WELCOME TO THE

86th Annual Twin Cities Regional Science Fair
32nd Annual St. Paul Science Fair
30th Annual Western Suburbs Science Fair

Twin Cities Regional Science Fairs

Serving Ramsey, Hennepin, Washington, Dakota, Anoka, Chisago, Isanti, Sherburne, and Wright Counties

2024
March 1 – 3
Research Papers February 5 -18

Affiliated with the International Science & Engineering Fair and the
Minnesota Academy of Science Minnesota State Science & Engineering Fair

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**WELCOME TO THE 86th ANNUAL TWIN CITIES REGIONAL SCIENCE FAIR,
THE 32nd ANNUAL ST. PAUL REGIONAL SCIENCE FAIR,
THE 30th ANNUAL WESTERN SUBURBS REGIONAL SCIENCE FAIR.**

Our Host this year is the Minnesota State Fairgrounds – Warner Coliseum
Our host for our research competition is tcrsf.zfairs.com.

Students: YOUR NAME BADGE is <u>required</u> both Friday and Sunday.

All projects *must* have a **vertically displayed abstract** at their exhibit. All projects who required a **Form 1C** (for work done in any site other than home, school or field) and/or **Form 7** (for projects that are a continuation from a previous year) must post these vertically on the project exhibit. Save all your project forms after the fair. TCRSF will send project forms to state for those projects advancing to state, but you will still need a copy at your project exhibit during state. Alternates to state: you may be promoted to become a state presenter. Save your forms!

1. The show floor is divided into Middle School (MS, grades 6-8) and High School (HS, grades 9-12). Next projects are set up by category, then number. The last 4 digits in your project number are unique and in numeric order. When you find your place, set up your project. If you ordered electricity, find your place in "Electricity Row."
2. After your project is completely set up, self-check your display to make sure it meets all the requirements on the green Display & Safety checklist. If you need help, ask. This year, put the green Display & Safety page that you checked on your exhibit table top and WAIT. Our Display & Safety team members will walk up and down the aisles. Wait for them to check your display. If you have any videos or photos to show judges, please be ready to show them to the Display & Safety team. You will need to correct any violations before competition.
3. **There is no food or beverage allowed anywhere in the competition area.** A closed bottle of drinking water is the only exception. (Food may be eaten in the lobby area by the concessions food, or very carefully in the seats around the coliseum. Keep the building clean!) All trash must be thrown out!
4. **Wear your TCRSF name badge in a clearly visible place, BOTH Friday and Sunday. Do NOT forget. You need your badge for the awards program!**

TCRSF requires that ALL TEAM members of team projects must be present at judging on Friday night and that all ISEF winners must be at the Sunday Awards Ceremony (unless cleared by the fair director and the SRC chair). Winners of **sponsor's awards must be present** at the Sunday Awards Ceremony to win, have their photo taken with their award and the sponsor. An alternate will become the winner if the student winner is not present.

All ISEF winners and all persons interested in traveling with the group to ISEF MUST attend the **Tuesday 6:00 p.m.** ISEF meeting. (This meeting is *only* for ISEF winners, ISEF alternates, & their teachers/mentors/and family members.) The location and time of this meeting will be confirmed with the ISEF winners immediately following the Awards Ceremony.

Green, Red, and Blue ribbon winners are all eligible to win special awards. Some special awards are specifically for certain fields of science or other criteria that are separate from the ribbon earned. All students: please listen carefully for your name during the awards program on Saturday. In order to shorten the awards program, the large groups of winners will be posted on a bulletin board Sunday morning in lieu of the students being all called up to the podium. The winners and alternates will receive instructions and/or a purple ribbon or a certificate in their project or paper envelope. **Alternates have an excellent chance of being advanced, so keep your boards and your paperwork ready! Many of those not advancing to state still win awards.**

Project Competition Schedule:

Location Lee & Rose Warner Coliseum, Minnesota State Fairgrounds

Friday, March 3, 2023 – Students, Judges, Volunteers, Teachers
1:00-3:30 pm Student check-in & set up project exhibits; Clear Display & Safety;
4:00-9:00 pm Judging (grades 6-8 likely done by 8pm); **students stay at your exhibits for judges & our photographer's official photo** at your exhibit.
No parents, advisors, teachers, or other non-participants are to be in the exhibit area during judging times, 4:00 PM – close Friday.

