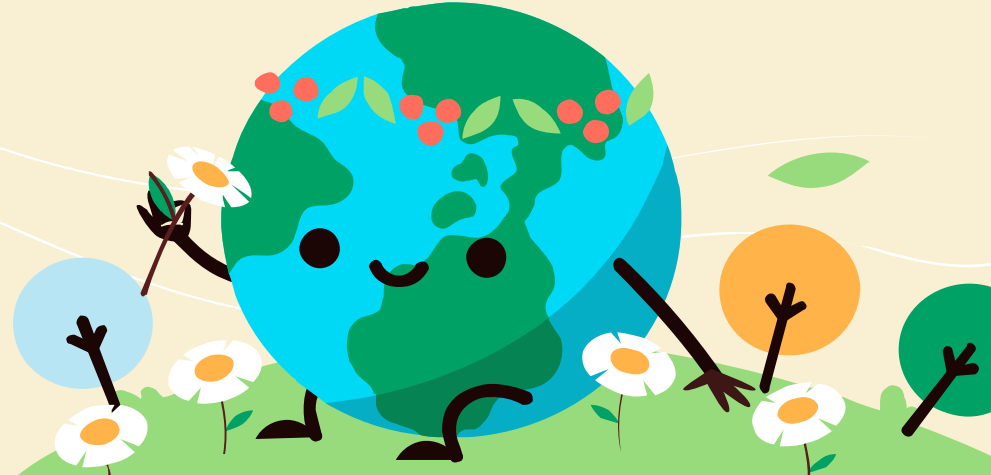
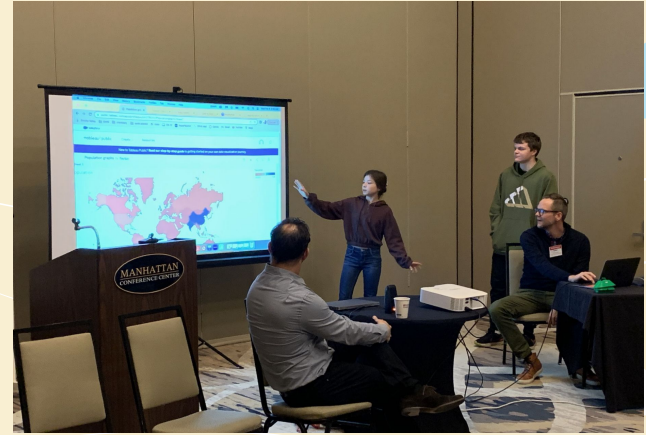


Smoky Valley BTU Crew

Lindsborg, Kansas

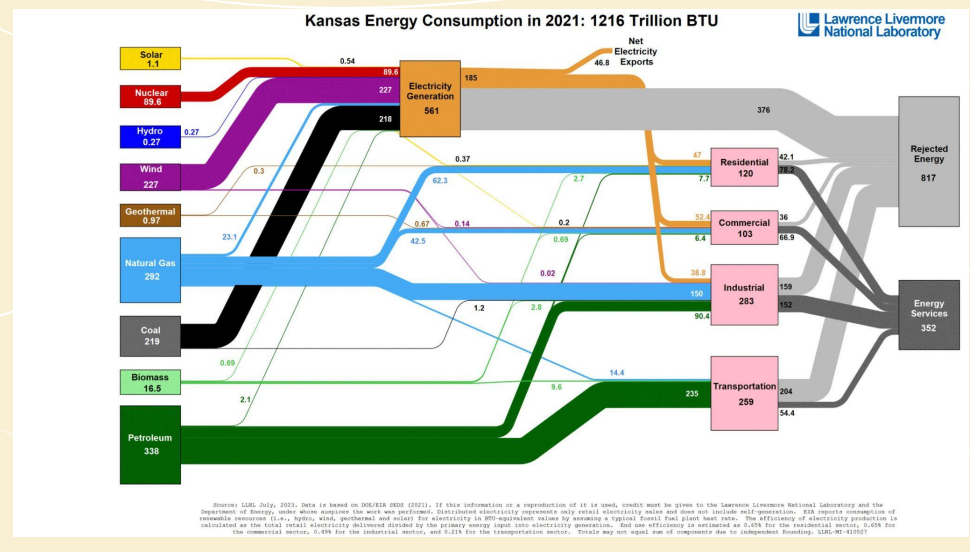
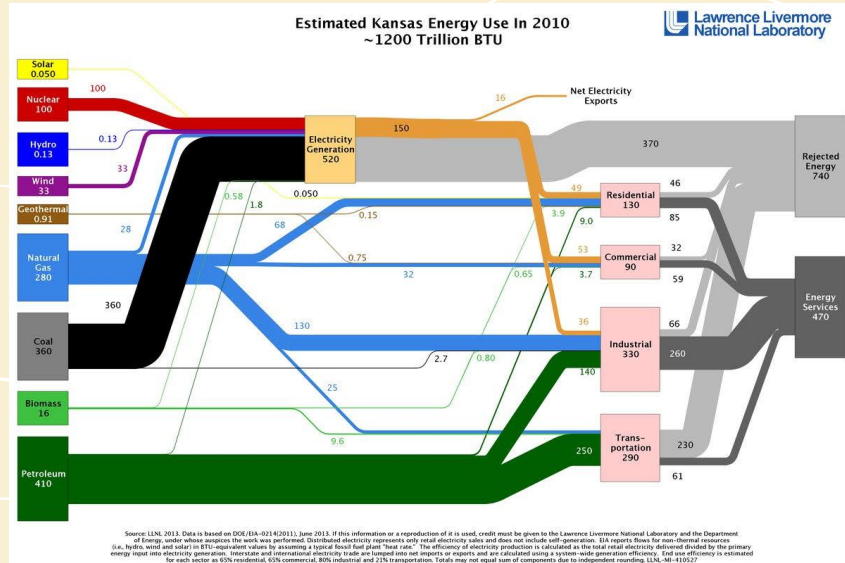
Mr. Adam Krug
Claire Blanner, Anna Karnes, Peyton
Wesley and Brock Gengler



