Data is NOT a Four Letter Word

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Community School of Naples

FCIS Annual Convention
November 7, 2019

TODAY'S TOPICS

1. **Background** & Context
2. **Guidelines** for Using Data
3. Setting up **Spreadsheets**
4. Quick & Easy **Statistics**
5. Practical **Examples**

TODAY'S GOAL #1

Provide you new skills and ideas to better **tell your school's story**.

TODAY'S GOAL #2

Demystify "data" and **empower** you to use it regularly.

MY BACKGROUND

★ Education

★ Experience

★ School Context
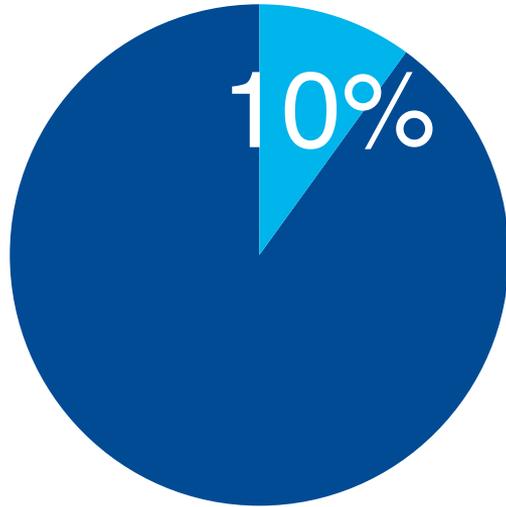
WHY DATA MATTERS

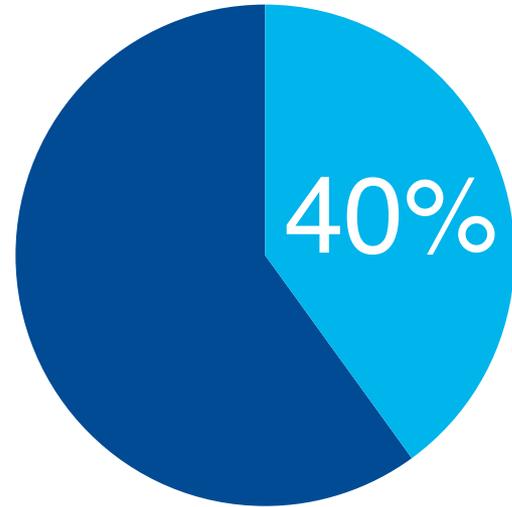If you're not using data to tell your story, **other people will**.

SAVVY PARENT 1

"My neighbor's kid goes to public school, gets straight A's, and will **get into a better college** than my kid who has too much homework and a **lower GPA**."

EXAMPLE #1

10%

Students Enrolled in Private Schools

40%

…who are Admitted to Elite Universities

https://news.brown.edu/articles/2017/03/admitted   https://paw.princeton.edu/article/students-admitted-princetons-class-2021   http://features.thecrimson.com/2016/freshman-survey/makeup-narrative/
http://www.capenet.org/facts.html   https://news.dartmouth.edu/news/2017/03/2092-students-are-offered-admission-class-2021   http://features.thecrimson.com/2015/freshman-survey/makeup-yale/

EXAMPLE #2

90% of all grades were either an A or B last school year.

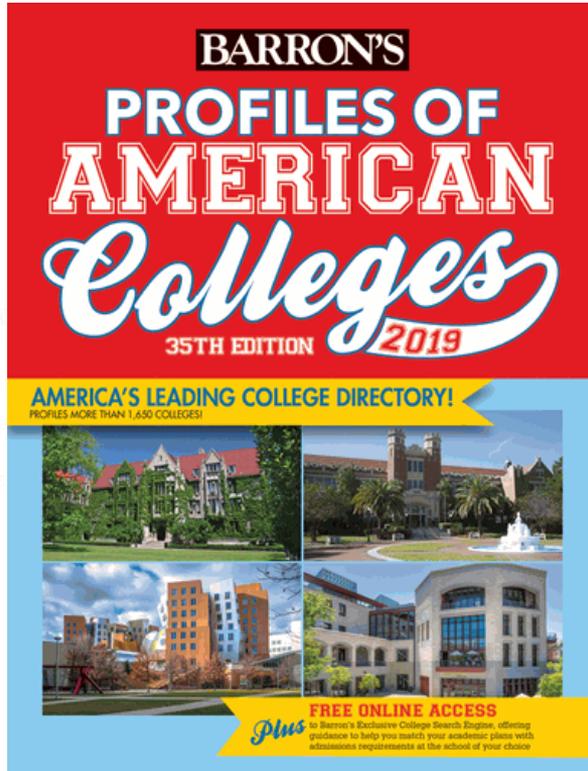*Pair this with standardized test results to **avoid grade inflation concerns**.*
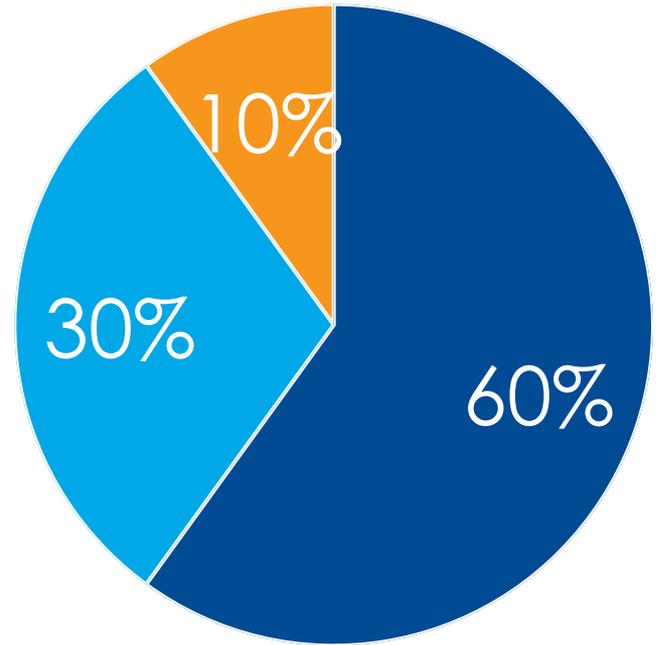
- ● A's
- ● B's
- ● C's and lower

SAVVY PARENT 2

"Your college acceptance list is really just **a few of the top kids** getting into all the top schools."

EXAMPLE #3

Has a list of colleges based on selectivity, with **the top category "most competitive" having around 70 exceptional colleges.**

https://archive.nytimes.com/www.nytimes.com/interactive/2013/04/04/business/economy/economix-selectivity-table.html?_r=2

EXAMPLE #3

Of those who applied to a "most competitive" school…

88% of the **entire class** was admitted.

100% of the **top half** of the class was admitted.

65% of the **bottom half** of the class was admitted.

DATA GUIDELINES

BE Truthful
Clear
Selective
Thoughtful
Positive
Humble

SPREADSHEETS

Have a master spreadsheet of student data that can be added to year after year. Naviance is a good place to start.