Saturday, March 4, 2023 – No Students, No Judges; Volunteers only for awards prep.

Sunday, March 5, 2023 – Students, Parents, Teachers, Volunteers, General Public
9:00 am   Doors open, students pick up ribbon envelopes for projects & research papers
11:00 am- 12:30pm   Open to the Public
1:00 pm   Awards program. Immediately following the Awards program, PLEASE help clean up. Throw all trash including plastic table covers. Exhibits MUST be removed.

If you are picking up awards for a student not present, please pick up their project and/or research paper envelope before the awards AND pick up other announced awards at the Awards Podium right AFTER the awards ceremony. **Remember to be sure their project exhibit is removed and returned to them.**

All ISEF winners must be at both the Sunday Awards Ceremony AND the Monday ISEF meeting to be eligible to be named finalist to travel to and compete in ISEF, or they will forfeit their finalist status to an alternate (unless cleared by the Fair Director and the SRC chair). Details will be handed out at the end of the awards program.

Our research paper competition is hosted on **tcrsf.zfairs.com.** This is open to students in grades 6-12. Research papers were judged from February 3-16. The high school winners (grades 9-12) advance to the North Central Regional Tri-State Symposium for Minnesota, North Dakota, and South Dakota. This year, the North Central Regional will enter the Virtual Regional JSHS. Winners from JSHS advance to the National JSHS (jshs.org).

What about the awards?
We have two kinds of judges.
1. **Ribbon Judges:** All projects will have judges that are scoring their project according to our scoring rubric which is available on our website (Judging Criteria). This is the same rubric as is used at international science fair.
2. **Special Awards Judges**: There are special awards judges who are selecting projects based on the criteria for the award. Any project many win a special award regardless of their ribbon score, if they happen to best match the award criteria. These special awards come from 3 areas:
   a. **Regional affiliated awards** from our affiliations with international
   b. **Sponsor awards** which are in honor of the annual financial donations that pay for 80% of the costs of running Twin Cities Regional Science Fairs (registration fees cover only about 17% of our annual budget). ***Remember, we are an ALL-volunteer 501c3 educational nonprofit, so our sponsors are donating directly into the costs of this youth program!***
   c. **Awards from Individuals/Groups.** Some corporations, academic societies or other groups or individuals give special awards according to their own criteria.

‹DUPONT›

Water Solutions

DuPont Water Solutions congratulates your achievements in competing at the Twin Cities Regional Science Fair.

We thank DuPont Water Solutions for their sponsorship of this event!

The quality and scarcity of freshwater has become a critical issue worldwide. More than one billion people lack access to safe drinking water today, and experts estimate that by 2025, five billion people will live in areas of significant water stress. While water conservation is one of the most cost-efficient answers, technology, in combination with sound management practices, can help effectively solve the world's worsening water crisis.

DuPont Water Solutions, a subsidiary of DuPont, is committed to advancing water treatment technologies and ensuring availability of clean water to those who need it-through advanced research and industry-leading application expertise.

NORTHROP GRUMMAN

Northrop Grumman is a long-time sponsor of STEM in the community and this Science Fair. The hands-on event is inspiring to not only the students, but those from our company who participate as volunteers and judges. We feel that by inspiring curiosity and interest today, we develop our future scientists, engineers and astronauts. Good Luck To All Our Participants – today and for the future.

Northrop Grumman's Plymouth facility has been a sponsor for 30+ years, dating back to the organizations roots as divisions of Honeywell, ATK and Orbital ATK.

