

# A+ in Math

TURN THE EQUATION ON LOW RESULTS



**"Mathematics is  
the key and door  
to the sciences."**

**Galileo Galilei**



Achtung!

# PISA 2018

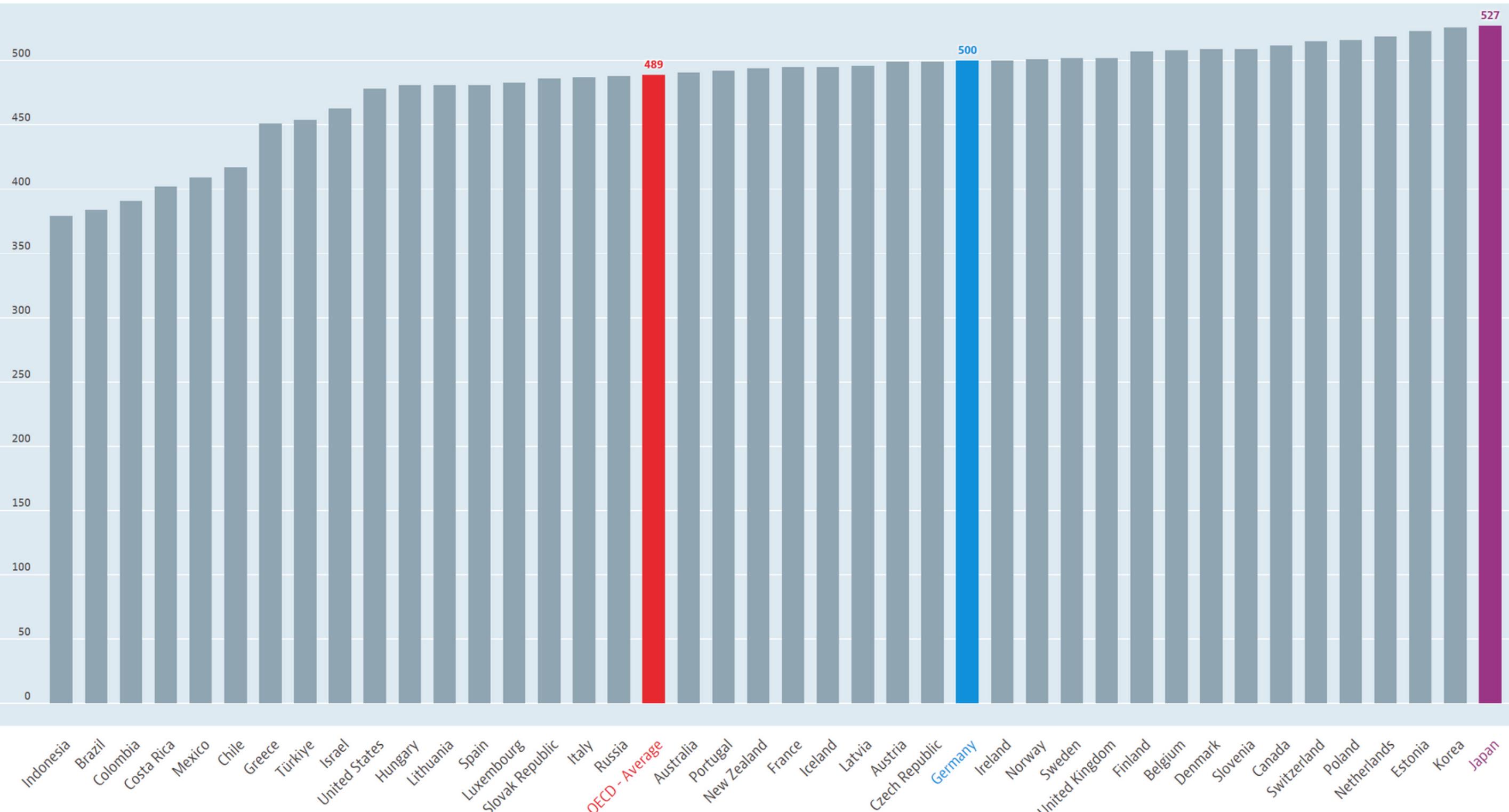


International student assessment (PISA) -  
Mathematics performance (PISA) - OECD Data

Find, compare and share OECD data by indicator.

theOECD

Mathematics performance (PISA) Total, Mean score, 2018 or latest available



# PISA 2018



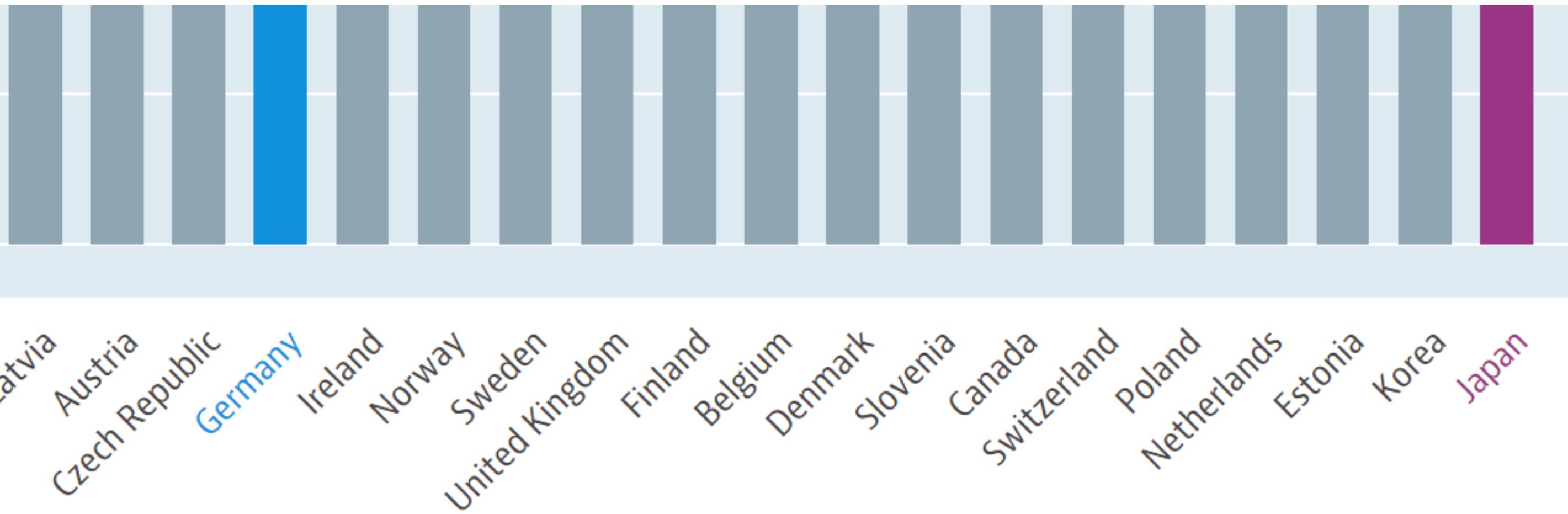
International student assessment (PISA) -  
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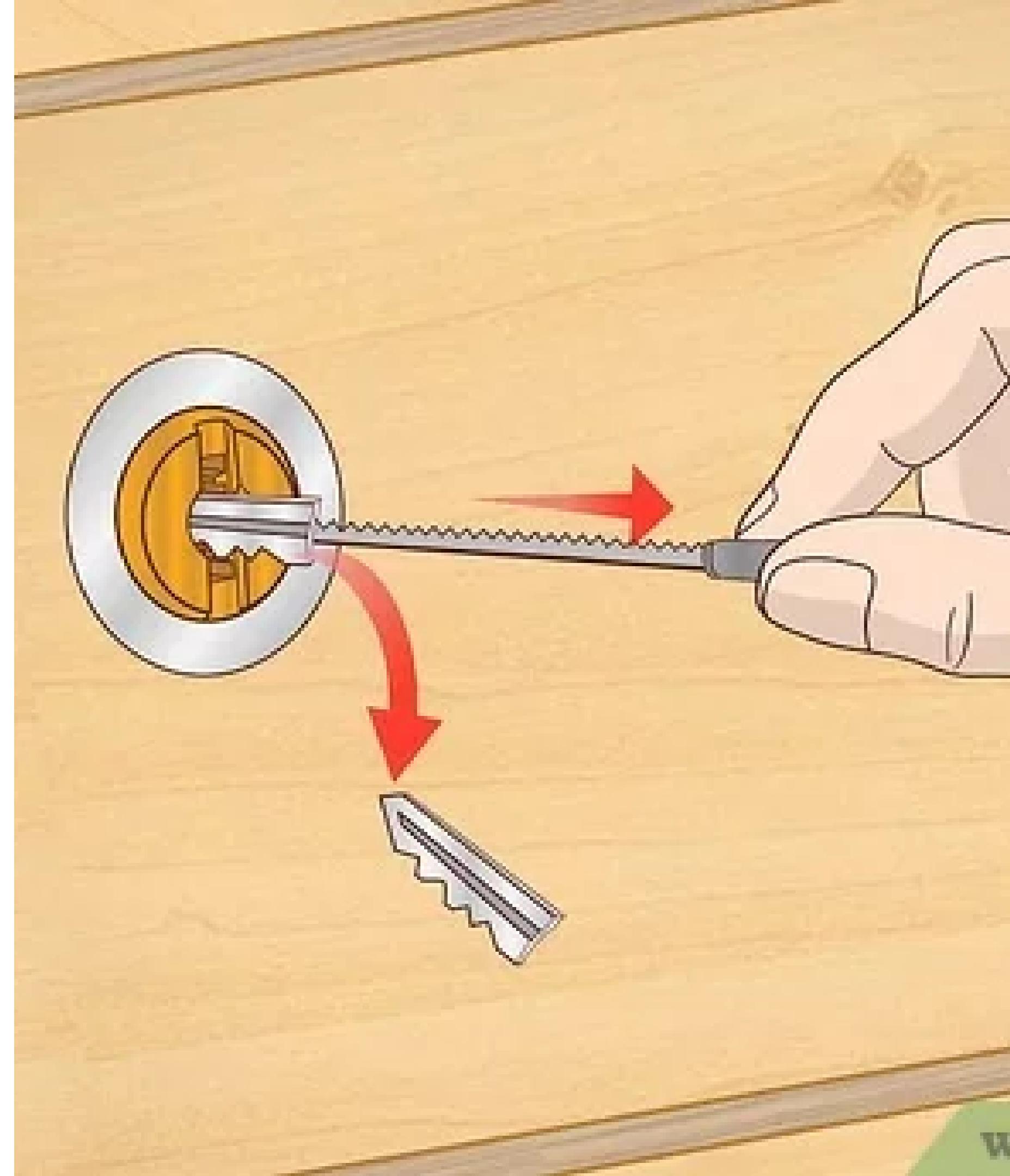
theOECD