Freeze Headers for Easy Viewing

Track Averages in the Header

	A	B	C	D	H	I	J	K
Student		**Class**	uGPA	wGPA	11th PSAT	11thPSAT:V	11thPSAT:M	11thPSAT:SS
		AVGs	3.35	3.82	? =average(H3:H388) 8		607.45	178.84
	Last Name, First Name	2019	3.96	4.37	1180	550	630	173
	Last Name, First Name	2019	3.28	3.81	1310	630	680	194

Students in Rows & Easily Sortable

The more columns of data, the better

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SPREADSHEETS

Other helpful reminders for spreadsheets include

Formulas
=sum(X:X)
=average(X:X)

★ **Sort Columns A-Z**

★ **Be careful**: some formulas will change–always check.

★ **Copy/Paste Formula** will adjust columns automatically.

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STATISTICS

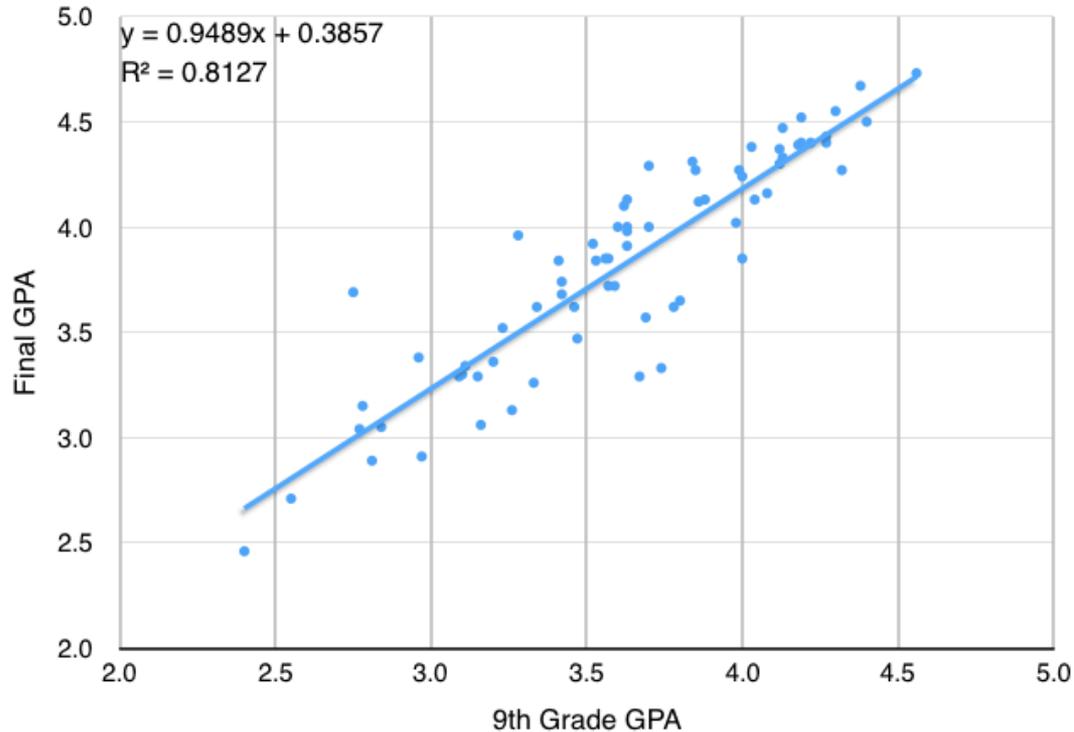Correlations & Scatterplots

Averages & T-Tests

CORRELATIONS

★ Correlations shows **how closely related** two variables are.

★ Helpful in showing how one variable can **predict** another.

★ Visualized by **scatterplots**.

★ **Does not prove causation!**

EXAMPLE #4

Why it's important to earn good grades in 9th Grade…

$y = 0.9489x + 0.3857$
$R^2 = 0.8127$

EXAMPLE #5

What is the relationship between 9th Grade CTP Percentiles in Verbal & Math and 12th Grade SAT EBRW and Math Scores?

U	V	Z	AC	AD
Highest SATv	Highest	00	**Highest ACT**	**ERB9v**
639.85	6	=correl(U:U,AD:AD)	27.33	54.09
620	680	1300	26	54.00
750	660	1410	32	72.80
620	580	1200	31	
670	800	1470	27	56.40

AM2   0.76 ×

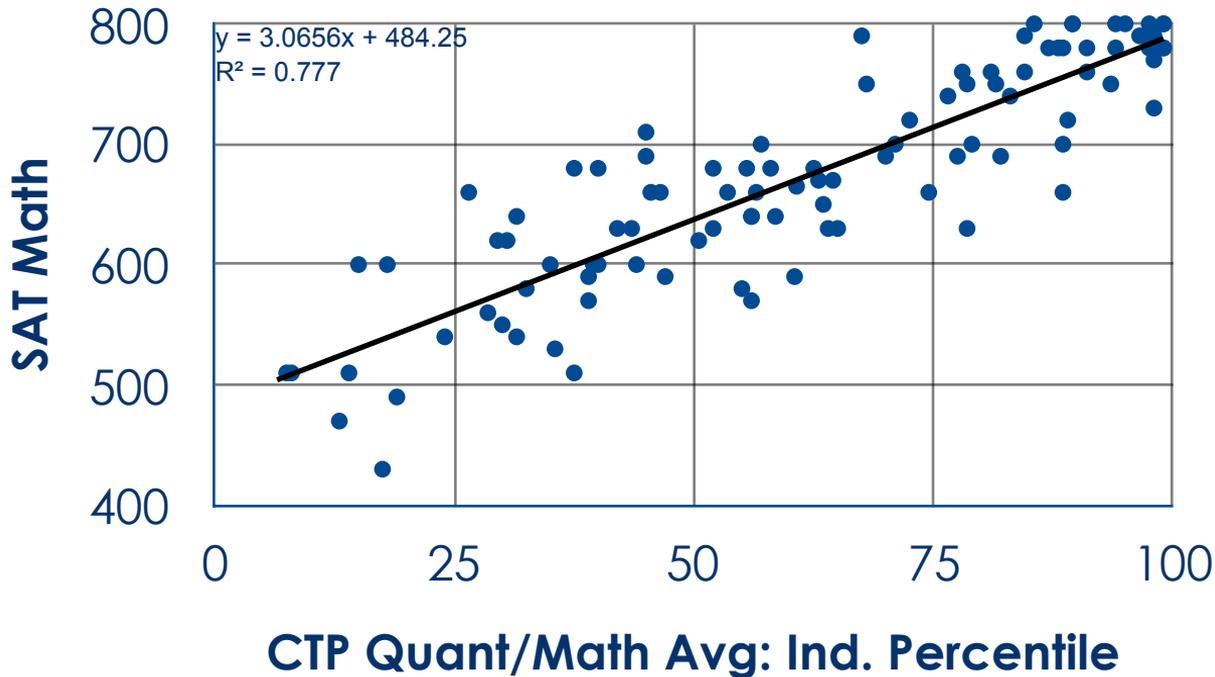| Correl. (r)	Strength
≤ 0.3	Weak
0.3-0.5	Moderate
≥ 0.7	Strong

For the Classes of 2018 and 2019…

★ **0.76** correlation between CTP Verbal and SAT Verbal

★ **0.88** correlation between CTP Math and SAT Math

EXAMPLE #5

*What is the relationship between 9th Grade CTP Percentiles in Verbal & Math and 12th Grade SAT EBRW and Math Scores?*

Scatter plot with trend line:
- y-axis: SAT Math (400 to 800)
- x-axis: CTP Quant/Math Avg: Ind. Percentile (0 to 100)
- $y = 3.0656x + 484.25$
- $R^2 = 0.777$

EXAMPLE #5

Pro Tip: Keep all of your Correlations in the Header, to the right of all the test scores. Beware of Sorting!