Why Study Energy?

Energy is everywhere! It is necessary for how we got here, how we're living, and how we will thrive in the future. Studying energy will allow us to advance in everything we do and find ways to make the Earth and our lives better. Studying energy is cross curricular and involves math, science, economics, and politics. It allows us to find patterns, problems, and reasons why and how we do certain things. Our calculations with going over the LLNL Energy Flow Charts (pictured below) show a 16% increase of renewable energy use in the last decade.

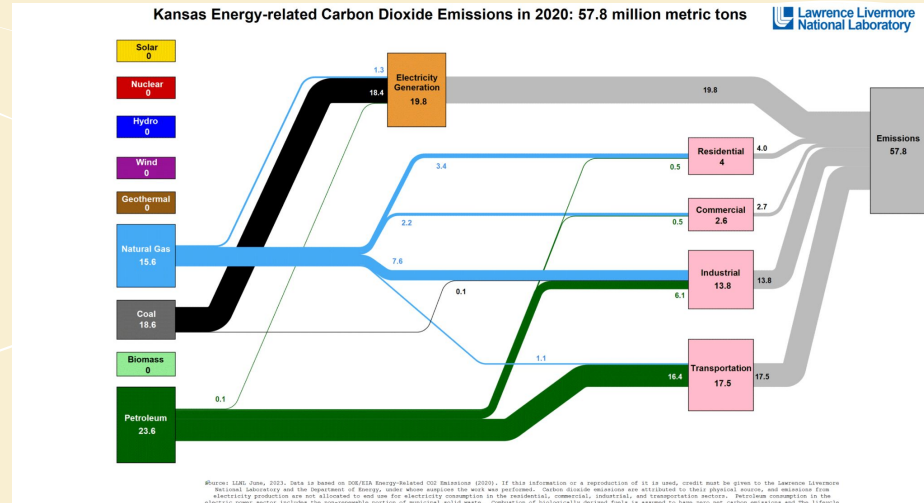
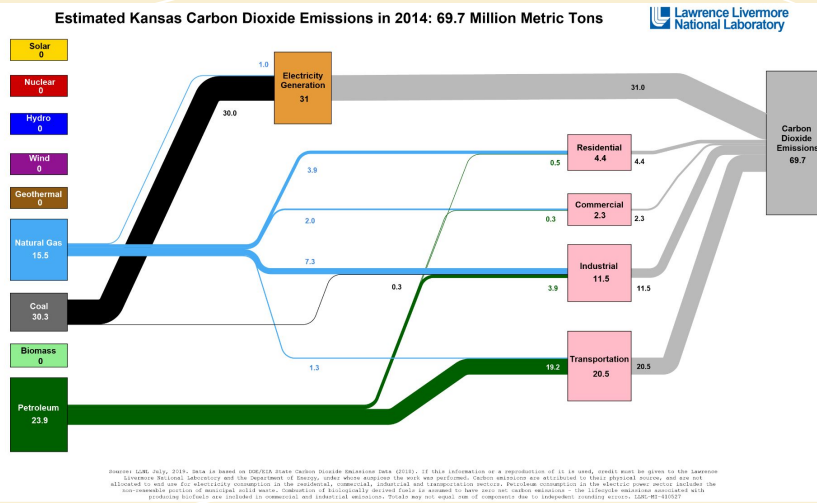
Sources for electricity generation changed significantly with coal decreasing and wind increasing dramatically.



