**SF Union School District Track Overview**

1. **Introduction**

**Track Title**: SFUSD Student Program Optimization

**Objective**: Develop an equitable and practical plan for splitting the Webster attendance area into two new attendance areas that optimizes the distribution of Kindergarten General Education seats in San Francisco Unified School District (SFUSD). The plan should prioritize socio-economic diversity, ensure the maximum number of students are accommodated within the new school boundaries, and maintain geographic continuity of the attendance areas to align with existing zoning standards. The solution should effectively utilize student application data, demographic characteristics, and census block group data to inform the division of the attendance areas.

1. **Background Information**

The topic of optimizing school attendance areas and language programs within SFUSD is crucial for promoting educational equity, efficient resource use, and community cohesion. San Francisco's changing demographics and urban development present challenges such as overcrowded schools, underutilized facilities, and socioeconomic divides. Addressing these through data-driven analysis helps balance student distribution and program accessibility. Additionally, rising demand for specialized language programs necessitates strategic placement to align with student preferences while maintaining a balance between general education and language pathways. This work has the potential to guide real-world policy, enhancing educational opportunities and fostering equity across the school district.

There are 22 Kindergarten General Education spaces at Webster (they have 44 Spanish Immersion Kinder spaces, but it's a citywide program so open to kids outside the attendance area), and there are 66 Kindergarten General Education spaces at the new Mission Bay Elementary. You can see a picture of the Webster attendance area on [page 38 of the enrollment guide](https://drive.google.com/file/d/1sYv9ObLhNWKJIMqSXqes6nXwR6Xt3oxC/view) - the new Mission Bay school will be at 1415 Owens St. Students can ignore Bessie Carmichael, as it's a Citywide school.

In terms of splitting the Webster attendance area into two new attendance areas, the best attendance areas will be:

* as socioeconomically diverse as possible - looking at diversity by both race and income
* maximum number of students fit into the new attendance area schools
* contiguous zones like the others on the attendance area map - we don't want census blocks added in to make it more diverse that are not touching the bigger group of census blocks

In terms of the language pathways question, the best answers to how we might best reorganize them will:

* Tell us what schools should expand their language programs, and which schools should close their language programs. When you look at [sfusd.edu/highlights](http://sfusd.edu/highlights), you'll see that some schools like Alvarado have two programs for Kindergarteners (44 seats for General Education and 44 seats for Spanish Immersion). We want to know - should Alvarado have 44 Spanish Immersion seats? Or 66? Or 88? Or 0? And, if Alvarado adds 44 more Spanish Immersion seats, should we close less-requested programs?
* Make space for the maximum number of applicants to language pathways without having more than 35% of Kindergarten seats reserved for language pathways - we need 65% of seats for General Education spaces across all Kindergarten classrooms. When we place applicants in programs they prefer more, they are more likely to attend SFUSD.
* Minimize the number of schools with a specific language pathway for quality control. For example, a single school with 66 Spanish Immersion spaces is a much better solution than 3 schools with 22 Spanish Immersion spaces each. Schools don't do well when they have a language program and a GE program, or multiple language programs - having just one type of program per school is best.
* Keep language programs close to the students who apply to them. For example, moving a Spanish Biliteracy program to the Richmond wouldn't make sense, since there are very few applicants to that program who live there.

1. **Problem Statement**

Your task is to develop a data-driven plan to split the current Webster attendance area into **two new attendance areas**, one for Webster Elementary and one for the new Mission Bay Elementary. The objective is to create attendance areas that achieve the following criteria:

* **Socioeconomic Diversity:** Each new attendance area should be as socioeconomically diverse as possible, balancing both racial and income characteristics to promote equitable access to educational resources.
* **Student Accommodation:** Maximize the number of students assigned to the new attendance area schools, ensuring that the plan efficiently utilizes available school capacity.
* **Contiguous Zones:** Ensure that the newly defined attendance areas are geographically contiguous (every student must be assigned a region), resembling the existing attendance zones and avoiding the inclusion of non-adjacent census blocks solely for diversity purposes.