AF	AG	AH	AI	AJ	AK	AL	AM	AN
ERB8v	ERB8m	wGPA:ACT	wGPA:SAT	wGPA:PSAT	ACT:ERB9v	ACT:ERB9m	SATv:ERBv	SATm:ERBm
52.86	57.23	0.69	0.72	0.73	0.81	0.74	0.76	0.88
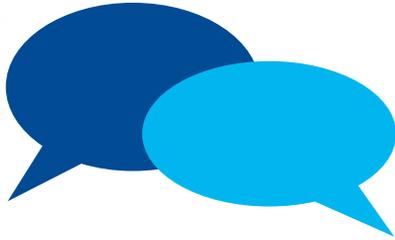
What are some metrics you might like to compare using correlations and/or scatterplot graphs?

AVERAGES & T-TESTS

★ **<u>T-Tests</u>** compare two sets of data to see if there's a meaningful difference between them

   ★ **"Statistically Significant"**

★ Helpful to measure the **<u>impact of a new program</u>** on test results or if one group is truly different from another.

EXAMPLE #6

How have our Junior PSAT scores been the last three years?
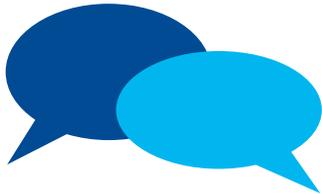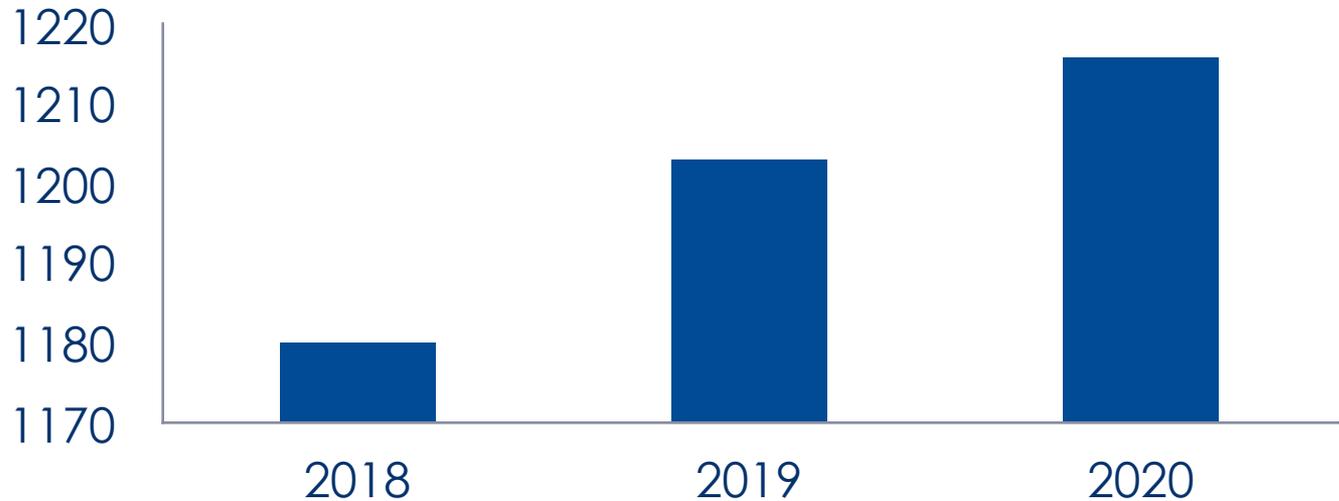
What's wrong with this bar graph?!

EXAMPLE #6

After implementing a test prep program, did the Class of 2020 see an increase in their PSAT scores?
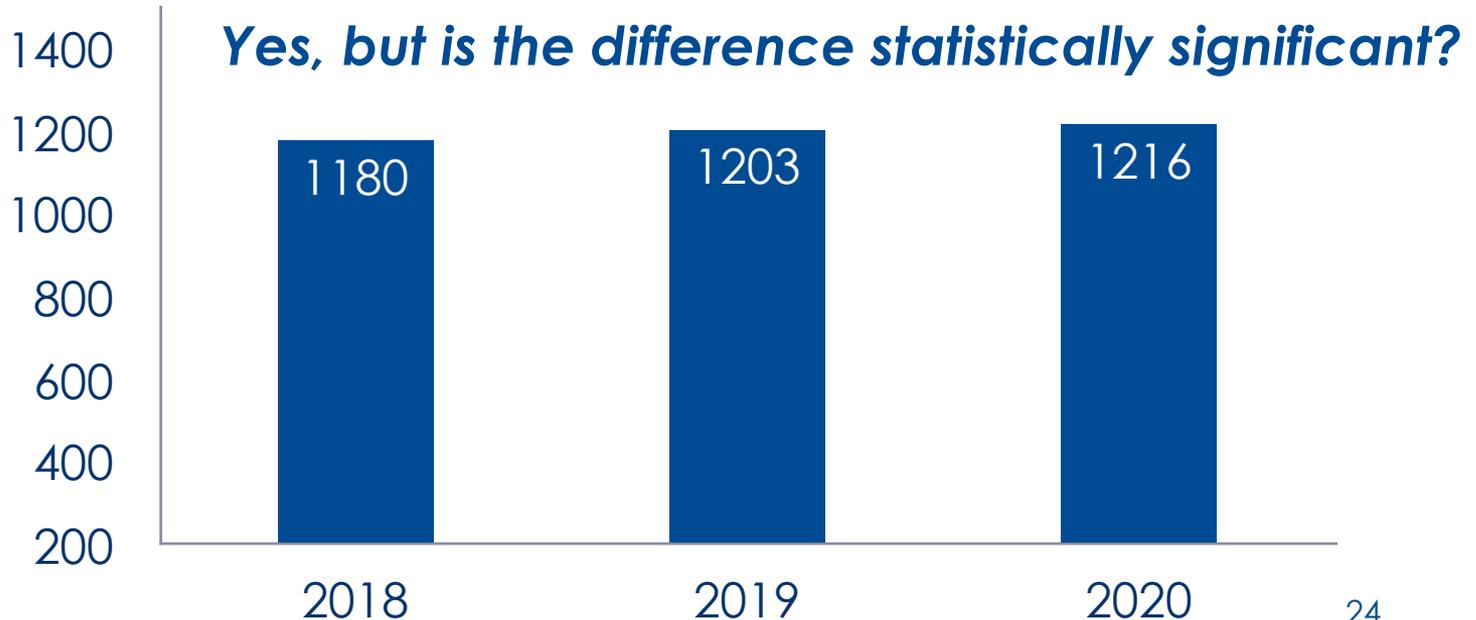
Yes, but is the difference statistically significant?