Note the changes in black and purple on the flow charts black = coal purple = wind

Analysis and Calculations

It takes data science, communication, and creativity to study the energy. The possibilities of studying and growing energy sources is endless. You can see in the charts that the carbon dioxide emissions are dropping as a result of the increase in renewable energy, but there is always so much more to the story. Even with the increase in renewables there will continue to be a significant presence of fossil fuels into the future. We want to help others learn how to make 'data-driven decisions' as this is needed not just in energy, but all industries.



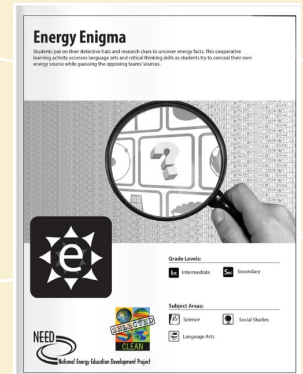
2014 CO2 Emissions = 69.7 million metric tons

2020 CO2 Emissions = 57.8 million metric tons

17% reduction in six years

Timeline

- November 2021 - Intro to energy workshop
- December 2021 - Energy Enigma with Earth Science classes
- May 2022 - Introduced KidWind as an end of year challenge
- June 2022 - Data Analytics Certification 1 workshop
- January 2023 - Certified 50 students in Data Analytics 1
- February 2023 - Mr. Krug and 2 students presented at CTE conference in Manhattan
- February 2023 - Competed in KidWind regional challenge with 7 students
- April 2023 - Presented to fellow teachers at KATS conference in Wichita
- May 2023 - Presented to Smoky Valley USD#400 Board of Education
- August 2023 - Presented to teachers and administrators in Branson, MO - GOCS D
- November 2023 - Virtual presentation in Tennessee with Brock about data analytics
- February 2024 - Presented with a group of 7 students at CTE conference in Manhattan
- February 2024 - KidWind regional challenge in Hutchinson with 5 students
- February 2024 - CTE Legislative Day at the Capitol in Topeka
- March 2024 - Presented projects to the KTOY finalists visiting Smoky Valley
- April 2024 - Presented projects to the local CTE Advisory council
- April 2024 - Visit Trane Customer Education Center to explore next steps



Data Analytics - CTE Legislative Day in Topeka

Legislative Update from Brenda Dietrich

[View Email in Browser](#)



Turnaround

The legislature has reached the “Turnaround” point of the session, which in legislative terms essentially means halftime. Under legislative rules, most bills must be adopted by one chamber in order to be considered by the other chamber. The exception would be bills in a few exempt committees such as Ways & Means, Taxation, and Federal & State Affairs.

Visited the capitol to engage with state legislators and the public.
Showcased the data and research visualization projects from class. State Senator Brenda Dietrich featured our visit in her legislative update!

Visitors in the Capitol

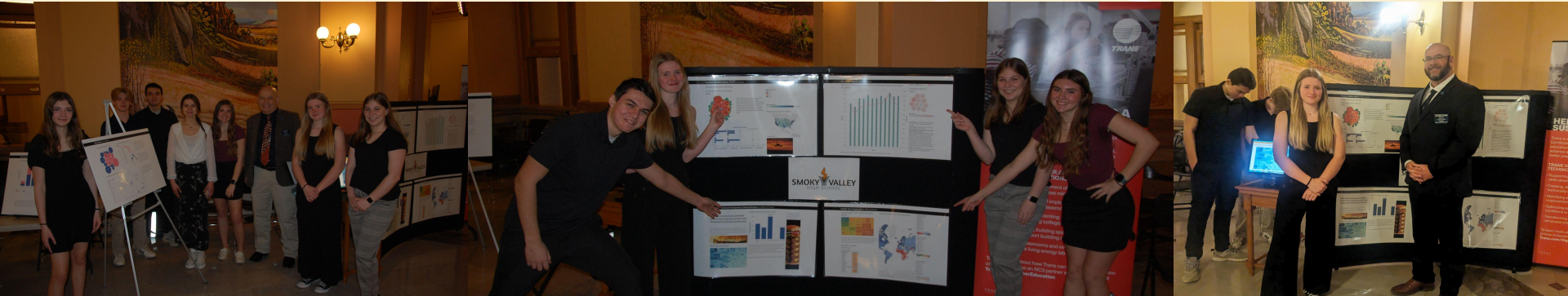
Tuesday, Feb. 20th, was Career and Technical Education Day at the Capitol. I met lots of high school students from across the state who shared their projects. These young ladies were freshmen from Smoky Valley High School in Lindsborg! They expertly articulated their work and had amazing data to share. What a great day to showcase students and their teachers.