16th

1st



**What is the  
key to get  
better results?**





**Most predictive  
feature  
of low  
math result**

A photograph of a person's hand holding a small, round compass. The compass has a white face with black markings for cardinal directions (N, S, E, W) and other degrees. The needle is pointing towards the North. The background is a blurred landscape of green trees and rocky mountains, suggesting a outdoor setting like a forest or park.

**Focus especially  
on guiding  
students with  
these features**



I know....

do you want to know?

# Dataset

## E.D.A.

# Regressions

Dataset

kaggle

R

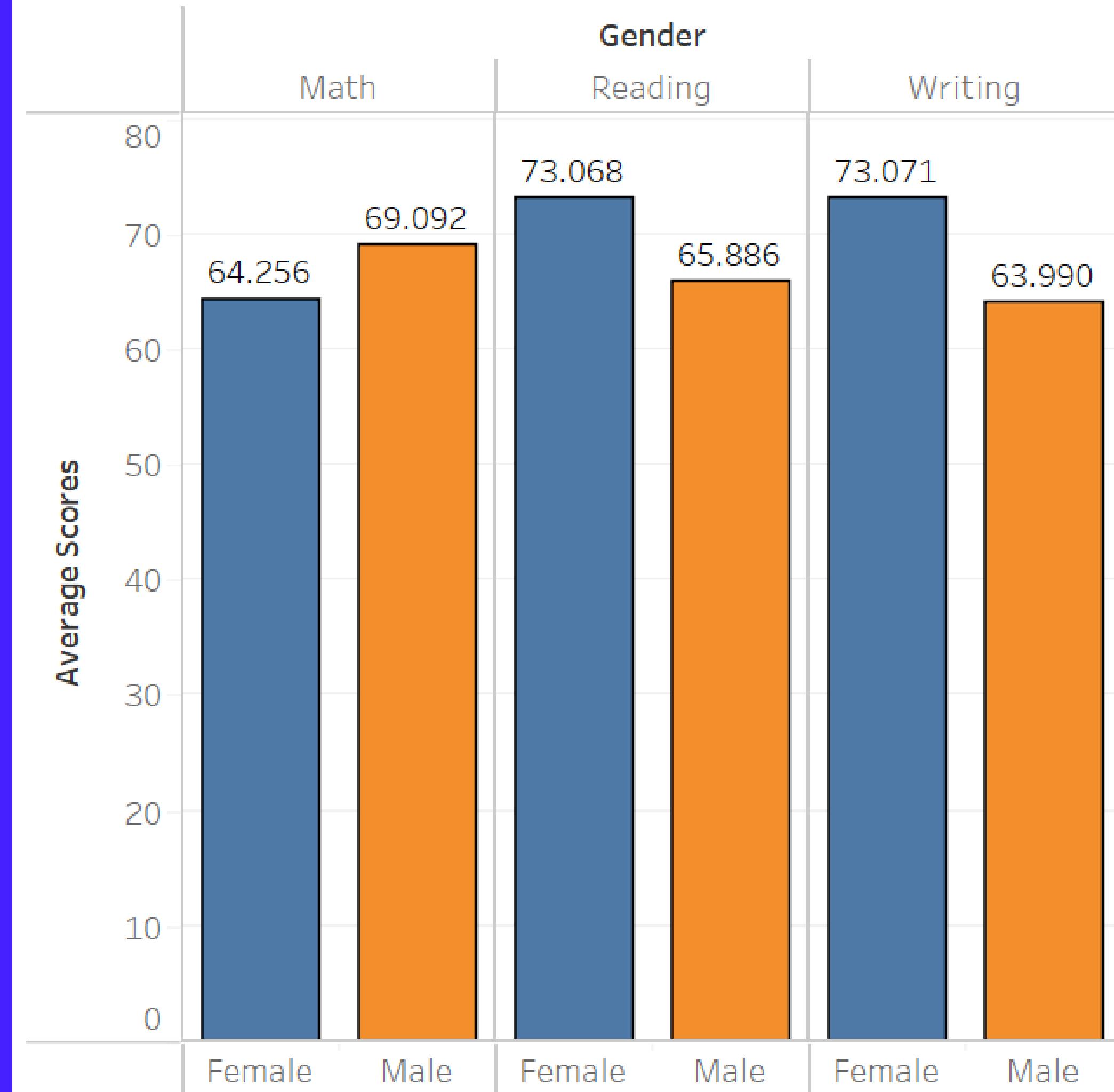
19243 rows

C

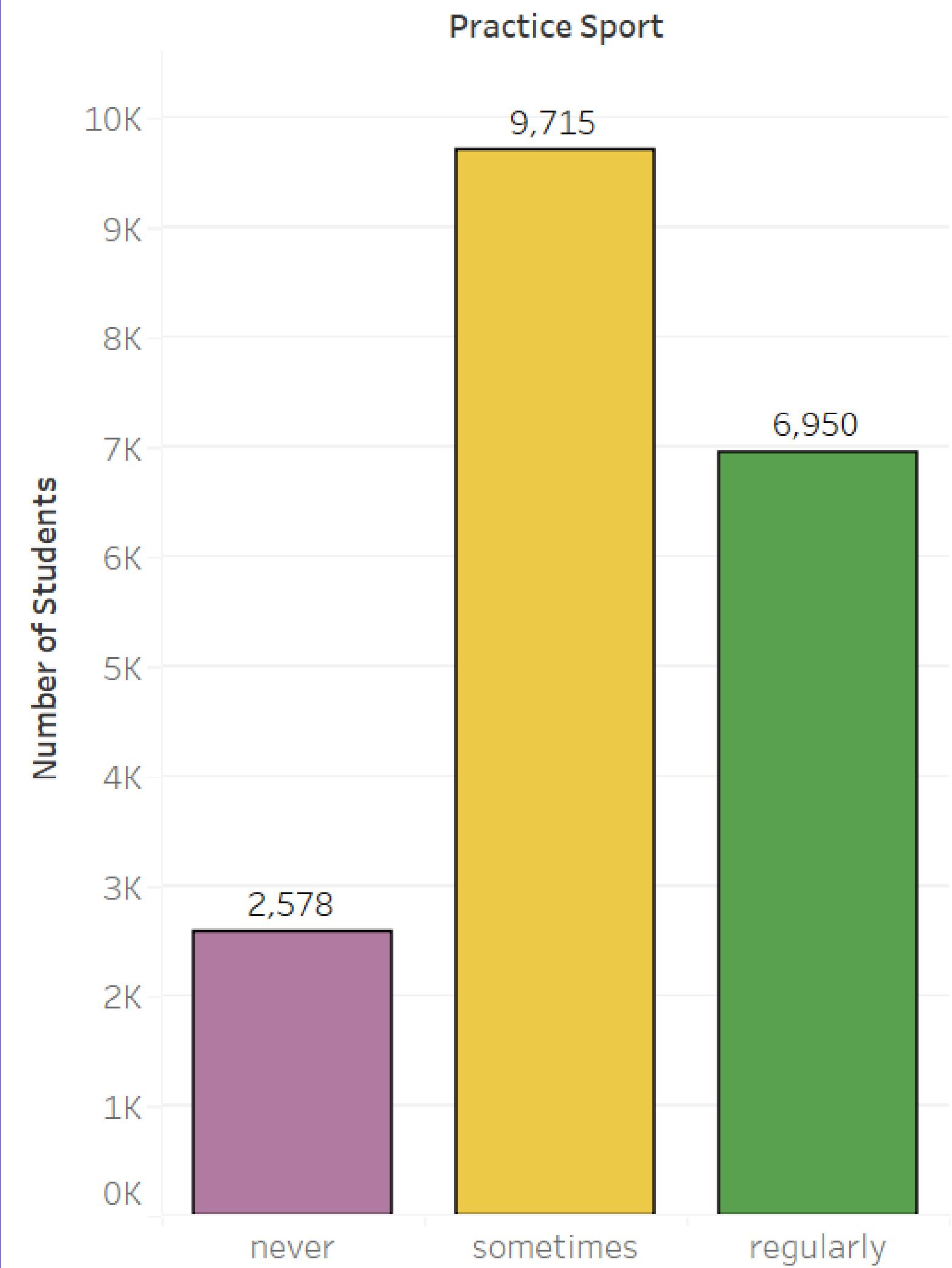
15 columns

# E.D.A.

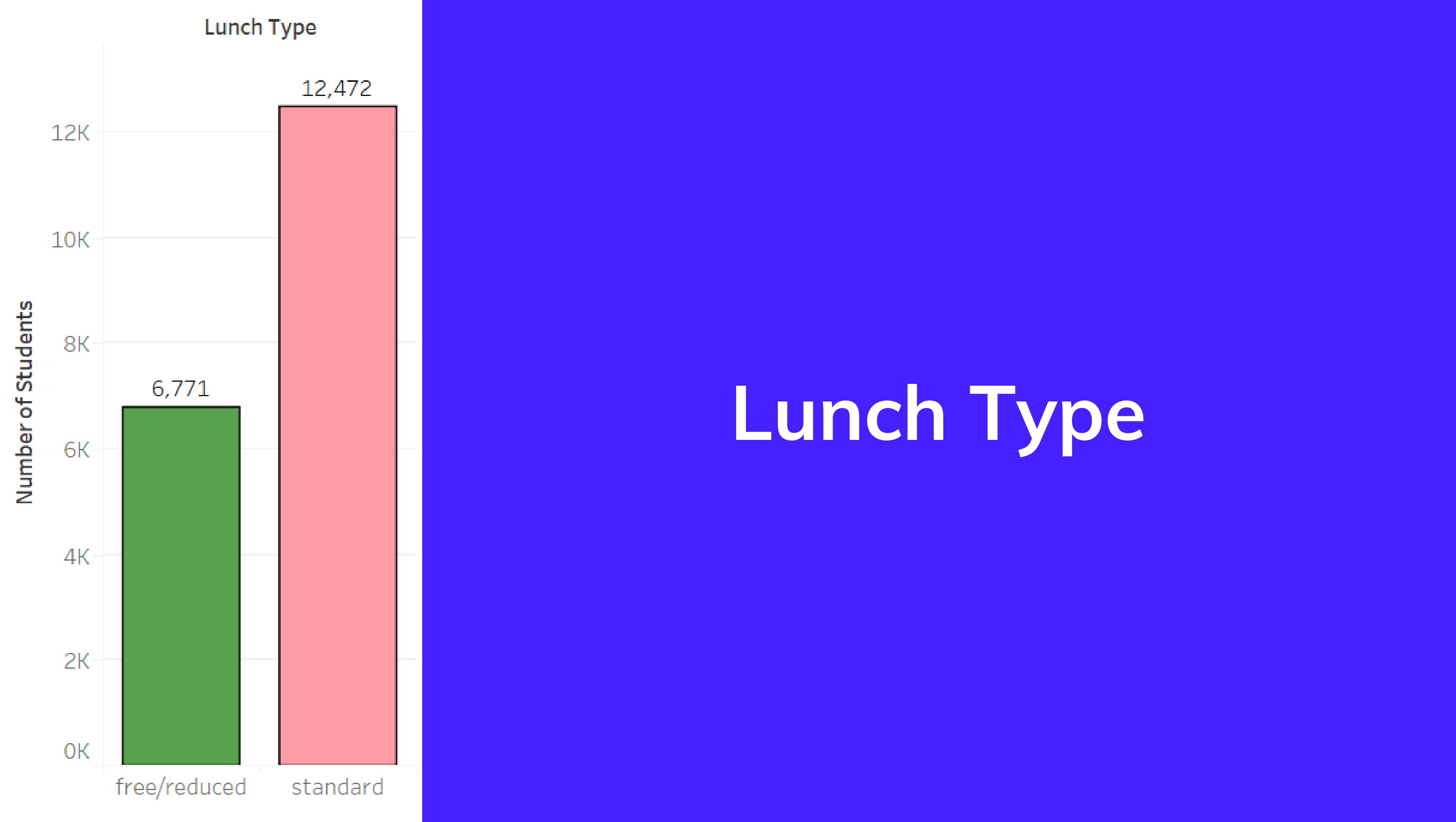
Avg Score of Math,  
Reading and Writing  
divided by gender