Year	Score
2018	1180
2019	1203
2020	1216

EXAMPLE #6

Use a T-Test to see if the difference is statistically significant…
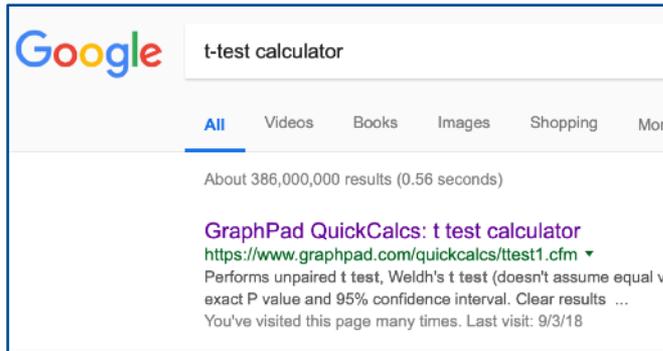
Copy/Paste from your Spreadsheet the two columns, in this case PSAT Scores from 2018 and 2020.

EXAMPLE #6

Use a T-Test to see if the difference is statistically significant…

Unpaired *t* test results

P value and statistical significance:
The two-tailed P value equals 0.1605
By conventional criteria, this difference is considered to be not statistically significant.

Confidence interval:
The mean of 2018 minus 2020 equals -35.59
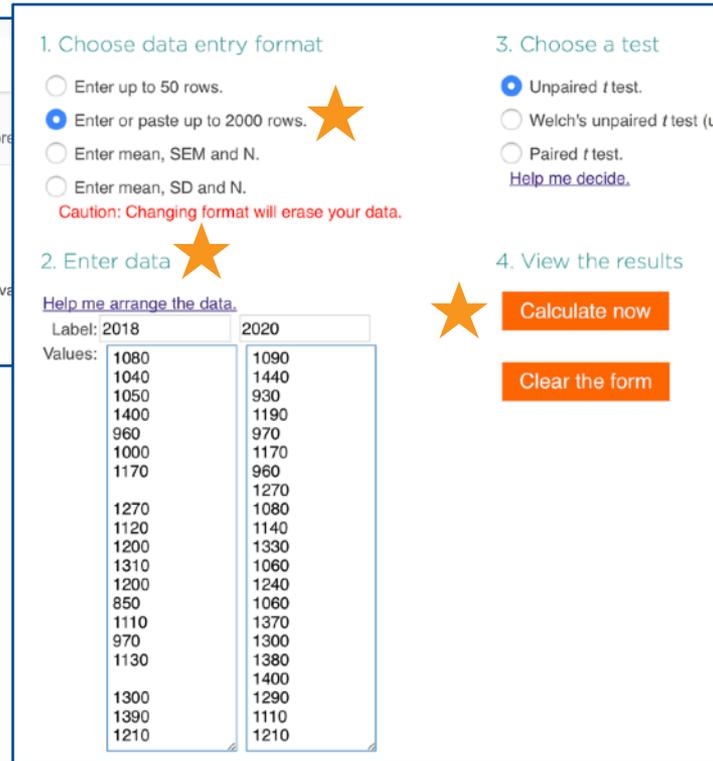95% confidence interval of this difference: From -85.47 to 14.29

Intermediate values used in calculations:
t = 1.4107
df = 142
standard error of difference = 25.232

Learn more:
GraphPad's web site includes portions of the manual for GraphP
statistics. First, review the meaning of P values and confidence inter
results from an unpaired or paired *t* test. These links include GraphP

Review your data:

Group	2018	2020
Mean	1180.30	1215.90
SD	153.14	148.92
SEM	18.85	16.86
N	66	78

P value of ≤0.05 is a statistically significant result. **The smaller the better.**

T-Test does NOT let you attribute cause, just that there's a **real difference between two groups**.

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PRACTICAL EXAMPLES

★ AP Scores

★ SAT Scores

★ Survey Data

EXAMPLES: AP

AP scores can both…

⭐ **Tell your school's story**.

⭐ **Empower teachers** to use data to improve.

EXAMPLE #7

Story: Good AP results are a combination of **talented students, excellent teachers**, and a **supportive learning environment.**
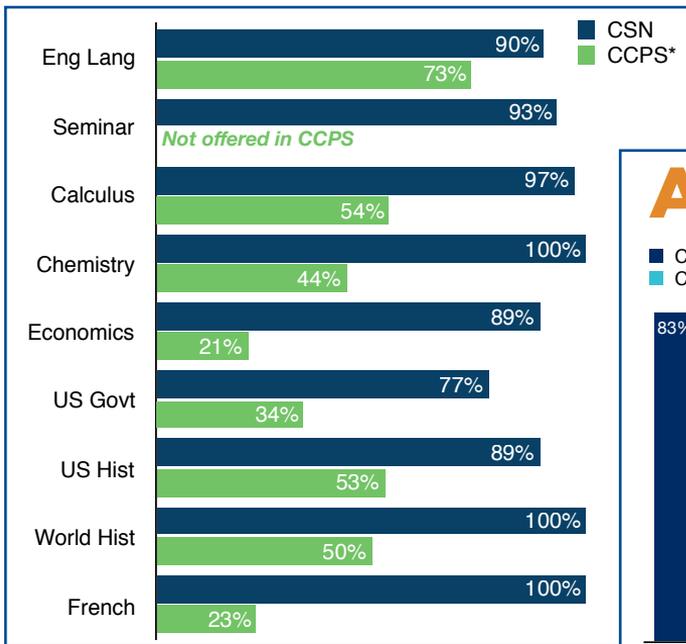
AP provides state-level data, but some school districts also release results. Having a comparison can help put your school's success in context.

