Epsilon School

Nick Eck, Eddie Goodwin, Shivani Gupta

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01

Problem +
Hypotheses

The student population at Epsilon School is increasing from 490 to 630 students. The school is hiring 7 new teachers. **Which departments should receive the teachers?**

Hypotheses

- English, Biology, and Math will increase because they are the most popular
- Music and art will increase because they both have only 1 teachers
- Some classes will increase by two while others won't increase at all

Variables

- Students of each grade in each class
- Number of teachers
- Total number of students
- Students in each grade (as a total)
- Dropout rate

02

Assumptions Process

Assumptions

- English is a standard (everyone is required to take exactly one English class)
- Language is treated as a department, not specifying between different language teachers
- Dropout rates are equal each year
- The ratio of students in each class to the total amount of students in that grade stays consistent every year (ex. 10th graders in Math to total 10th graders)
- Current student to teacher ratio is optimal

Process

1. Assuming that english was a standard, we could find the number of students in each grade
2. Found the number of students in each grade
3. Calculated the ratio of students in a class (in 1 grade) to the ratio of students in that grade
4. Factored in a 5% dropout rate into 11th and 12th grade, and an additional 6 to 10th grade to keep total at 630
5. Calculated student to teacher ratio for each department (as a whole) from 2023-2024
6. Calculated the amount of teachers needed in each department for 2024-2025 to keep the student to teacher ratio as close as possible to the past year

03

Data

2023-2024	#Teachers	9th	10th	11th	12th	Total (10, 11, 12)	Student/Teacher		
Art	1		31	33	35	99	99.00		
Biology	4		198	95	26	319	79.75		
Chem	3		59	126	109	294	98.00		
English	5	292	183	155	152	490	98.00		
Language	3		111	80	92	283	94.33		
Math	6		184	201	262	647	107.83		
Music	1		50	56	49	155	155.00		
Physics	3		50	58	183	291	97.00		
Social Studies	5		183	131	59	373	74.60		
Average									
Total Students	31	292	183	155	152	490	15.81		

2024-2025	#Teachers	#Teachers (Unrounded)	10th	11th	12th	Total (10, 11, 12)	Student/Teacher
Art	1.0	1.24	50	38	35	123	123.00
Biology	6.0	5.74	322	110	26	458	76.33
Chem	4.0	3.58	96	146	109	351	117.00
English	6.0	6.43	298	180	152	630	105.00
Language	4.0	3.88	181	93	92	366	91.50
Math	7.0	7.38	300	233	263	796	113.71
Music	1.0	1.26	81	65	49	195	195.00
Physics	3.0	3.41	81	67	183	331	110.33
Social Studies	7.0	6.82	298	152	59	509	72.71
Total Teacher/Students	390		298	180	152	630	16.58

But Hold Up

We had now added 8 teachers rather than 7, so we had to cut someone. We decided to cut chem, as they were closest to being rounded down at 3.55.

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New Hirees

- 2 Biology teachers
- 1 English teacher
- 1 Foreign Language teacher
- 1 Mathematics teacher
- 2 Social Studies teachers

04

Conclusion

Strengths and Weaknesses

Strengths:

- Ratio of students to teachers stayed as close as possible to original
- Mathematical reasoning to distribute the teachers

Weaknesses:

- The ratio of students in a grade taking classes in a certain department may not be consistent

Why is it fair?

- Trying to keep it as similar as possible to the previous year
- Classes that could previously handle more students, continued to have a lot of students with comparison to the total number

Thanks!

Do you have any questions?