# Avg Practice of Sport

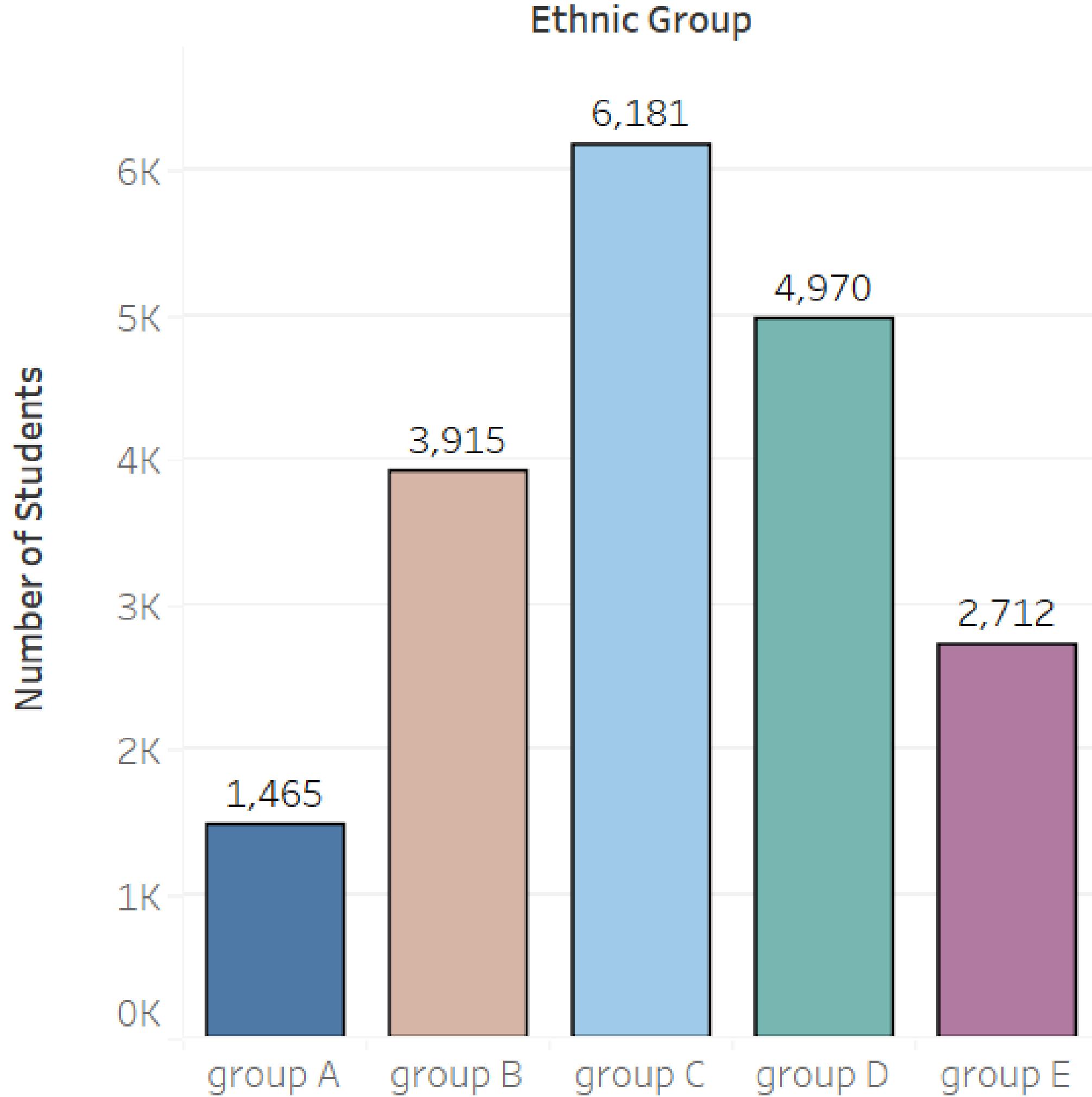


## Lunch Type



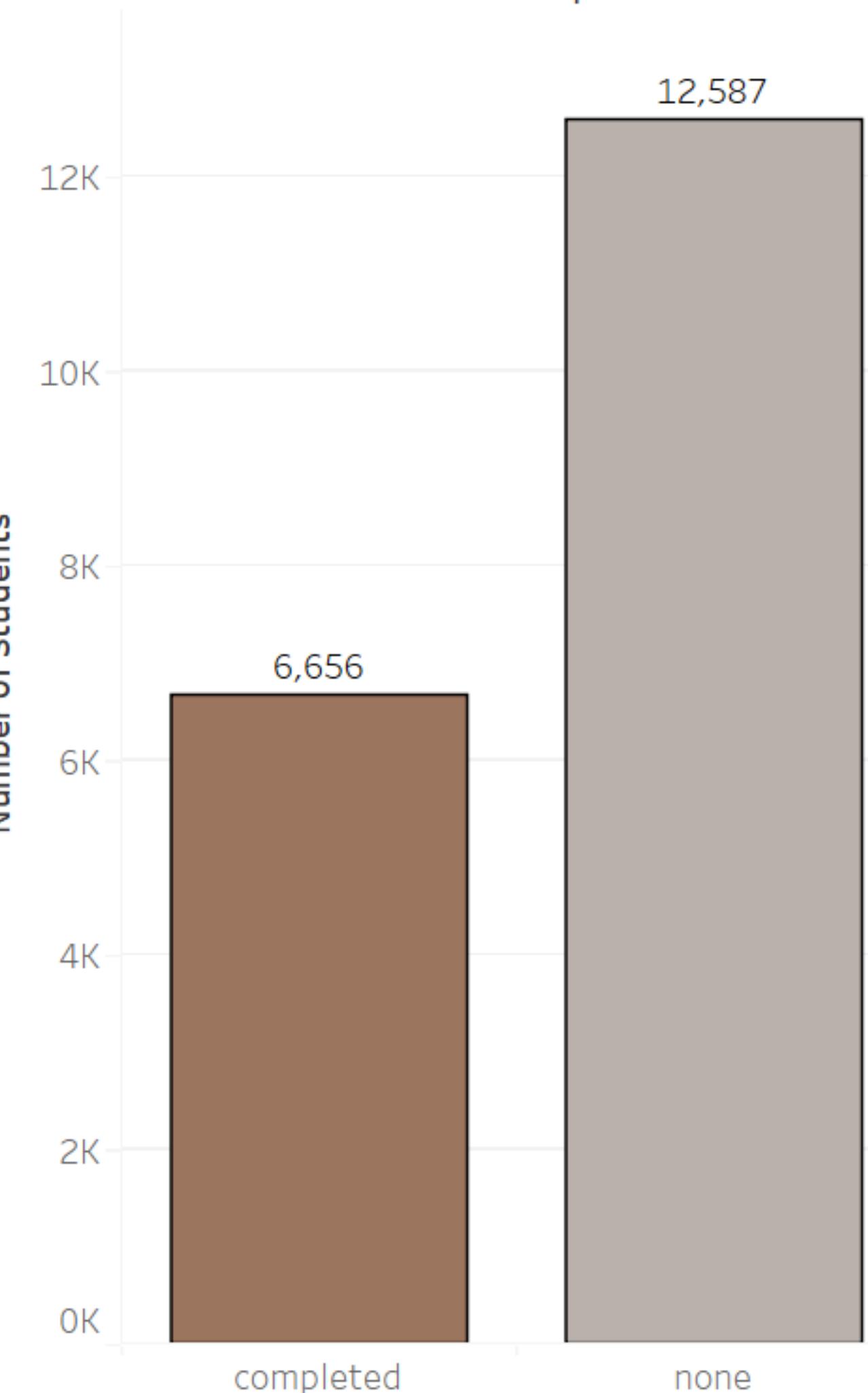
# Lunch Type

# Ethnic Group



# Test Preparation

Test Prep



# Rest of the categories

ParentEduc,

ParentMaritalStatus,

IsFirstChild, NrSiblings,

TransportMeans,

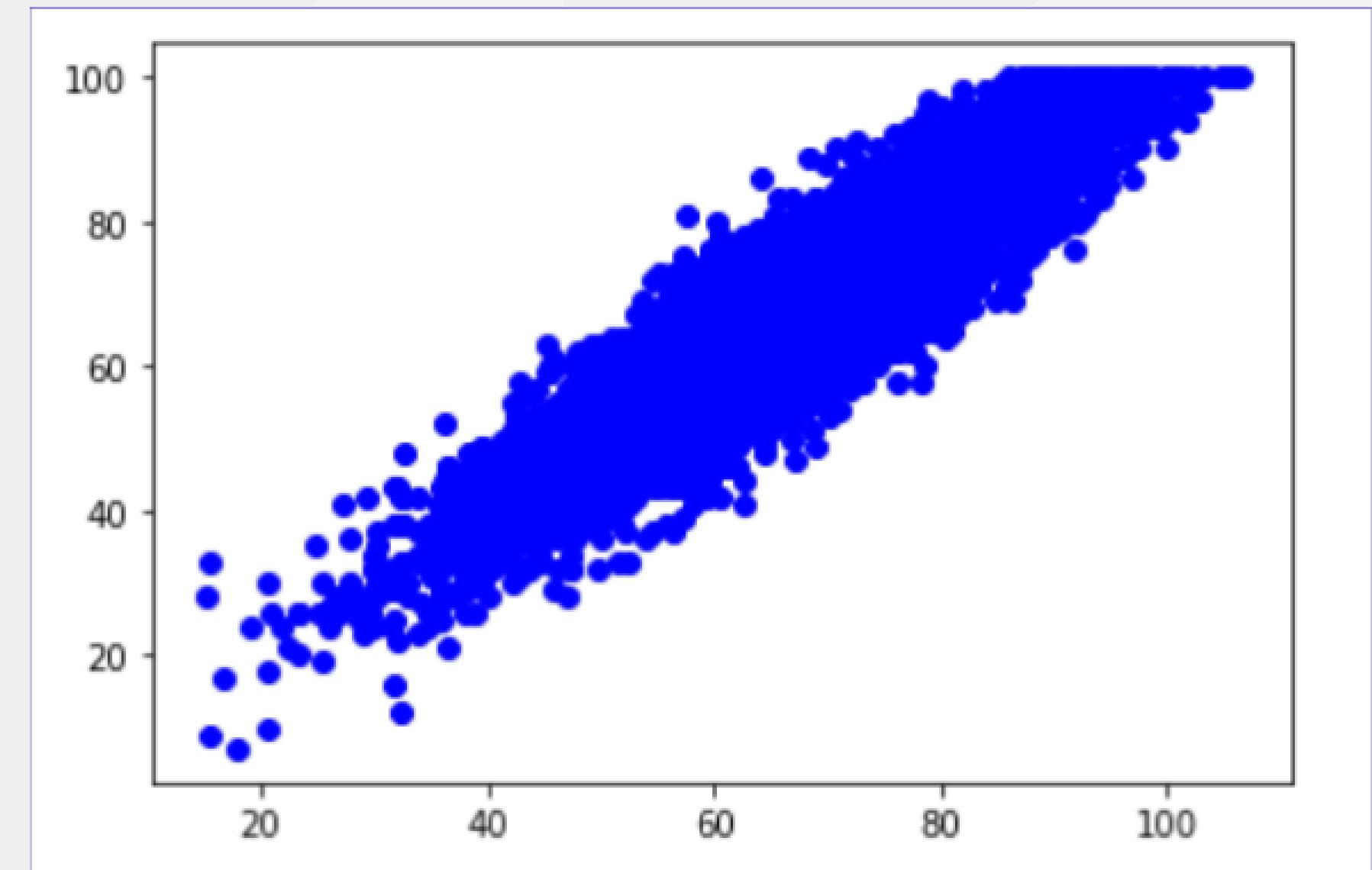
WklyStudyHours

# Regressions

Linear  
Decision tree

KNN

# Linear Regression



# Results

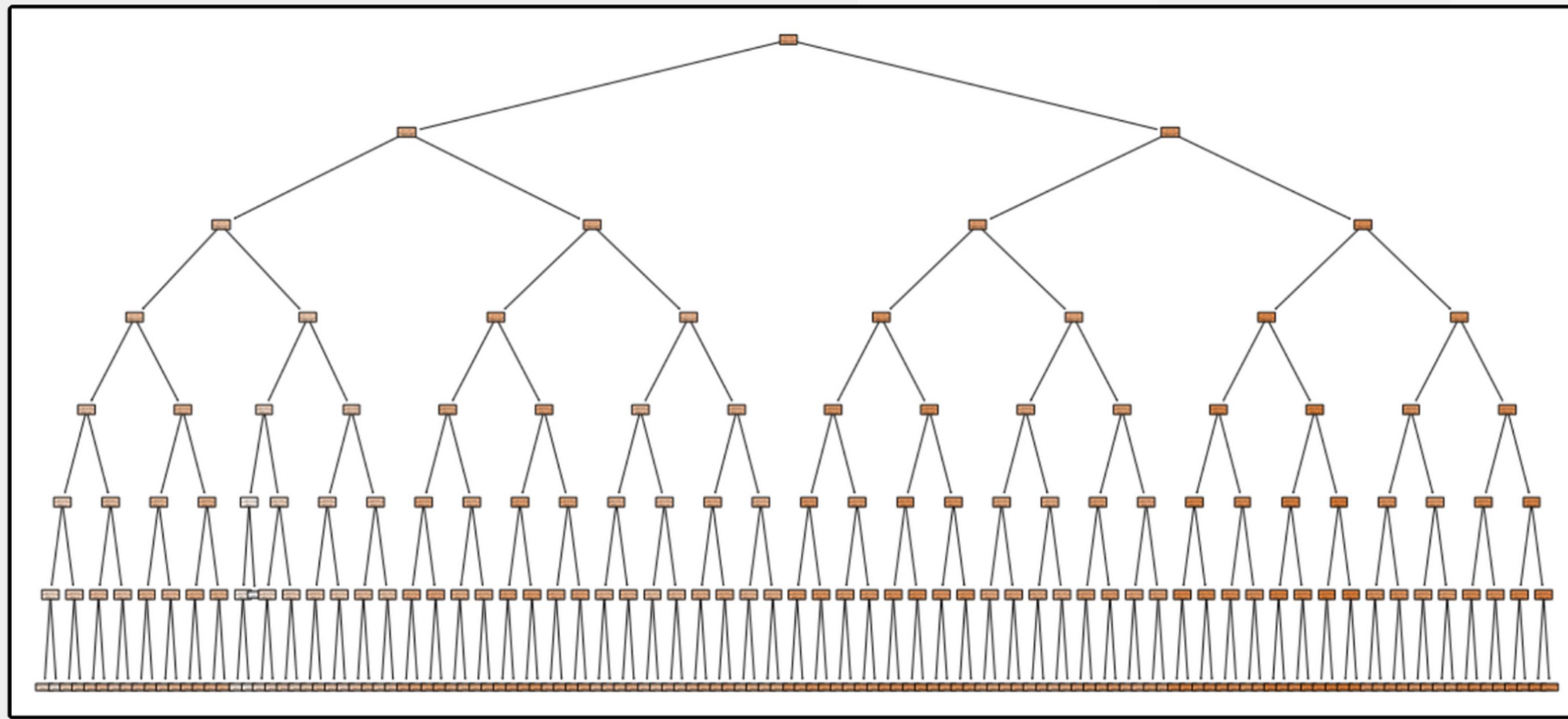
## OLS Regression Results

Dep. Variable:	MathScore	R-squared:	0.842
Model:	OLS	Adj. R-squared:	0.842
Method:	Least Squares	F-statistic:	3980.
Date:	Sun, 14 May 2023	Prob (F-statistic):	0.00
Time:	14:33:33	Log-Likelihood:	-43420.
No. Observations:	13470	AIC:	8.688e+04
Df Residuals:	13451	BIC:	8.702e+04
Df Model:	18		
Covariance Type:	nonrobust		

# Results

	coef	std err	t	P> t	[0.025	0.975]
const	8.9217	0.409	21.815	0.000	8.120	9.723
ParentEduc	-0.1363	0.029	-4.643	0.000	-0.194	-0.079