CTE Legislative Day in Topeka

On February 20th, 7 SVHS students and Mr. Krug packed into a suburban and left at 4:30 AM to head to the capitol building in Topeka! We presented our own data analytic projects to legislators and people from other schools around the state.

“I was thoroughly impressed by Anna and Claire’s research projects presented at the Kansas State Capitol. Not only was their research fantastic, their ability to present with confidence was to be commended. There is no doubt in my mind that these two ladies will be leaders in their fields of study ” - Stephen Owens, State Representative 74th House District



CTE conference in Manhattan 2023 and 2024

- Spoke to teachers and administrators about data analytics, KidWind, and energy building analysis.
- Public speaking opportunity where we got to share our findings with other teachers and administrators, and then we got to answer any questions they had.
- We also got the chance to walk around and see other educational projects they were working on from 3D printing to robots.

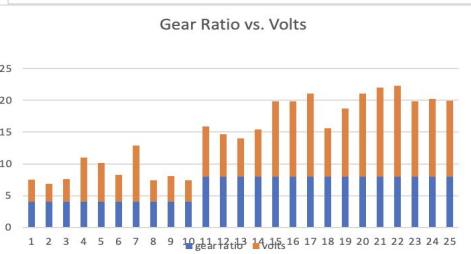
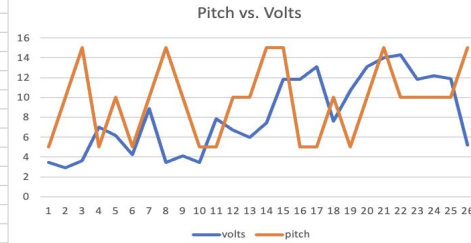


KidWind

- Collect data and use it to improve designs
- Use spreadsheets to input and organize data
- Get comfortable with large data (over 100 data points)
- Make graphs to show trends across all class periods
- Compete against each other in class trying for the most energy
- In year 2 we increased gear ratios and improved problem solving in real time
- The most successful students in classroom trials traveled to Hutchinson to compete against other schools

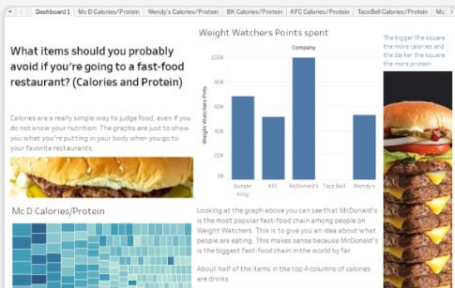


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	KidWind Data Collection														
2															
3	set #1 - # of	gear ratio	pitch	volts											
4	2	4	5	3.47											
5	2	4	10	2.89			gear ratio	volts	pitch						
6	2	4	15	3.64			4	3.47	5						
7	2	8	5	7.88			4	2.89	10						
8	2	8	10	6.71			4	3.64	15						
9	3	4	5	6.98			4	6.98	5						
10	3	4	10	6.14			4	6.14	10						
11	3	4	15	4.23			4	4.23	5						
12	3	8	10	6			4	8.9	10						
13	3	8	5	7.4			4	3.45	15						
14	4	8	5	11.81			4	4.1	10						
15	4	4	10	8.9			4	3.45	5						
16	4	8	10	11.8			8	7.88	5						
17	4	8	15	13.1			8	6.71	10						
18	4	4	15	3.45			8	6	10						
19	2	8	5	7.6			8	7.4	15						
20	2	8	5	10.68			8	11.81	15						
21	2	8	10	13.1			8	11.8	5						
22	3	8	5	14.02			8	13.1	5						
23	3	4	10	4.1			8	7.6	10						
24	3	4	15	3.45			8	10.68	5						
25	3	8	10	14.3			8	13.1	10						
26	4	8	10	11.8			8	14.02	15						
27	4	8	10	12.2			8	14.3	10						



Data Analytics

When we were learning data analytics, we learned about the history of the charts and graphs. We looked at several data sets from our own school and were able to look at data some other people had made. We used software called Tableau to analyze large data sets (thousands of data points). Pets, Nascar, car crashes, populations trends/migration, and many more were studied. The possibilities are endless!