This problem requires analysis of student application requests, demographics, and census block group data to propose an equitable and practical solution for the distribution of students across the two schools.

1. **Dataset Overview**

Below are the three datasets available for your analysis and recommendations. Each sheet has a data dictionary on the second page briefly explaining the columns.

Please note that all data across the files are for the 2023-24 school year.

* ​​[SHAREABLE 23-24 Application Request Data](https://docs.google.com/spreadsheets/d/1CDYBnrdhAuTPG_RfB61mR2X4YbvzG-07_ayaWcS6iEI/edit?usp=drive_link)
  + All application request data across the SF Union School District for 2023-24.
* [Blockgroups to ESAA Spreadsheet with student counts](https://docs.google.com/spreadsheets/d/1JPT8u2jIWtZdHHHG4IDf_bkSkLByWt9zv-cq0TIDI8M/edit?usp=drive_link)
  + Describes income and racial characteristics of the census block groups.
* [Requests per Seat Data](https://docs.google.com/spreadsheets/d/17pVTwQDxwh7i_tb1OklSkPbhnuqxbZc7DNElgXVL1qw/edit?usp=drive_link)
  + Shows how many seats there are in each school, grade, and program.
* [SFUSD Application Highlights (Website)](https://www.sfusd.edu/schools/enroll/student-assignment-policy/annual-assignment-highlights)
  + Additional data and information can be found at this link. Feel free to use any historical data in your findings.
* Additional information and links can be found in the [folder](https://drive.google.com/drive/folders/1lEzwwSBUkzkQtl9W-MbI0SUGS6mEXHPc?usp=drive_link).

1. **Limitations and Assumptions**

Above datasets may have some missing data.

1. **Evaluation Criteria**

Your submission will be evaluated on the following factors:

* **Creative**
  + There is a strong element of **originality**; the project employs unique methods or unexpected ways of looking at the data that are not easily replicable or commonly found in similar projects.
* **Complexity**
  + Complex and ambitious projects that dive deeper than the original prompts.
  + The project goes beyond standard methods, using **sophisticated models** (e.g., machine learning, statistical modeling, or optimization algorithms) and possibly combining multiple methods to achieve more accurate or comprehensive results.
* **Presentation**
  + Key insights, visualizations, and findings are effectively communicated with special attention to design and audience. Content is logically structured and flows smoothly, making it easy for the audience to follow the project's progression from problem statement through to solution.
* **Functionality**
  + Meets the goals of the prompts while also achieving practicality and efficiency.
* **Impactfulness**
  + The solution shows a clear, real-world impact, and is scalable for the SF Union School District to implement.

1. **Submission Requirements**

Please submit the following to [this submission form](https://docs.google.com/forms/d/e/1FAIpQLSdvHf4WtTKagVqvmnSVKhwmWGY7HDyi7_HdPoSCJPEjUGyMoA/viewform?usp=sf_link).

* Presentation Video
  + Submission Format
    - Must be a **public or unlisted** YouTube video and be shared by link
    - Must be 5 minutes or less in length
    - TIP: If you are working in a team, try recording using Zoom ([tutorial](https://library.gwu.edu/sites/default/files/2023-06/How%20to%20Record%20a%20Video%20Presentation%20using%20Zoom.pdf))!
  + Content
    - Include your findings in a Slides/PowerPoint presentation format and give a brief overview of your code!
    - Be as thorough as you can within 5 minutes!
    - For code overview, either scroll through your notebook/code file or include screenshots on your slides
    - **All** team members must speak in your recording!
* Code Files
  + Jupyter Notebook in .ipynb format recommended
  + Make sure all code files are uploaded to a single Google Drive folder
* Presentation Slides
  + Please share in Google Slides or PowerPoint format
  + Make viewing public

1. **Acknowledgements**

All data has been provided by the SF Union School District (SFUSD).