TestPrep	1.2766	0.113	11.256	0.000	1.054	1.499
NrSiblings	-0.0024	0.036	-0.065	0.948	-0.074	0.069
WklyStudyHours	0.2965	0.069	4.307	0.000	0.162	0.431
ReadingScore	0.8882	0.004	222.465	0.000	0.880	0.896
Gender_female	-11.2224	0.109	-103.286	0.000	-11.435	-11.009
EthnicGroup_group B	0.1888	0.223	0.847	0.397	-0.248	0.626
EthnicGroup_group C	0.1640	0.211	0.777	0.437	-0.250	0.578
EthnicGroup_group D	1.3839	0.217	6.389	0.000	0.959	1.808
EthnicGroup_group E	5.5987	0.237	23.626	0.000	5.134	6.063
LunchType_free/reduced	-4.7898	0.114	-41.895	0.000	-5.014	-4.566
ParentMaritalStatus_divorced	0.1175	0.145	0.811	0.417	-0.166	0.401
ParentMaritalStatus_single	0.0107	0.128	0.083	0.933	-0.240	0.261
ParentMaritalStatus_widowed	-0.0159	0.386	-0.041	0.967	-0.772	0.740
PracticeSport_1	2.1903	0.168	13.060	0.000	1.862	2.519
PracticeSport_2	1.2832	0.161	7.951	0.000	0.967	1.599
IsFirstChild_no	0.0054	0.111	0.049	0.961	-0.212	0.222
TransportMeans_private	-0.0345	0.106	-0.325	0.745	-0.243	0.174