Horizontal bar chart (CSN / CCPS*)

Subject	CSN	CCPS*
Eng Lang	90%	73%
Seminar	93%	Not offered in CCPS
Calculus	97%	54%
Chemistry	100%	44%
Economics	89%	21%
US Govt	77%	34%
US Hist	89%	53%
World Hist	100%	50%
French	100%	23%

AP Pass Rate by Subject

Subject	CSN	CCPS*
English	83%	63%
Math	95%	48%
Comp. Sci.	89%	44%
Science	88%	60%
Social Sci.	71%	51%
World Lang.	100%	87%
Capstone	100%	Not offered in CCPS
OVERALL	82%	56%
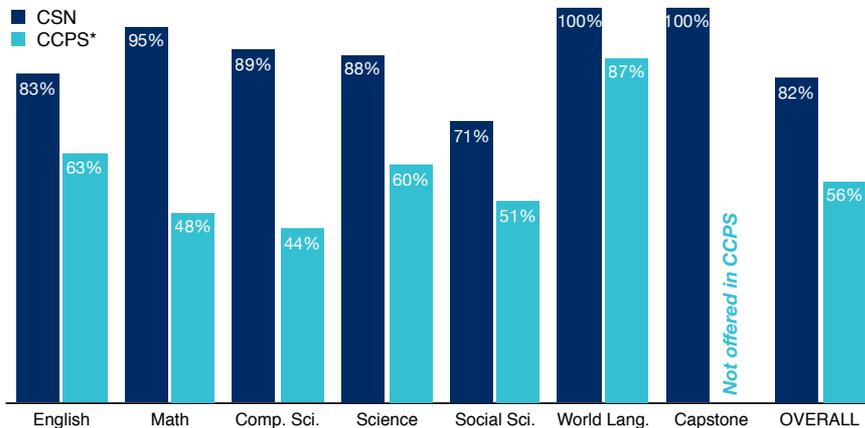
EXAMPLE #8

Story: Good AP results are a combination of **talented students**, **excellent teachers**, and a **supportive learning environment**.

1,838

The number of UF credit hours CSN students were eligible for based on their AP exam scores in 2017. That's the equivalent of **over 15 bachelors degrees** or **$390,960.98 in tuition!**

Converting your AP/IB scores into credit hours and tuition dollars is a very easy way to communicate your school's value.

EXAMPLE #9

After a disappointing year of AP results, we began emphasizing the importance of AP scores matching finals grades in class.

Dept	Course	Teacher	Student	Final Gr.	AP Sc.	Correl.
Hist	**Econ**	**Johnson**	***STATS**	**90.80**	**3.89**	**0.87**
Hist	Econ	Johnson	Last Name	85.42	3	
Hist	Econ	Johnson	Last Name	83.46	3	
Hist	Econ	Johnson	Last Name	83.29	4	

Created a spreadsheet with every student's final grade and AP score.

Created a scatterplot of every AP class and shared with AP teachers at the start of the school year.
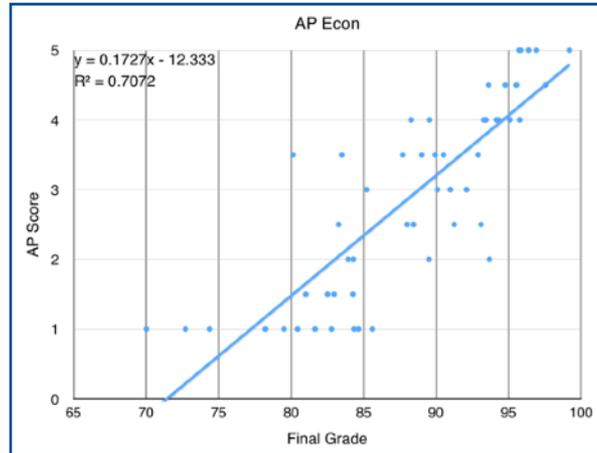
AP Econ

y = 0.1727x - 12.333
R² = 0.7072
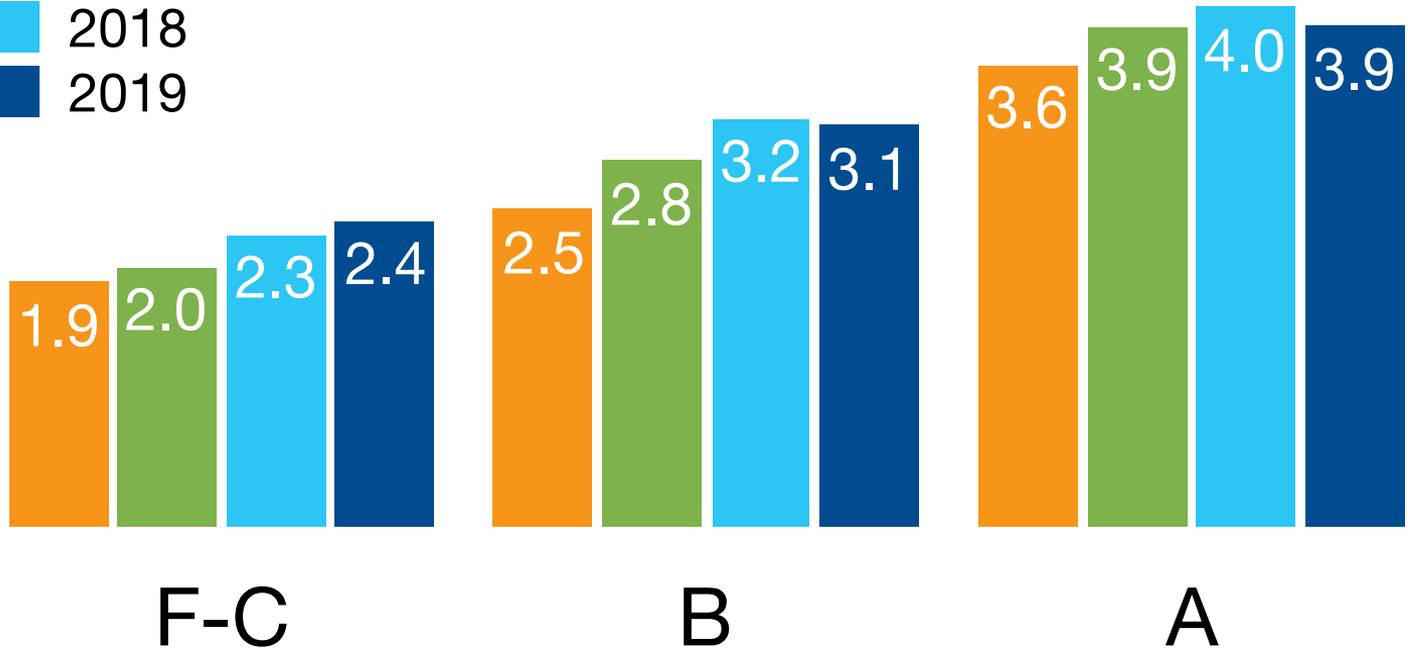
EXAMPLE #11

Teachers can also correlate their unit test grades with AP scores to both track and predict student results.