Fast food restaurant comparison calories/protein

Rebel O'Farrell

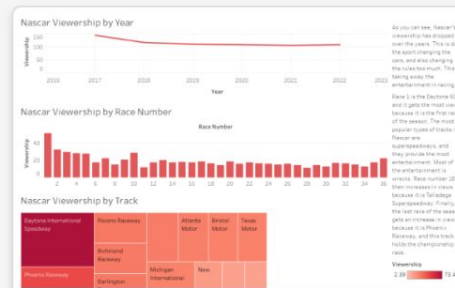
★ 1 👁 64



Population graphs

Peyton

★ 1 👁 108



Nascar

Brock Gengler

★ 2 👁 137



Cats vs dogs

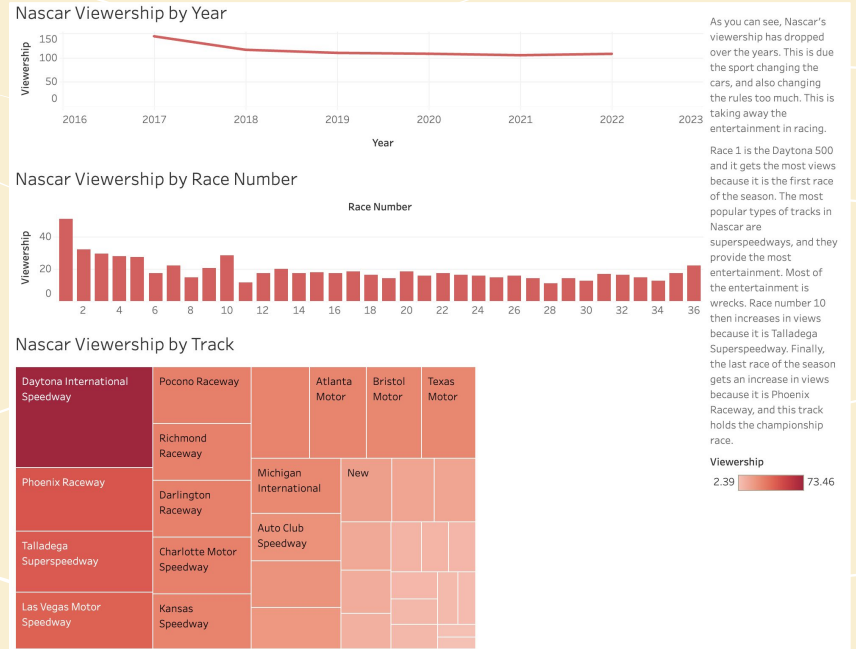
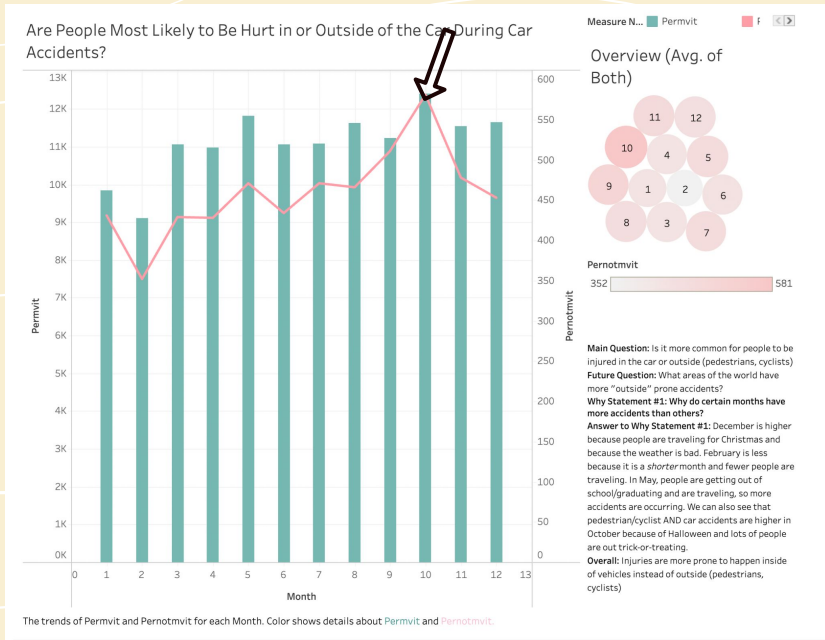
Madison Myers

★ 1 👁 45

Data Analytics Graph Explanation

Here, we can see that both pedestrians/cyclists and people inside of the cars have abnormally high number of injuries in the month of October because of Halloween!