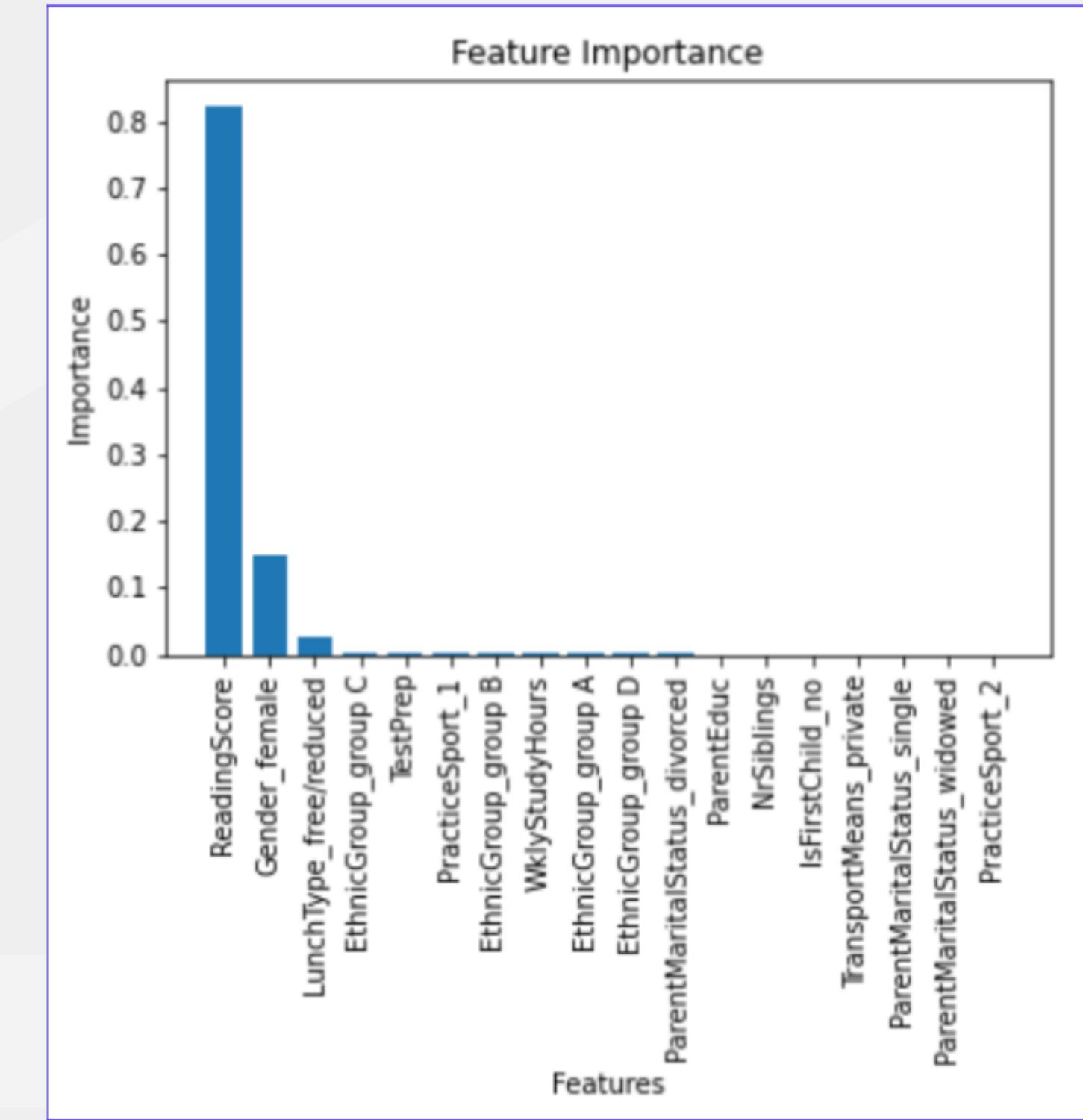
# Decision tree



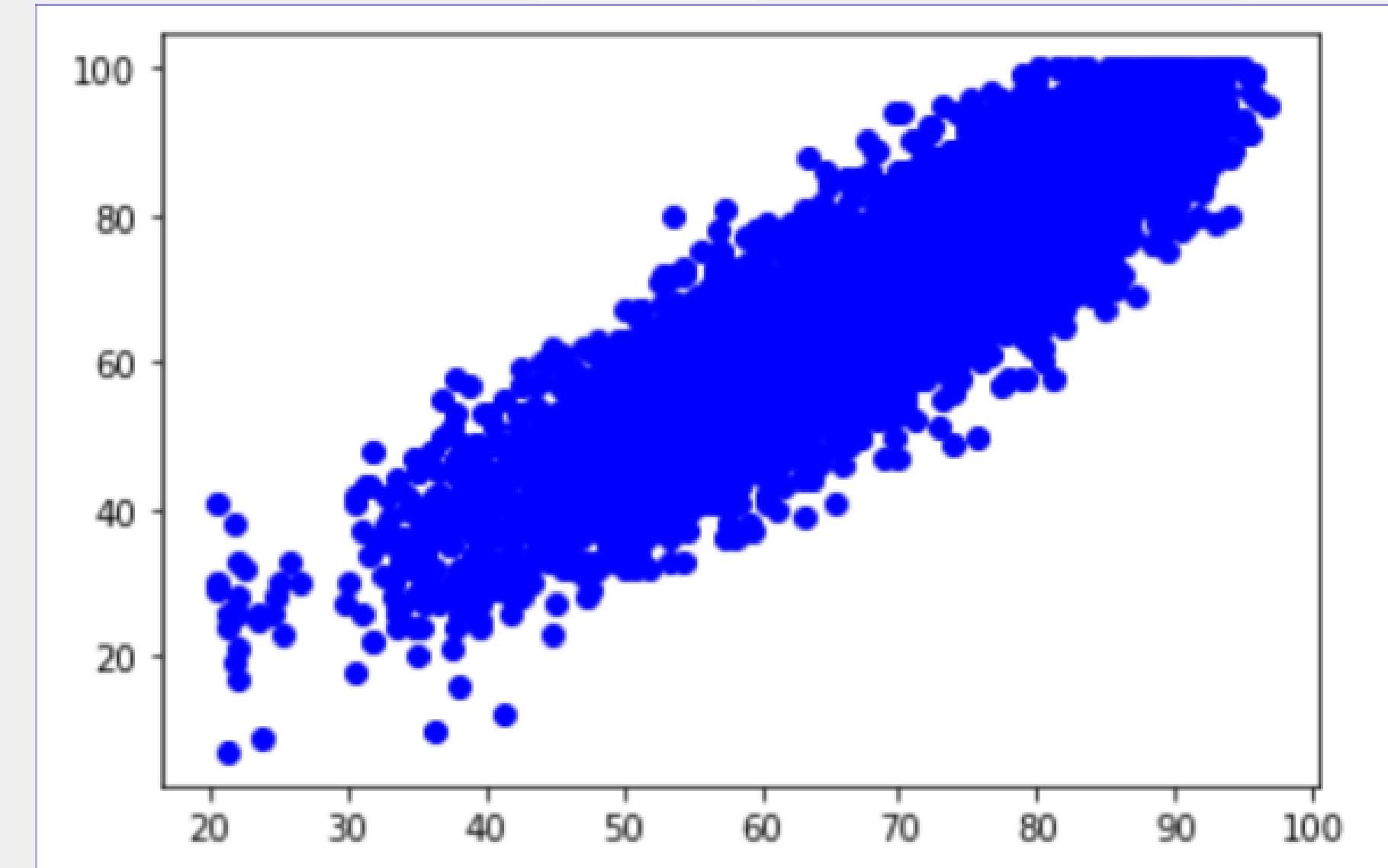
# Error metric

	Error_metric	Train	Test
0	Mean error	-0.00	-0.03
1	Mean absolute error	5.04	5.21
2	Mean squared error	39.77	42.77
3	Root mean squared error	6.31	6.54
4	Mean absolute percentual error	8.17	8.53
5	R2	0.83	0.82

# Feature importance



# KNN



# Error metric

	Error_metric	Train	Test
0	Mean error	-0.02	-0.04
1	Mean absolute error	5.52	6.02
2	Mean squared error	47.34	56.24
3	Root mean squared error	6.88	7.50
4	Mean absolute percentual error	inf	10.02
5	R2	0.80	0.77