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ahanson@mintahoe.com

Explanation of this year's project numbers:

The first letter indicates which affiliation your school is in.
T = Twin Cities; S = St. Paul; W = Western Suburbs
Next is a 4 letter abbreviation to your science category.
Last is a 4 digit number (each is unique)
        – High school is 5001 and up (grades 9-12), Middle school is 1001-4999 (grades 6-8)

Research Paper numbers: P = all research papers in our 9 county area
Note: Research papers start with a P, then next is the division HS or MS, then research paper category (different groupings than for projects), then a unique 3 digit number.

Project Science Categories:
(ANIM)	**Animal Sciences**
(BEHA)	**Behavioral and Social Sciences**
(BCHM)	**Biochemistry**
(BMED)	**Biomedical and Health Sciences**
(ENBM)	**Biomedical Engineering**
(CELL)	**Cellular and Molecular Biology**
(CHEM)	**Chemistry**
(CBIO)	**Computational Biology and Bioinformatics**
(EAEV)	**Earth and Environmental Sciences**
(EBED)	**Embedded Systems**
(EGSD)	**Energy: Sustainable Materials and Design**
(ENEV)	**Environmental Engineering**
(ETSD)	**Engineering Technology: Statics and Dynamics**
(MATS)	**Materials Science**
(MATH)	**Mathematics**
(MCRO)	**Microbiology**
(PHYS)	**Physics and Astronomy**
(PLNT)	**Plant Sciences**
(ROBO)	**Robotics and Intelligent Machines**
(SOFT)	**Systems Software**
(TECA)	**Technology Enhances the Arts**
(TMED)	**Translational Medical Science**

What do the colored ribbons mean?

Congratulations in competing at the regional science fair! Great job! Both projects and research papers entered in TCRSF receive a Twin Cities regional ribbon based on a statistical analysis of the judges' scores.
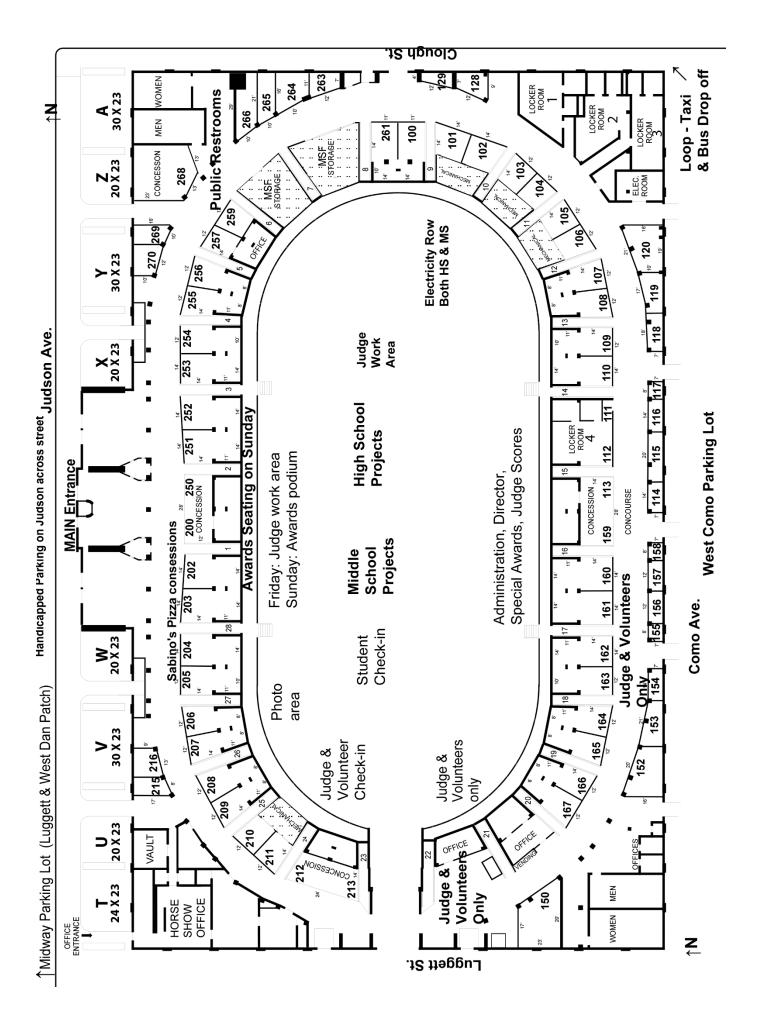
All projects and papers will earn a **green ribbon, red ribbon, or a blue ribbon**. Each student in a team will receive their own ribbon.