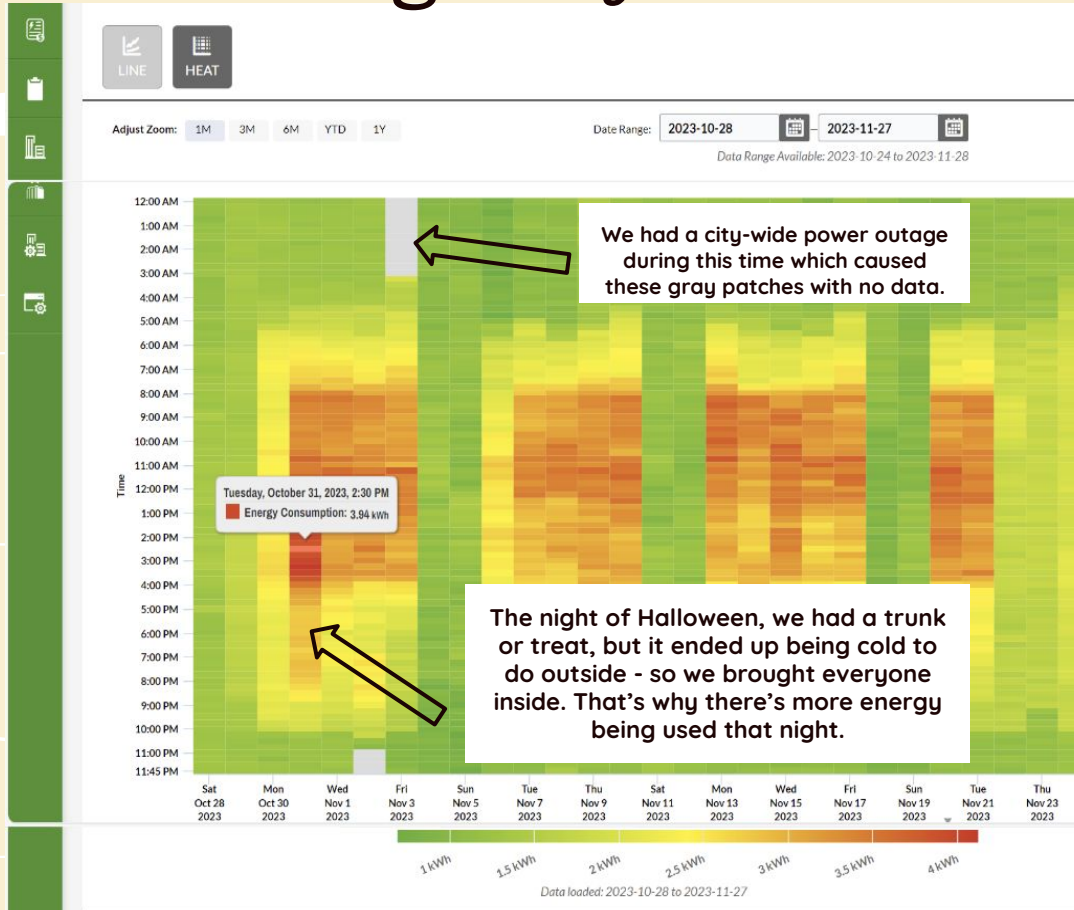
In this Nascar Dataset, you can see that the first race is very popular because it is the first race of the season, and there are many wrecks! At the bottom, the darker the color is, the more viewership the race has.



Pink: Pedestrians/Cyclists Teal: People in Cars

Maroon: More Views Light Red: Less Views

Building analytics



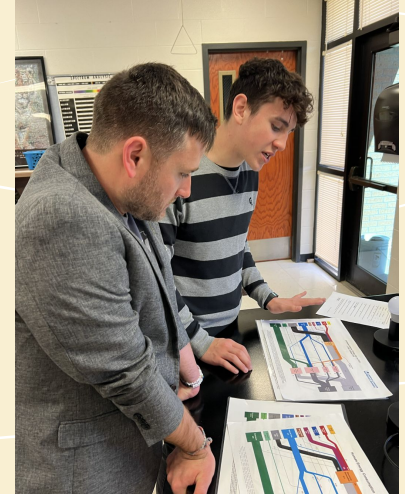
When we first started looking at data analytics, we had a member from Trane, Dan Whisler, come to SVHS and talk to us about energy and some energy data sets. We were able to look at our school's energy consumption. The greener, the less amount of energy used. The redder, the more energy used. During the weekends we can see that there's barely energy being used because no one is in the building.

