



Epsilon - School



Harshil Hari, Anthea Sun, Adam Yanco

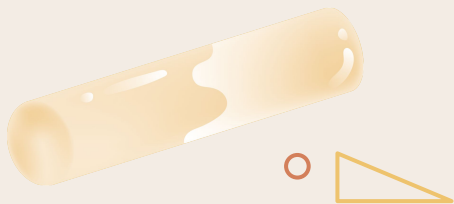
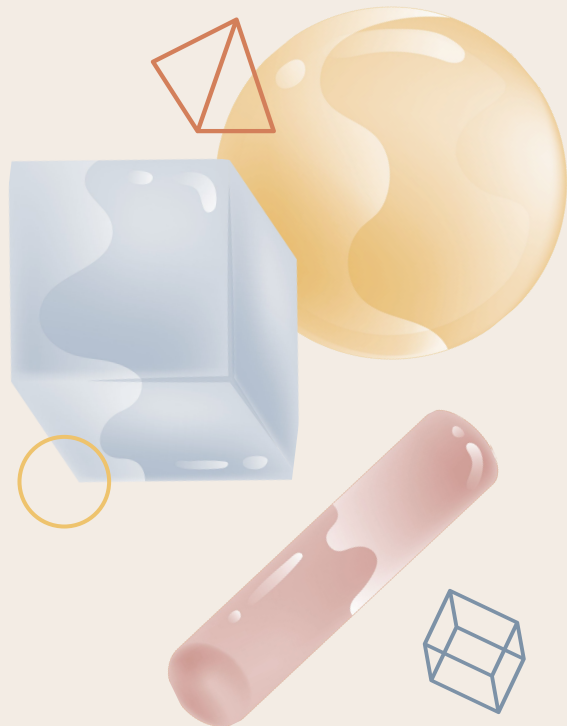




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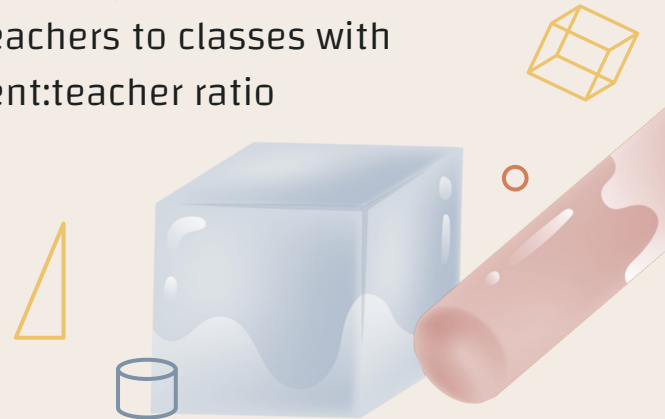
Summary

The Problem

The Epsilon School of Math and Science is being expanded so the total student population can be **increased** from **490 to 630** for the 2025-2026 school year. The incoming sophomore class will have **140 more** students than the graduating senior class. To accommodate this growth, **7 new teachers** are being hired. Which department(s) should receive these new teachers? Why?

Our Work

1. Find number of classes each student takes (6.02)
2. Find drop-out percentage for each grade
3. Use drop-out percentages to find students in each class for each grade post-drop
4. Find and compare student:teacher ratio for pre and post drop + increase
5. Assign new teachers to classes with highest student:teacher ratio



Assumptions

- Ratio of classes 10th wants to take = avg ratio of classes 11th and 12th want to take
- Can dropout whenever during the school year
- Current language teachers only teach one language (1 teacher for each language)

Hypotheses

- Subjects with the largest amounts of students will receive a teacher
- Music, some Languages, and Art will increase because they currently only have 1 teacher

Variables

- How many teachers in each subject
- Student to teacher ratio
- Incoming 10th graders and what classes they will take
- Dropout percentages