Green ribbon: You competed at regions! Great job!!!
Red ribbon: This is like a second place. There are multiple second places.
Blue ribbon: This is a first place. There are multiple first places and these projects and research papers are in the top portion of the fair.
Purple ribbon: This signifies Advancement! The top of the project blue ribbons to move on to state science fair. The top research papers also receive a purple, although they do not advance this year. (JSHS was in January.) Congratulations!

N

OFFICE ENTRANCE

Clough St.

A 30 X 23

WOMEN

MEN

CONCESSON

Public Restrooms

266 265 264 263

268

Z 20 X 23

259 257

MSF STORAGE

MSF STORAGE

261 100

101 102 103 104

Y 30 X 23

269 270

256 255

OFFICE

6

7

MECHANICAL

105 106

X 20 X 23

254 253

5

4

3

MECHANICAL

107 108

Electricity Row Both HS & MS

Judge Work Area

W 20 X 23

252 251 250 CONCESSION

200 CONCESSION 202 203

Sabino's Pizza consessions

MAIN Entrance

Awards Seating on Sunday

Friday: Judge work area
Sunday: Awards podium

High School Projects

Middle School Projects

109 110 111 112 113

LOCKER ROOM 4

CONCESSION 159

LOCKER ROOM 1

LOCKER ROOM 2

LOCKER ROOM 3

ELEC. ROOM

118 119 120

114 115 116 117

Loop - Taxi & Bus Drop off

128 129

N

West Como Parking Lot

Como Ave.

Administration, Director,
Special Awards, Judge Scores

CONCOURSE

155 156 157 158

150 152 153 154

160 161 162 163 164 165 166 167

Judge & Volunteers Only

Judge & Volunteers only

Judge & Volunteer Check-in

Photo area

Student Check-in

V 30 X 23

216 215

204 205 206 207 208 209 210 211

MECHANICAL

212 213 CONCESSION

23 24 25 26 27 28

22 21 20 19 18 17 16 15 14 13 12 11 10 9 8

U 20 X 23

VAULT

T 24 X 23

HORSE SHOW OFFICE

OFFICE ENTRANCE

OFFICE

OFFICE

VENDING

OFFICES

MEN

WOMEN

Luggett St.

						ELEC:	1221	1727	1909	2109	2113	5005	5230	5319	5406	5721	5723	5802	5910
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6719	6714	6713	6711	6710	6709	6707	6706			6705	6704	6703	6702	6701	6631	6623	6618	6617	6605
6505	6506	6507	6508	6509	6510	6511	6512			6513	6514	6515	6516	6517	6519	6520	6522	6602	6603
6504	6503	6502	6501	6413	6412	6410	6409			6408	6403	6402	6401	6216	6214	6213	6212	6206	6201
6002	6003	6004	6005	6006	6007	6008	6009			6101	6102	6103	6104	6105	6106	6107	6108	6111	6115
6001	5910	5908	5906	5904	5903	5902	5803			5802	5801	5729	5723	5721	5720	5719	5717	5716	5715
5511	5512	5603	5604	5605	5607	5608	5641			5644	5701	5702	5703	5704	5705	5706	5707	5708	5714
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5307	5308	5310	5311	5312	5313	5314	5315			5316	5319	5320	5321	5323	5324	5326	5327	5328	5332
5306	5305	5304	5303	5302	5301	5237	5230			5228	5227	5226	5225	5224	5223	5222	5220	5214	5213
5002	5003	5004	5005	5007	5101	5103	5106			5201	5202	5204	5205	5206	5207	5208	5209	5210	5212
5001																			
						Middle	School												
	3103	3001	2815	2729	2728	2727	2726			2725	2724	2723	2722	2721	2718	2717	2716	2715	2712
2611	2612	2613	2614	2615	2616	2619	2620			2621	2622	2624	2625	2626	2627	2628	2629	2632	2708
2610	2609	2608	2607	2606	2521	2518	2416			2415	2414	2411	2407	2406	2405	2404	2301	2215	2211
1907	1909	1911	1912	1913	1914	2109	2110			2112	2113	2114	2116	2202	2203	2207	2208	2209	2210
1905	1901	1728	1727	1726	1725	1722	1718			1712	1711	1710	1643	1642	1640	1638	1637	1636	1635
1615	1616	1617	1618	1619	1620	1621	1622			1623	1624	1625	1626	1627	1628	1630	1632	1633	1634
1614	1613	1612	1611	1610	1609	1606	1602			1513	1337	1336	1334	1331	1330	1329	1325	1322	1318
1006	1008	1104	1107	1211	1215	1216	1217			1218	1219	1221	1229	1231	1232	1234	1235	1236	1317