Present to 8 finalists for KTOY

We were very lucky to have the 8 finalists for Kansas Teacher of the Year visit Smoky Valley and 14 students had the opportunity to present our projects and research.

“The KTOY team was extremely impressed with the data analytics and energy analysis and KidWind Topics. It was extremely invigorating to see young students work at such high levels, and even more, to be able to speak so eloquently to our group. The presentation was the highlight of an already awesome day!”

-Gretchen Elliott (2024 KTOY Finalist)



Smoky Valley CTE Advisory Presentation

NC3 “Harnessing the Power of Data” is listed as a certification in every Kansas CTE pathway and 85 SVHS student have earned the credential in the last two years!



Currently 85 SVHS students have earned their “Harnessing the Power of Data” IRC!

Kansas Pathway Assessments, Credentials, or Certifications (K-PAC)

The K-PAC includes Assessments, Credentials and Certifications organized by Pathway.

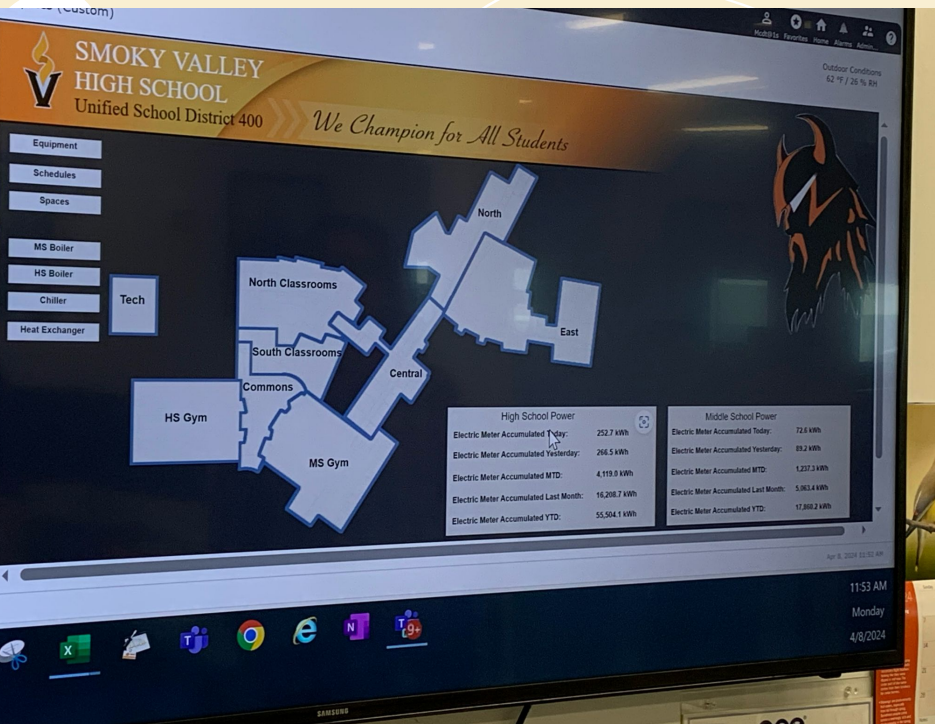
The K-PAC, Kansas Pathway Assessments, Credentials, and Certifications document is organized by Pathway. The assessments, credentials and certifications are listed by name and CTE certification code number. In addition, the assessments and credentials are organized by: 1. 2023-2024 Excel in CTE (SB155) Qualifying Recognized Credential Incentive List 2. Postsecondary Success Approved High School Credentials 3. End of Pathway Assessment/Certification for Completer Status 4. Certifications Counting for Completer Status and 5. Minimum Professional Certification Requirement for Pathway Approval.

Color Coding for Career Fields/Clusters		
Media & Technology Field	Public Services Field	Health Field
ARTS, A/V COMMUNICATION CLUSTER	EDUCATION & TRAINING CLUSTER	HEALTH SCIENCE CLUSTER
INFORMATION TECHNOLOGY CLUSTER	GOVERNMENT & PUBLIC ADMINISTRATION	Agriculture Field
Design, Production & Repair Field	LAW, PUBLIC SAFETY, CORRECTIONS & SECURITY CLUSTER	AGRICULTURE CLUSTER
TRANSPORTATION CLUSTER	Business Field	Family & Consumer Sciences Field
ARCHITECTURE & CONSTRUCTION CLUSTER	BUSINESS MANAGEMENT & ADMINISTRATION CLUSTER	HOSPITALITY & TOURISM CLUSTER
ENGINEERING CLUSTER	FINANCE CLUSTER	HUMAN SERVICES CLUSTER
MANUFACTURING CLUSTER	MARKETING CLUSTER	