# Overview

	Linear Regression	Decision Tree	KNN
R <sup>2</sup>	0.842	0.83 - 0.82	0.80 - 0.77

# Conclusion

The most  
accurate  
predictors are:

gender: female (-)  
lunch type: free / reduce (-)  
ethnic group: E (+)  
reading score (+)

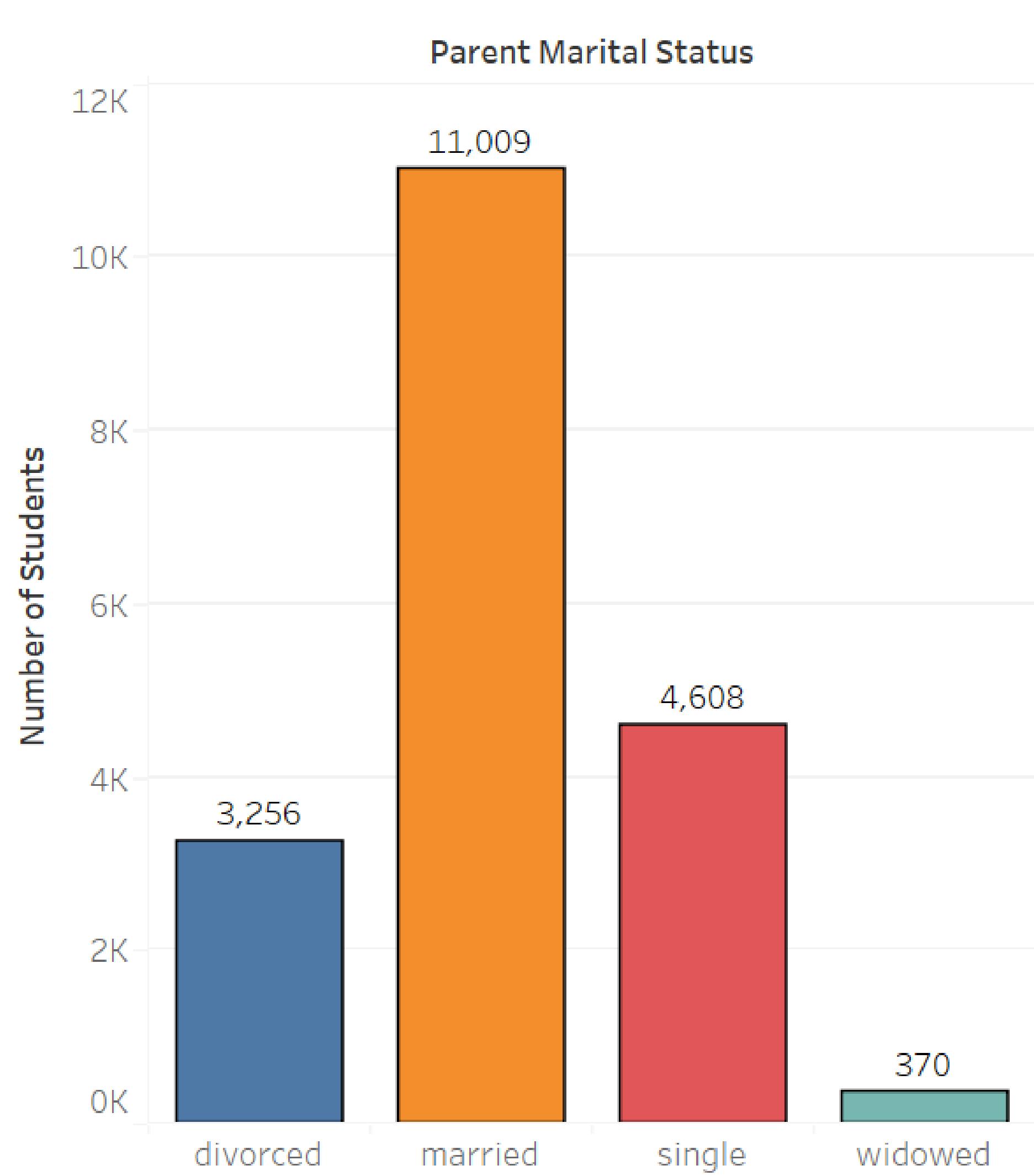
# Thank you!



SUNDAY

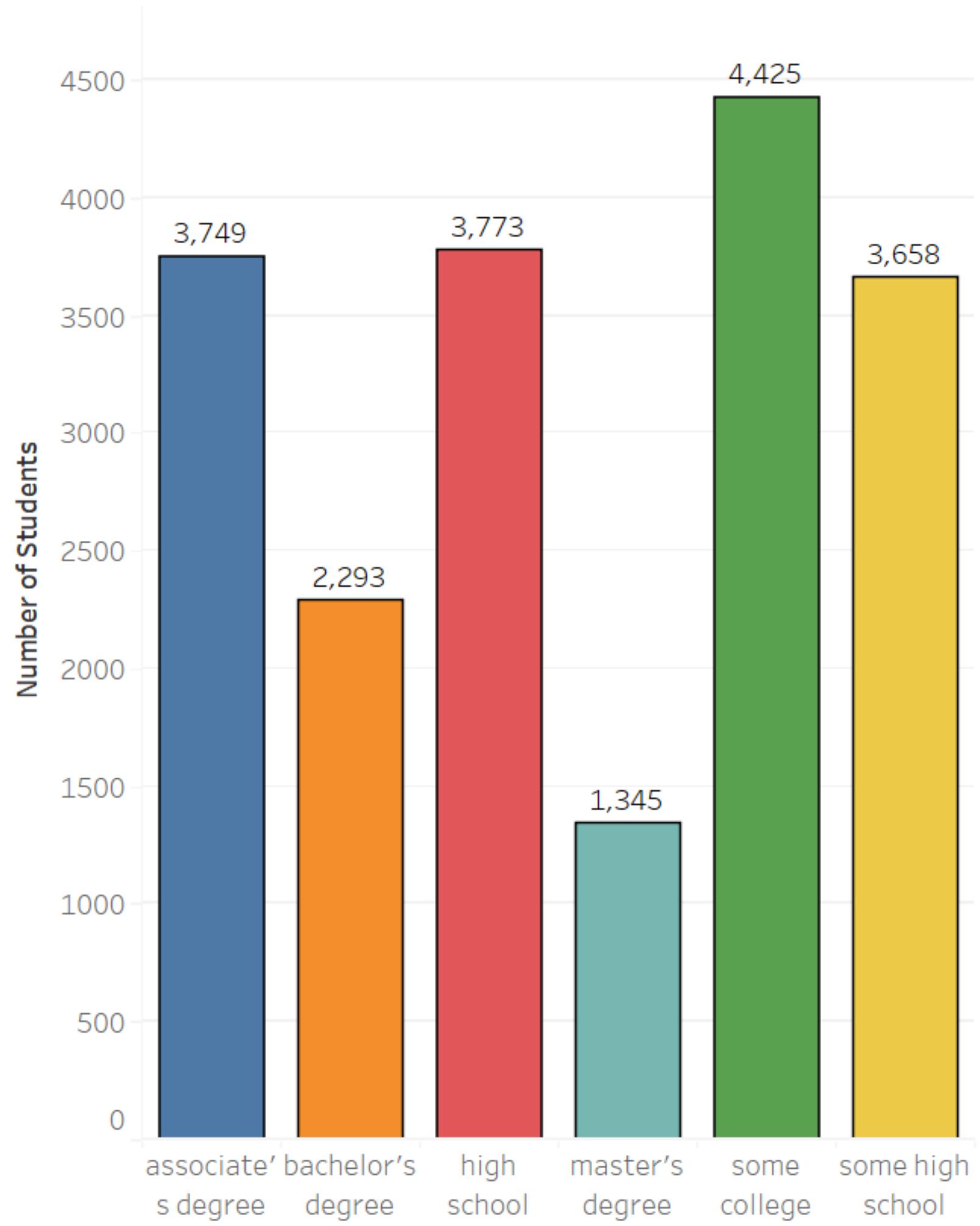
Gender, EthnicGroup,  
ParentEduc, LunchType,  
TestPrep, ParentMaritalStatus,  
PracticeSport, IsFirstChild,  
NrSiblings, TransportMeans,  
WklyStudyHours, MathScore,  
ReadingScore, WritingScore