PROJECT SETUP BY 4 DIGIT NUMBER

Middle School

Animal Sciences (ANIM)

S-ANIM 1006
Kaydence Chang
Grade 8 - Burrowing Owl

W-ANIM 1008
Adlai Jeevanathan
Grade 6 - Spectrum of Feathers: Analyzing Bird Behavior and Color

Biochemistry (BCHM)

W-BCHM 1104T
Touathar Ly, Abdurahman Hassen
Grade 8,8 - **Team** - How Does Meat Shrink

T-BCHM 1107
Jai Nair
Grade 8 - Comparative analysis of calcium content in plant based foods for dietary recommendations

Behavioral and Social Sciences (BEHA)

W-BEHA 1211
Kaitlyn Mulle
Grade 7 - If you can see it, you can clean it.

S-BEHA 1215
Cecelia Leitner
Grade 8 - How Does the Offer of Rewards Affect the Behavior and Time Efficiency of Different Age Groups of Kids?

S-BEHA 1216
Helen Summers
Grade 8 - Which Method Works Best For Memory Recall In Elementary School Students

S-BEHA 1217
Ella Henningsgard
Grade 8 - Does Birth Order Affect Personality

S-BEHA 1218
Maddy Miley
Grade 8 - How Do Teaching Methods Affect Student Comprehension?

S-BEHA 1219
Fiona Smith
Grade 8 - Are Elementary, Middle, or High School teachers more likely to be Introverts?

T-BEHA 1221
Laura Hansen
Grade 6 - Music Magic: Using electroencephalography and surveys to investigate the therapeutic value of music
Project At Electicity Wall

W-BEHA 1229
Bree Denis
Grade 7 - Reaching for Speed Time and Stimulus

T-BEHA 1231
Natalia Godina
Grade 7 - Does Emotion Affect Our Heart Rate?

T-BEHA 1232
Natalia Rodriguez
Grade 7 - Tasting With Your Eyes

S-BEHA 1234
Estella Yunis
Grade 7 - They Look Just Like You

W-BEHA 1235
Claire Carlson
Grade 7 - How Does Lyrical, non Lyrical, or No Background Music Affect Memory When Learning New Content?

W-BEHA 1236
Kallen Fleming
Grade 7 - Do different colors lights affect our brains ability to recall content?

Biomedical and Health Sciences (BMED)

W-BMED 1317
Lucy Johnson
Grade 6 - Furry Friends Decrease Stress

W-BMED 1318
Maren Fahlin
Grade 6 - Dry Skin? Time to Moisturize!

W-BMED 1322
Baylee Martinez Ortiz
Grade 8 - How Does The Hand Cleaning Method Impact The Amount Of Bacteria

W-BMED 1325
Mena Severt
Grade 7 - Does our Echinacea tincture effectively kill bacteria compared to over-the-counter antibacterial medication?