2024 Pre-Drop

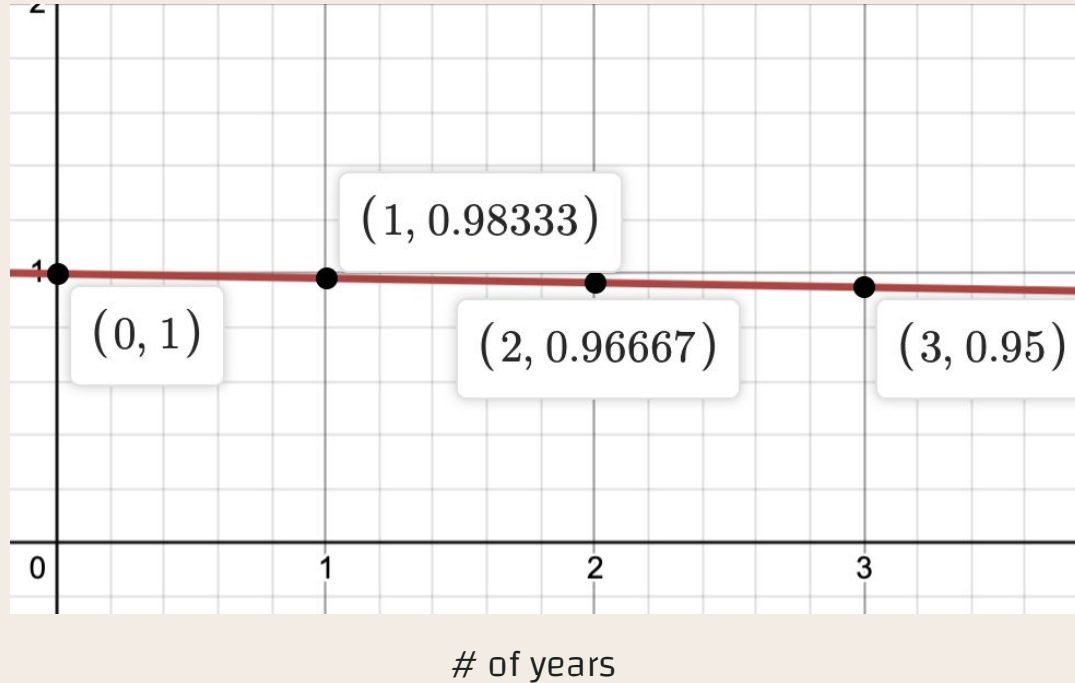
2024 Pre-drop					
Department	10th	11th	12th	Total	
Art		31	33	35	99
Biology		198	95	26	319
Chemistry		59	126	109	294
English		183	155	152	490
French		41	32	49	122
German		19	22	10	51
Spanish		51	26	33	110
Math		184	201	262	647
Music		50	56	49	155
Physics		50	58	183	291
Social Studies		183	131	59	373
Sum		1049	935	967	2951
#students		490		Classes/Student	6.02244898

Estimating dropout rates per year

- The graph estimates the percent of student who will not dropout per year, assuming an overall dropout rate of 5% for a class

Ratio of remaining students to original amount

Equation: $Y = 1 - (x/60)$



2024 Post-Drop

- Using the information from the graph, we can multiply each respective grade by the percent of students who didn't drop out to find the number of students left at the end of the year

2024 Post-drop				
Department	10th	11th	12th	Total
Art	30.48333332	32.43108	34.385967	97.30038032
Biology	194.6999999	93.3622	25.5438612	313.6060611
Chemistry	58.01666665	123.82776	107.0877258	288.9321524
English	179.9499999	152.3278	149.3333424	481.6111423
French	40.31666665	31.44832	48.1403538	119.9053405
German	18.68333333	21.62072	9.824562	50.12861533
Spanish	50.14999998	25.55176	32.4210546	108.1228146
Math	180.9333333	197.53476	257.4035244	635.8716177
Music	49.16666665	55.03456	48.1403538	152.3415805
Physics	49.16666665	57.00008	179.7894846	285.9562313
Social Studies	179.9499999	128.74156	57.9649158	366.6564757
Sum	1031.516666	918.8806	950.0351454	2900.432412
#Students	481.67		Classes/Student	6.021617314

2025 Pre-Drop


How we calculated the amount of students in each 10th grade class:

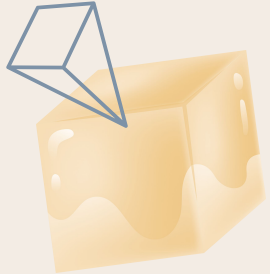
- Find the number of 10th grade classes taken that is closest
- Find the ratio of 11th + 12th graders taking a class to the total amount of 11th and 12th grade classes taken
- Multiply that by the number of total classes taken by sophomores, which was found by estimating a number that would keep the class/student ratio the same

2025 Pre-drop				
Department	10th	11th	12th	Total
Art	59.450075	30.48333332	32.43108	122.3644883
Biology	272.2002556	194.6999999	93.3622	560.2624556
Chemistry	171.83129	58.01666665	123.82776	353.6757167
English	313.9811544	179.9499999	152.3278	646.2589544
French	67.81329767	40.31666665	31.44832	139.5782843
German	38.08473872	18.68333333	21.62072	78.38879204
Spanish	71.53329532	50.14999998	25.55176	147.2350553
Math	357.6280115	180.9333333	197.53476	736.0961047
Music	98.46345872	49.16666665	55.03456	202.6646854
Physics	100.3207487	49.16666665	57.00008	206.4874954
Social Studies	291.6936743	179.9499999	128.74156	600.3852342
Sum	1843	1031.516666	918.8806	3793.397266
#students	630		Classes/Student	6.0212655



Justification for estimated student turnouts

- The ratio of sophomore students in a subject stayed the same compared to the average junior and senior ratios in a subject
 - The number of classes each student takes (6.02) stayed the same from a mathematical standpoint
 - Student:Teacher ratios stayed the same after new faculty were hired
- 



Teacher Assignment Strategy



We aimed to MINIMIZE the LARGEST “student to teacher” ratio

For example,

Physics has 68.8 students per teacher

Music has 202.6 students per teacher

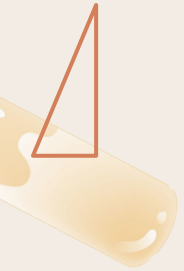
Music therefore ‘deserves a teacher’ more than Physics

We assigned teachers to the most ‘deserving’ subjects.

Department	Current Teachers	Current S/T Ratio	Plan to Add	Planned Teachers	Planned S/T Ratio
Art	1	122.3644883	1	2	61.18224416
Biology	1	140.0656139	1	5	112.0524911
Chemistry	0	117.8919056	0	3	117.8919056
English	1	129.2517909	1	6	107.7098257
French	1	139.5782843	1	2	69.78914216
German	0	78.38879204	0	1	78.38879204
Spanish	1	147.2350553	1	2	73.61752765
Math	1	122.6826841	1	7	105.1565864
Music	1	202.6646854	1	2	101.3323427
Physics	0	68.82916513	0	3	68.82916513
Social Studies	1	120.0770468	1	6	100.0642057



Solution



Class	Number of New Hires
Art	1
Biology	1
Chemistry	0
English	1
French	1
German	0
Spanish	1
Math	1
Music	1
Physics	0
Social Studies	1

Discussion

Strengths:

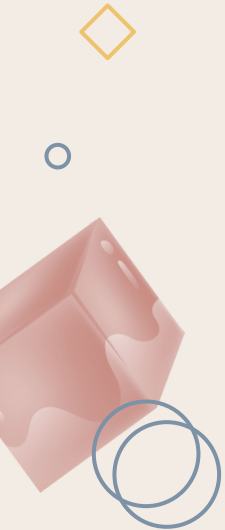
- Ratio of teachers to students before and after increase stayed the same/extremely close
- Data backs up our logic and reasoning for teacher distribution

Weaknesses:

- Could be inaccurate due to rounding
- Assumption that each student took 6 classes each day could vary based on actual schedules

Next Steps

- Consider difficulty of classes
 - Harder classes = less students enrolled?
- Consider teachers dropping out alongside students
- Create a math model that can predict and reallocate teachers due to fluctuations in incoming class every year





Merci Beaucoup!



Do you have any questions?

ayanco@wpi.edu

asun@wpi.edu

hhari@wpi.edu