# Parent Marital Status

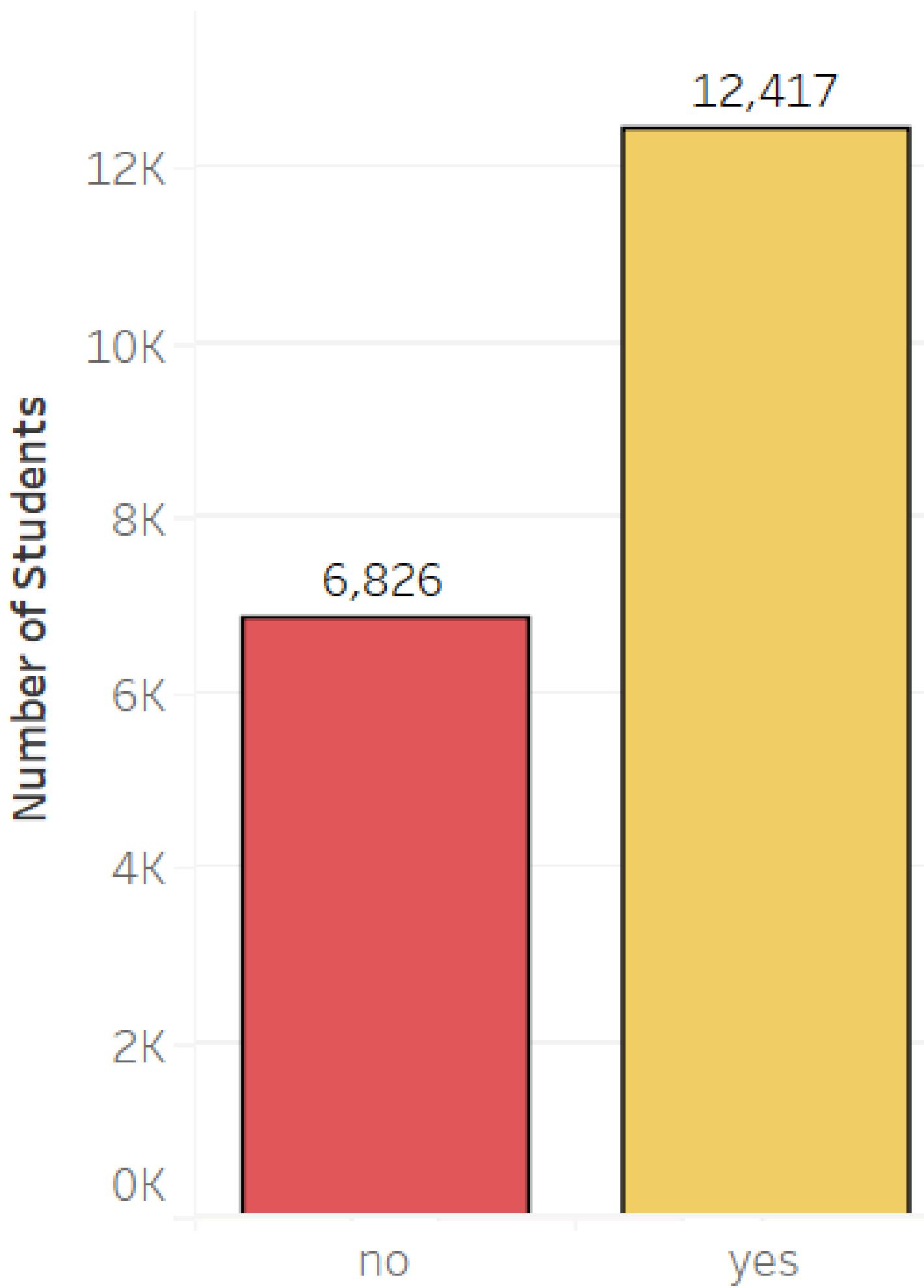


# Parent Education

Parent Educ

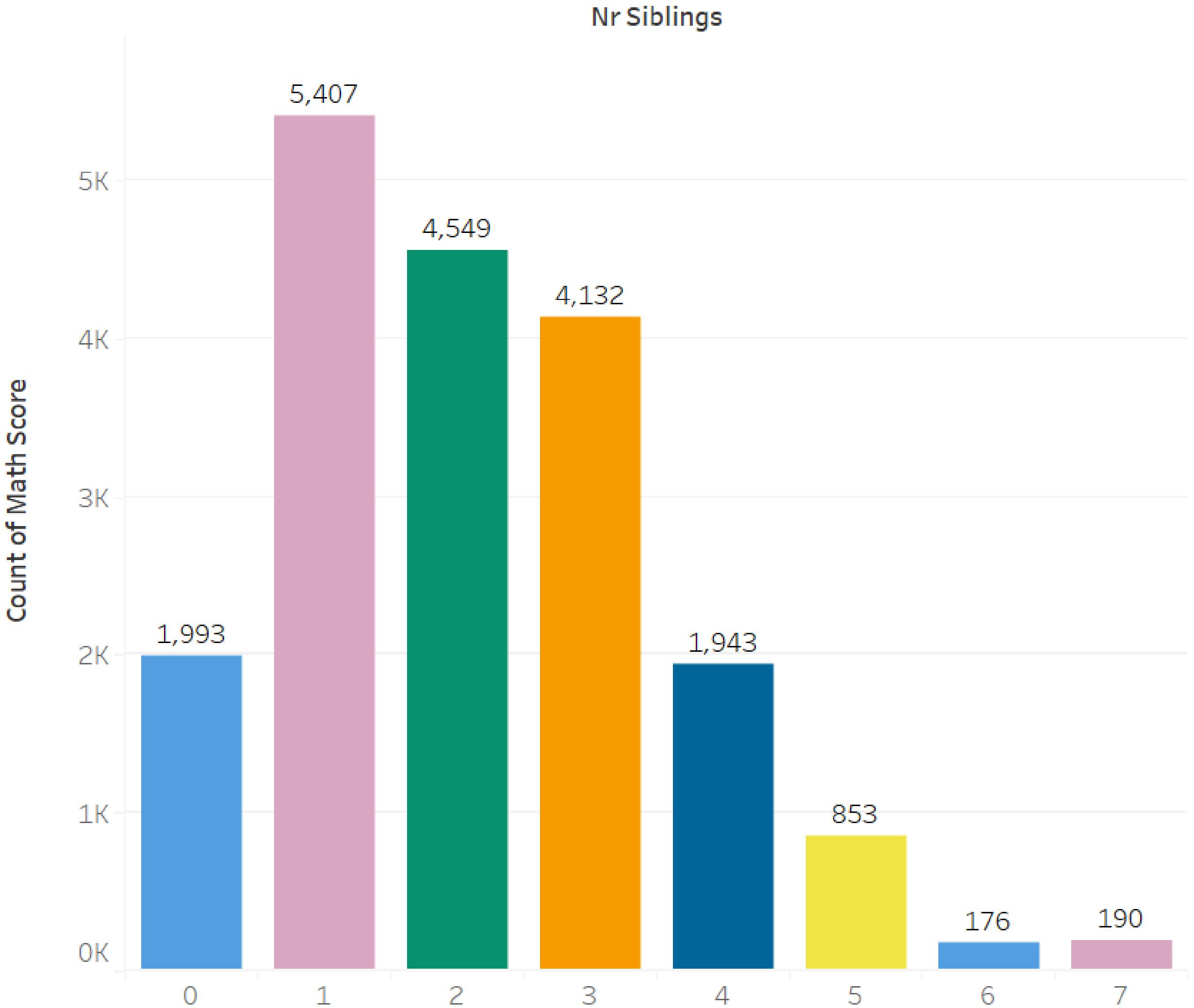


### Is First Child



# Is the First Child

# Number of Siblings



# Lay Your Groundwork

Create an operational plan by measuring quantitative metrics and outlining the process.

Set SMART goals: Specific, Measurable, Actionable, Realistic, and Time-Bound.



Gender, EthnicGroup,  
ParentEduc, LunchType,  
TestPrep, ParentMaritalStatus,  
PracticeSport, IsFirstChild,  
NrSiblings, TransportMeans,  
WklyStudyHours, MathScore,  
ReadingScore, WritingScore

# Free Resources

Use these free, recolorable icons, and illustrations in your Canva presentation.