T-BMED 1329
Grace Chinokoro
Grade 7 - Trace Amounts of Sugar: How is Your Blood Pressure Affected?

T-BMED 1330
Ruth Minke
Grade 7 - Which Mask is More Hydrating?

T-BMED 1331
Amy Robles
Grade 7 - The Effects of Caffeine According to Your Age

W-BMED 1333
Saee More
Grade 8 - The Fight Against Cardiovascular Disease

W-BMED 1334
Bethel Senay
Grade 8 - Blood Sugar High? Why?

W-BMED 1336T
Alec Bloomfield, William Spaulding
Grade 8,8 - **Team** - How does the brain tell your body it's hungry?

W-BMED 1337
Lily Dow
Grade 6 - Lungs At Work

Cellular and Molecular Biology (CELL)

S- CELL 1513 **Daniela Sullivan**
Grade 7 - Untangling DNA

Chemistry (CHEM)

T-CHEM 1602T **Lola Currier, Divora Adhanom**
Grade 8,8 - **Team** - An osmotic method for the determination of coordination numbers of simple sugars

S-CHEM 1606 **Faye Nation**
Grade 8 - How Do Different Yeast Strains Impact on the Flavor and Aroma of Distillers Fermented Beer?

W-CHEM 1609T **Isabelle Dahl, Harper Reil**
Grade 7,7 - **Team** - Height vs. Flour

W-CHEM 1610 **Favour Aroloye**
Grade 7 - Creating Cupcakes with Leavening Agents

W-CHEM 1611T **Natalie Mwaga, Gianna Kimaiga**
Grade 7,7 - **Team** - Bath Bomb Fizz Time

W-CHEM 1612 **Lola Dixon**
Grade 7 - Science behind the laundry fairy

W-CHEM 1613 **Samuel Edson**
Grade 8 - Destroying Science: Building Materials and Deterioration

W-CHEM 1614 **Audrey Strehler**
Grade 7 - Brillant Bath Bombs

W-CHEM 1615 **Makenna Glaser**
Grade 8 - Lip Gloss

W-CHEM 1616 **Dylan Arens**
Grade 8 - The Flour Experience

W-CHEM 1617T **Adebola Ogunsina, Gavrila Boakye-danquah**
Grade 8,8 - **Team** - How High Will it RIse?

W-CHEM 1618 **Isha Secka**
Grade 8 - Across A Cookie

W-CHEM 1619 **Evelyn Dupree**
Grade 8 - Soda-licious!

W-CHEM 1620 **Kallie Heath**
Grade 8 - Jiggly Jell-O

W-CHEM 1621 **Amerey Lee**
Grade 8 - Ice Breaker

W-CHEM 1622 **Andrew Johnson**
Grade 8 - Density of Bread by Amount of Flour

W-CHEM 1623 **Leah Benoit**
Grade 8 - Influence of Veganism on the Qualities of Traditional Dairy Products: Type of Plant-Based Milk and Density of a Pudding Dessert

W-CHEM 1624T **Addison Schafer, Sadie Beachem**
Grade 8,8 - **Team** - The greasy bun

W-CHEM 1625 **Samantha Morales**
Grade 8 - Balloon Power!

W-CHEM 1626T **Amelia Schwarze, Candice Kararu**
Grade 8,8 - **Team** - Muff Everest

W-CHEM 1627 **Hafsa Hilowle**
Grade 8 - Rise of the Cupcakes

W-CHEM 1628T **Hayden Smith, Braysen Holmes**
Grade 8,8 - **Team** - Soap Boat

W-CHEM 1630T **Jasper Funk, Lilly Mortensen**
Grade 8,8 - **Team** - Egg-Tastic Cupackes

S-CHEM 1632 **Poe Moo**
Grade 8 - Gummy Bear Growth

S-CHEM 1633T **Connor Kue, Eric Lor**
Grade 8,8 - **Team** - Measuring elephant toothpaste height

T-CHEM 1634 **Elizabeth Mader**
Grade 7 - Study of the Electrolytes in Energy Drinks

W-CHEM 1635 **Lydia Rieke**
Grade 7 - Flour Power: The Effect of Gluten Free Flour on Cupcake Rise

T-CHEM 1636 **Eloise Telep**
Grade 7 - Some Sweet Sugar Cookies

T-CHEM 1637 **Cordelia Anani**
Grade 7 - Cheesecake, Cheesecake, and Did I Mention Cheesecake?