A ◄ ►	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
PD		AP AVG SCORE	REAL AP MICRO SCORE	REAL AP MACRO SCORE		U1	U2	U3	U4	U5		MID TERM	FULL MICRO	MICRO AVG
P4	LastName	4.5	5	4		5	5	5	5	5		5	5	5.00
P4	LastName	1.5	1	2		3	2	3	2	4		3	1	2.57

Correlation to AP Micro Score	
U1	0.57
U2	0.73
U3	0.70
U4	0.72
U5	0.69
Midterm	0.76
Final	0.75
AVERAGE	0.82

AP Micro Exam Score & Unit Test Average

$y = 1.3959x - 2.3339$
$R^2 = 0.7154$

(y-axis: AP Micro Score; x-axis: Micro Unit Test Averages)
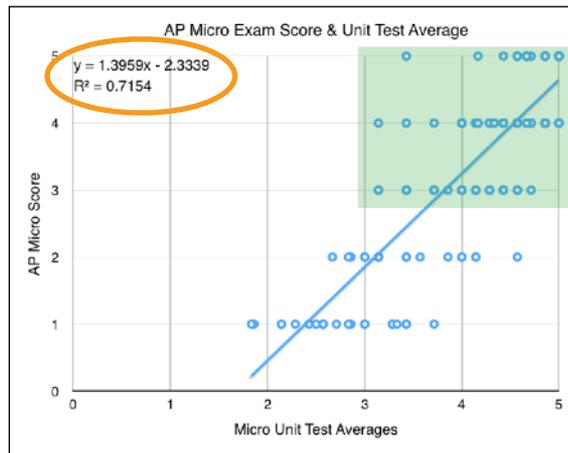
Q	R ►	Z	AA ◄ ►	AC
MICRO AVG		BIG AVG	MICRO ...T	AP AVG PREDICT
5.00		5.00	4.65 ×	=sum((Q2*1.3959-2.3339))
5.00		5.00	4.65	4.67

<u>Very Cool</u>: The line of best fit formula allows you to create a predicted score.

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EXAMPLES: SAT

Finding and comparing publicly available data can help your school **set goals and share success**.

EXAMPLE #12

This is often what independent schools report on their website to parents, but it has likely become white noise.

School	EBRW	Math
CSN	650	669
County	533	507
FL	517	493
USA	538	533
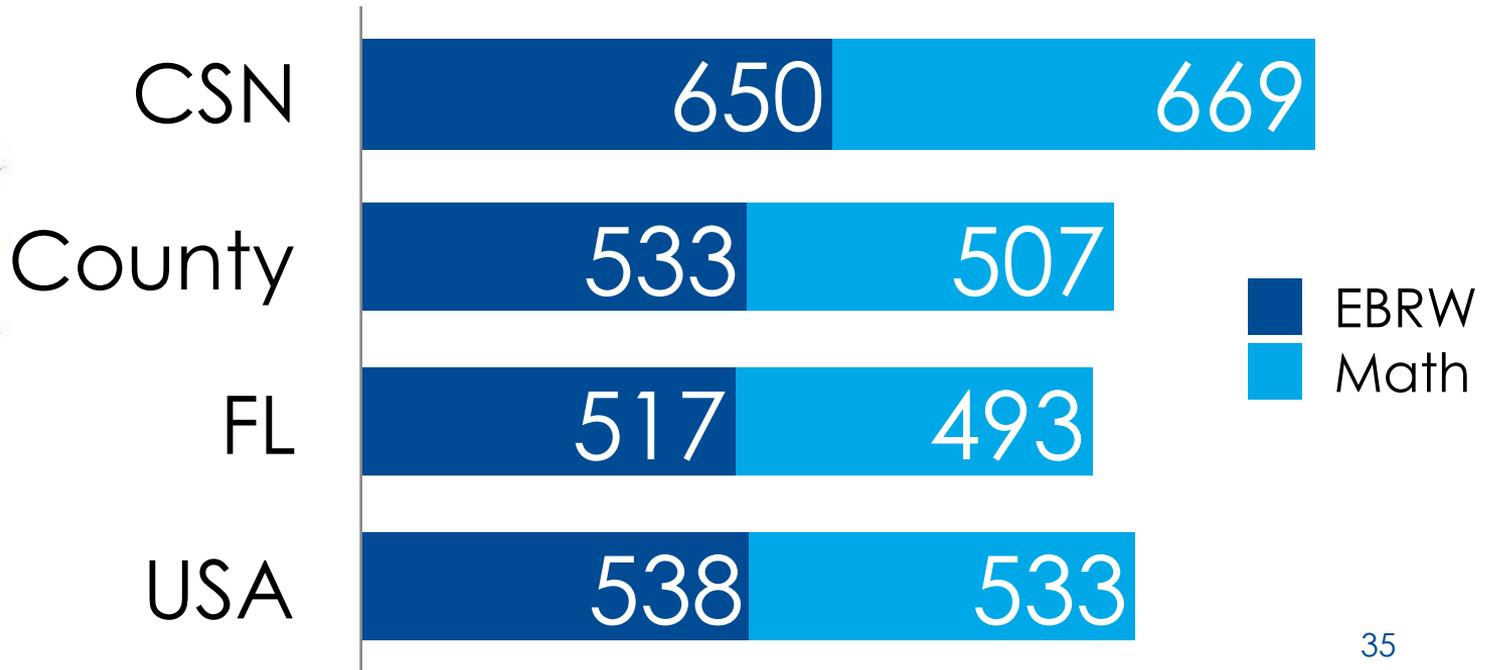
EXAMPLE #12

This is a fresher (and more comparable) way to present the exact same data.