Pathway	Assessments, Credentials or Certifications	CTE Certification Code	SB123 Industry Sought Credentials	Excel in CTE (SB155) Qualifying Recognized Credential Incentive List	KPAC	Postsecondary Success Approved High School Credentials	End of Pathway Assessment/ Certification for Completer Status	Certifications Counting for Completer Status	Minimum Professional Certification Requirement for Pathway Approval
AGRICULTURE CLUSTER									
Agribusiness Systems									
	KS Dept. of Agriculture: KS Agriculture Skills & Competencies	1071	X	2023-2024	X	2016-2022		X	X
	CareerSafe: OSHA Safety Certification (10 Hour)	1098			X				X
	cPass: Comprehensive Assessment	1114			X	2016-2017	X		
	NC3: Data Analytics/Harnessing the Power of Data	1147			X				X
Animal Science									

Presented to community members and teachers responsible for the career pathways that our district offers.

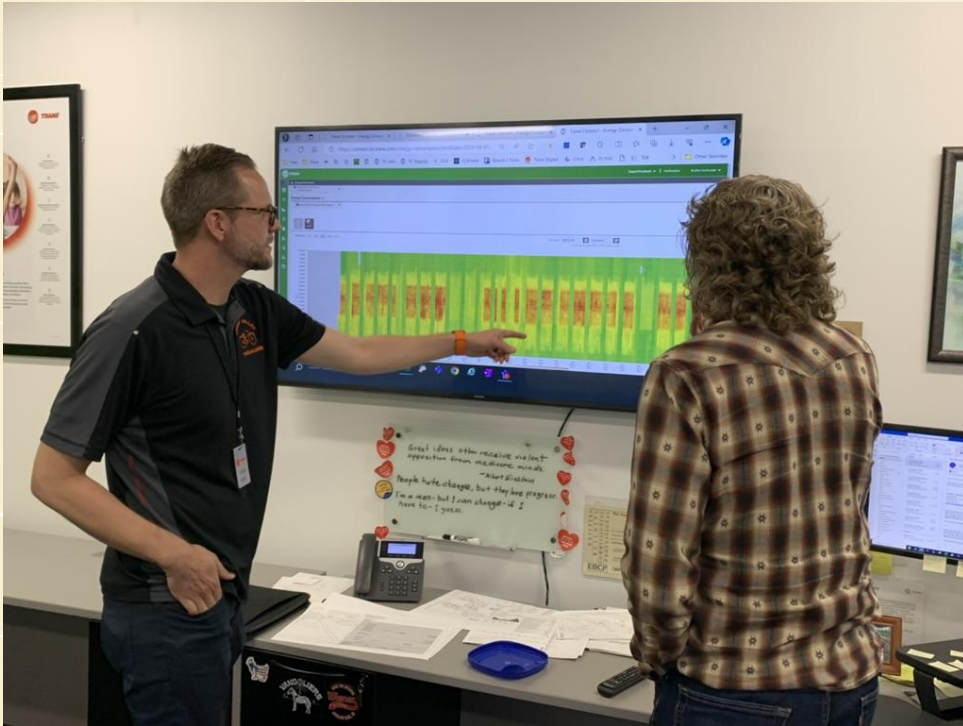
Next Steps



“Our students at Smoky Valley high school have been gaining real world experience as they discover how data analytics is used in every business and industry. They’ve presented to our local Board of Education, to local community leaders, to administrators and educators from across the state of Kansas at a statewide CTE conference as well as participating in the day on the Hill at the Kansas State Capitol, where they rubbed shoulders with state legislators and explained what they were learning. Our local district strategic planning process is showing that our community is wanting our students to experience more opportunities in technical education. Data analytics dovetails nicely in that it is found in virtually every industry in the United States. Our students are getting real world experience that opens the doorways for their future.” -Joe Ryan
(USD 400 Board of Education President)

Next Steps

Visited the Trane Customer Education Center to see how they analyze thousands of buildings including ours!



With the data we have today we can track the amount of energy being used in most buildings. You can see that we use more energy during school hours. Using this data we can see patterns and trends which can help us study energy efficiency and save money in the future! We will continue and expand the use of engaging lessons from KidWind, the NEED project, and BTU Crew. Making a course that centers on energy analytics and efficiency that uses our school as a learning lab is a goal in the next two years. Also, we will work with other subjects areas to make more cross curricular connections with data analytics.