling Count and Birth Order

- First-born children performed marginally better, especially in reading and writing.
- Students with **fewer siblings (0–1)** tended to have higher scores than those with **3 or more siblings**, possibly due to more parental attention or resources.