86%ile

650

88%ile

669

505 ········· 50%ile

EBRW   Math
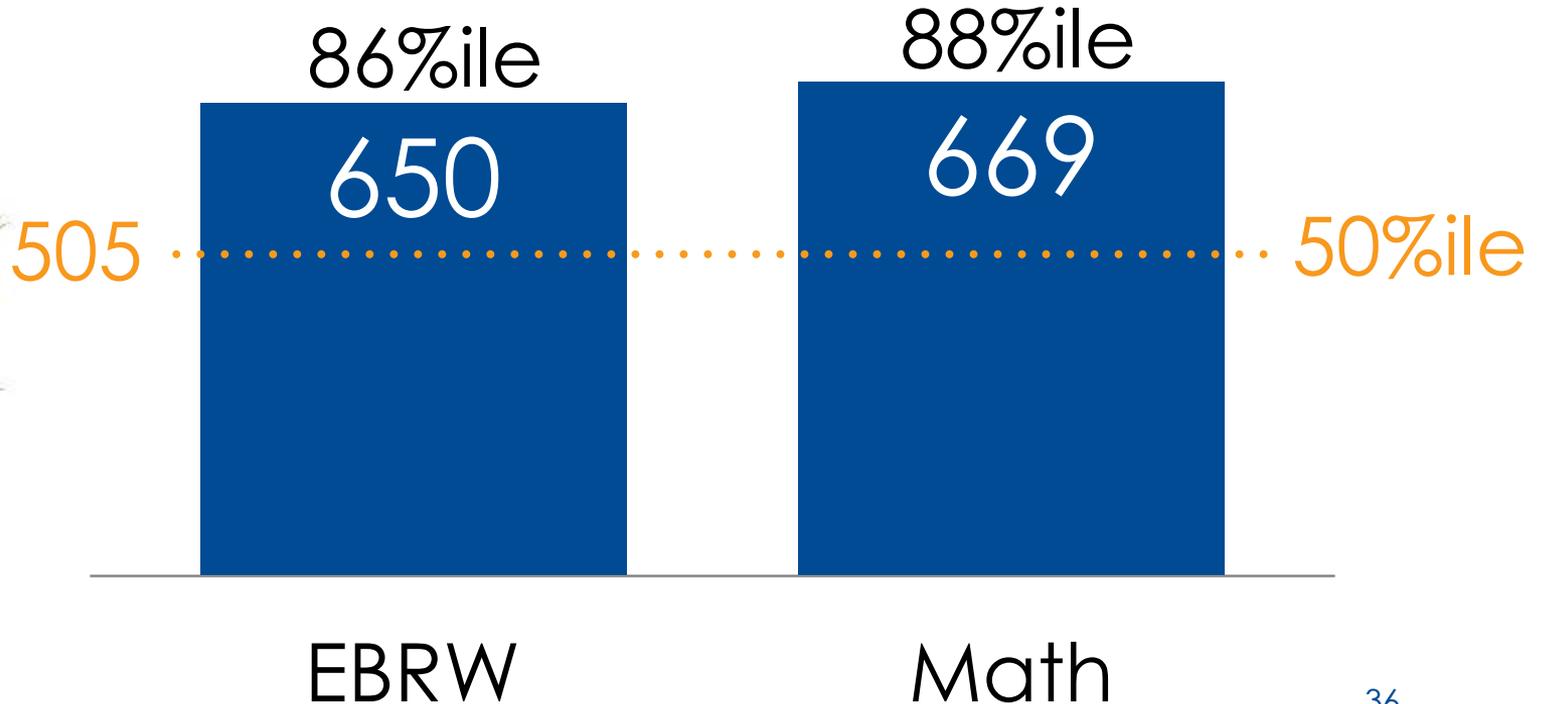
EXAMPLE #13

*Almost all **independent schools publish their School Profiles** on their websites for college admissions officers, which presents a wealth of comparable data. **Grouping by geography avoids naming schools.***

Region	Value
CSN	1319
SW FL	1212
SE FL	1279
Tampa	1210
Orlando	1188
North	1257

EXAMPLES: SURVEYS

Beyond test scores, you can **quantify almost anything with a survey**, such as…

★ Teaching Effectiveness

★ Alumni Success

★ Student Kindness

EXAMPLE #14

When creating surveys, use a 1-5 Likert Scale to easily quantify, compare, and track results.

1-5 Likert scale: Strongly Agree, Agree, Neutral, Disagree, or Strongly Disagree

- My teacher knows a lot about his/her subject.
- My teacher is excited about his/her subject.
- My teacher has high expectations for his/her students.
- My teacher is good at explaining new ideas.
- My teacher uses a variety of instructional strategies to help me learn.

OTHER EXAMPLES?
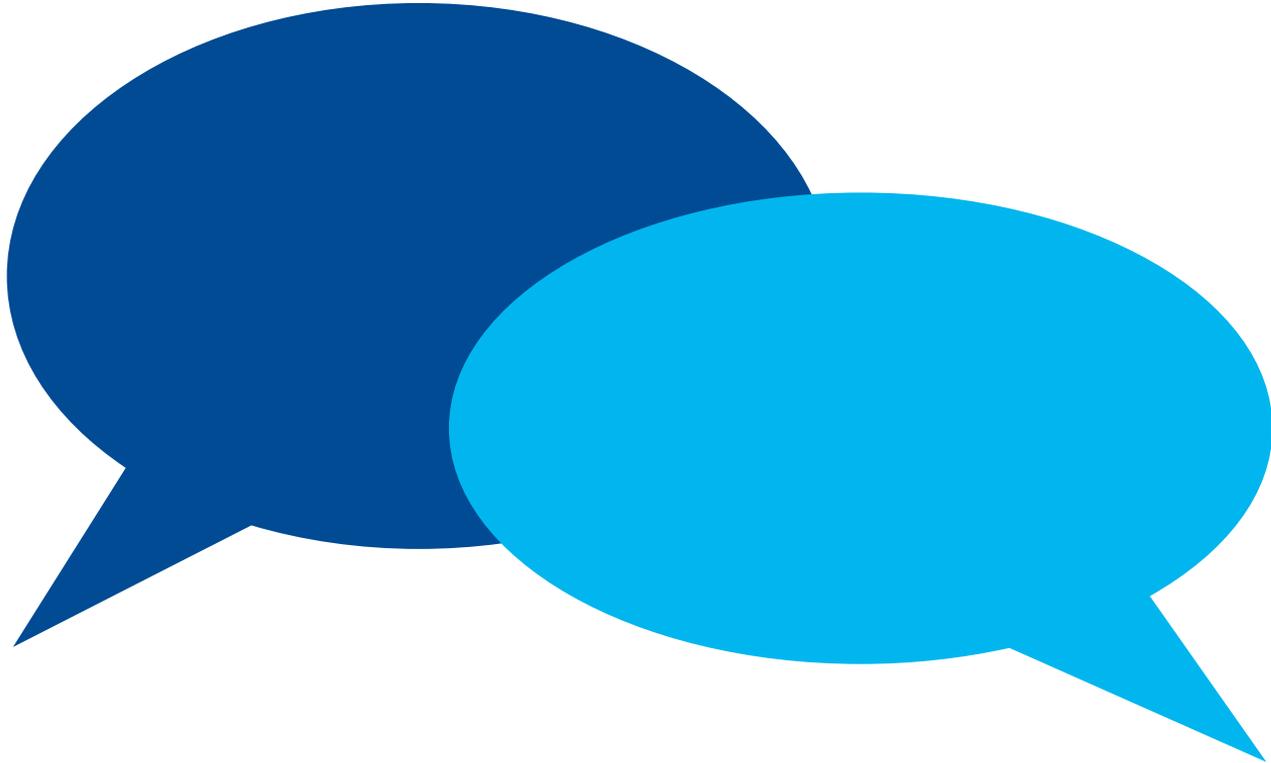
FINAL THOUGHTS

★ **Every school has strengths** which can (and should) be communicated through data and graphs.

★ **Your school's strengths should <u>drive the data</u>**, not the other way around.

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FINAL THOUGHTS

★ **Combine Data with Qualitative Stories**: Not all results can be boiled down to numbers

★ When presenting, **be ready to answer questions** and describe methodology. Know the data!

FINAL THOUGHTS

★ Whenever you share data, you are hopefully equipping your audience to share it with others. **Compelling stories are repeated**.

Thank You!

Eric G. Johnson, Ed.D
ejohnson@communityschoolnaples.org
Head of Upper School
Community School of Naples

Reach out with any data questions or ideas–I am happy to help!

INFOGRAPHICS

Examples of how to present data in a flyer or poster format for parents.

CSN Upper School 2017 AP Results
By the Numbers — AP®

Compared to the previous year, CSN increased the number of 5's by 50% and decreased the number of 2's by 50%, **demonstrating an increased level of student achievement across the board.**

Legend: 2017 / 2016

	5's	4's	3's	2's	1's
2017	121	159	190	72	53
2016	82	149	177	137	70

92.4% of the Class of 2017 **passed at least one AP exam** during their four years at CSN.

Didn't Pass 21% / Passed 79%

On nearly every AP test, **CSN students significantly outperformed** their peers in Collier County, particularly in the following areas below.

Legend: CSN / CCPS*

Subject	CSN	CCPS*
Eng Lang	90%	73%
Seminar	93%	Not offered in CCPS
Calculus	97%	54%
Chemistry	100%	44%
Economics	89%	21%
US Govt	77%	34%
US Hist	89%	53%
World Hist	100%	50%
French	100%	23%

Most AP courses at CSN are open to any student (not just the select few) willing to do the work and curious about the subject. **83% of all CSN students passed at least one of their exams,** compared to just 55% in Florida, 58% at Naples HS and 47% at Barron Collier HS.*

1,838 The number of UF credit hours CSN students were eligible for based on their AP exam scores in 2017. That's the equivalent of **over 15 bachelors degrees** or **$390,960.98 in tuition!**
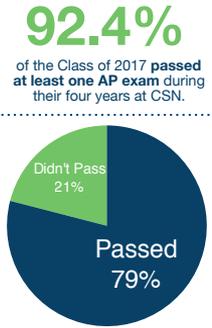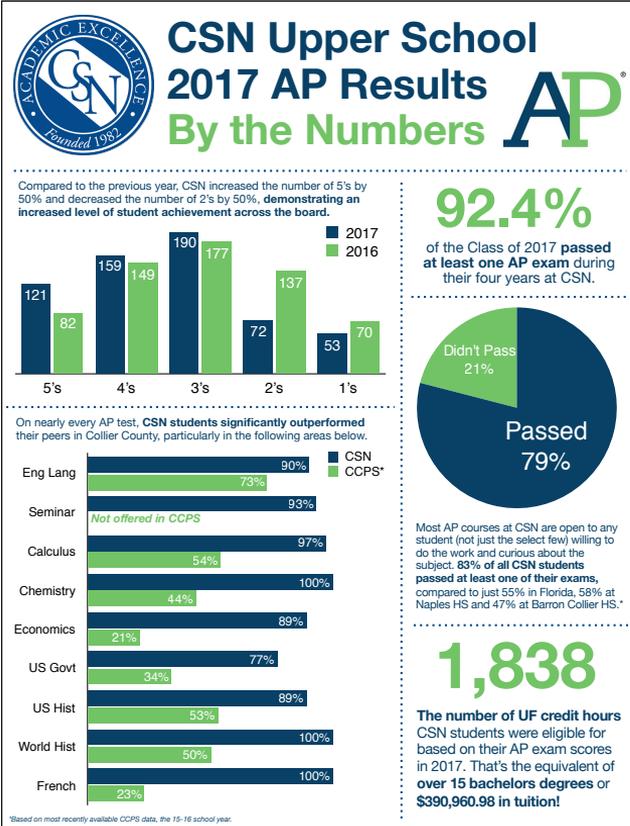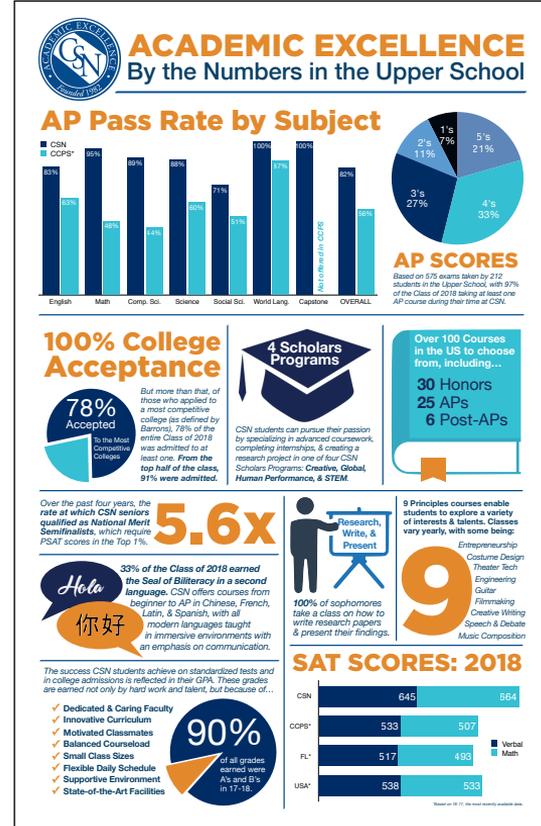
*Based on most recently available CCPS data, the 15-16 school year.

ACADEMIC EXCELLENCE
By the Numbers in the Upper School

AP Pass Rate by Subject

Legend: CSN / CCPS*

Subject	CSN	CCPS*
English	83%	63%
Math	95%	68%
Comp. Sci.	89%	44%
Science	88%	60%
Social Sci.	71%	51%
World Lang.	100%	57%
Capstone	100%	
OVERALL	82%	56%

AP SCORES
Based on 575 exams taken by 212 students in the Upper School, with 97% of the Class of 2018 taking at least one AP course during their time at CSN.

Pie chart: 1's 7%, 5's 21%, 2's 11%, 4's 33%, 3's 27%

100% College Acceptance
78% Accepted To the Most Competitive Colleges

But more than that, of those who applied to a most competitive college (as defined by Barrons), 78% of the Class of 2018 was admitted to at least one. **From the top half of the class, 91% were admitted.**

4 Scholars Programs
CSN students can pursue their passion by specializing in advanced coursework, completing internships, & creating a research project in one of four CSN Scholars Programs: **Creative, Global, Human Performance, & STEM**

Over 100 Courses in the US to choose from, including…
30 Honors
25 APs
6 Post-APs

Over the past four years, the rate at which CSN seniors qualified as National Merit Semifinalists, which require PSAT scores in the Top 1%.
5.6x

Hola 你好
33% of the Class of 2018 earned **the Seal of Biliteracy in a second language.** CSN offers courses from beginner to AP in Chinese, French, Latin, & Spanish, with all modern languages taught in immersive environments with an emphasis on communication.

Research, Write, & Present
100% of sophomores take a class on how to write research papers & present their findings.

9 Principles courses enable students to explore a variety of interests & talents. Classes vary yearly, with some being:
Entrepreneurship
Costume Design
Theater Tech
Engineering
Guitar
Filmmaking
Creative Writing
Speech & Debate
Music Composition

The success CSN students achieve on standardized tests and in college admissions is reflected in their GPA. These grades are earned not only by hard work and talent, but because of...
✓ Dedicated & Caring Faculty
✓ Innovative Curriculum
✓ Motivated Classmates
✓ Balanced Courseload
✓ Small Class Sizes
✓ Flexible Daily Schedule
✓ Supportive Environment
✓ State-of-the-Art Facilities

90% of all grades earned were A's and B's in 17-18.

SAT SCORES: 2018

Legend: Verbal / Math

	Verbal	Math
CSN	645	664
CCPS*	533	507
FL*	517	493
USA*	538	533

*Based on 16-17, the most recently available data.