S-CHEM 1638T **Leah Moore, Chloe Szenay**
Grade 8,8 - **Team** - How does the amount of butter affect the diameter and force it takes to break a cookie!

W-CHEM 1640 **Lila Foster**
Grade 6 - Where'd All the Bubbles Go?

W-CHEM 1642 **Vincent Impola**
Grade 6 - Don't Cry Over Spoiled Milk

W-CHEM 1643 **Olivia Zhou**
Grade 6 - Growing Marshmallows

Earth and Environmental Sciences (EAEV)

S-EAEV 1710 **Keagan Corcoran**
Grade 8 - How Do Microplastic Levels in the Ocean Impact the Penguin Population?

S-EAEV 1711 **Jake Olson**
Grade 8 - How Does Air Quality Differ in Urban and Rural Areas

W-EAEV 1712 **Vinetta Strelchuk**
Grade 7 - Ice Advice

W-EAEV 1718 **Batoul Taha**
Grade 8 - Measuring Tap Water Qualities In Different Cities (Fridley, Blaine, New Brighton, Brooklyn Park, Columbia Heights) From Public Facilities (Library, Clinic, Schools)

W-EAEV 1722 **Liam Peterson**
Grade 8 - Water Clarity

S-EAEV 1725 **Adam William**
Grade 8 - Air quality observation and comparison project

T-EAEV 1726 **Noah Nguyen**
Grade 7 - Spinning Pinwheel by Steam: Energy From the Earth

S-EAEV 1727 **Abdumalik Muktar**
Grade 8 - What would happen if I feed meal worms more food
Project At Electicity Wall

S-EAEV 1728 **Ferran Peckosh**
Grade 7 - Filtering Fire

Energy: Sustainable Materials and Design (EGSD)

T-EGSD 1901 **Lilly Bilek**
Grade 7 - Factors affecting anode performance in an alga I metal II carbon I ferric chloride circuit

W-EGSD 1905 **Noah Paulson**
Grade 7 - Cooking with the Sun/ Paper Color & °F

W-EGSD 1907 **William Rogers**
Grade 7 - How Does the Kind of Potato Impact How Much Electricity it Produces?

T-EGSD 1909 **Shea Bohl**
Grade 6 - The Power of Rust: A Study of Electrolytes in Iron-Air Batteries
Project At Electicity Wall

W-EGSD 1911 **Sebastian DeLeo**
Grade 8 - Different Angles of Polarizing Light

W-EGSD 1912 **Sandor Pratt**
Grade 8 - Sour Power!

S-EGSD 1913T **Edison Chit, Kidus Wolde**
Grade 8,8 - **Team** - How does blade length effect the energy produced

W-EGSD 1914 **Jared Griffiths**
Grade 6 - Shakes and Quakes

Environmental Engineering (ENEV)

T-ENEV 2109 **Norah Bergerson**
Grade 6 - Glitter, a Million Pieces of Litter: Quantifying microplastics in laundry effluents released from textiles during washing
Project At Electicity Wall

W-ENEV 2110 **Emaan Moheet**
Grade 8 - Developing and Testing Permeable Pavement Material to Prevent Urban Flooding

W-ENEV 2112 **Angelina Panko**
Grade 8 - Crystal Clear Choices

W-ENEV 2113 **Taher Taha**
Grade 7 - How to generate water out of air?

W-ENEV 2114T **Zakariya Shikder, Hamza Salem, Luqman Ibrahim**
Grade 7,7,7 - **Team** - Building a miniature Greenhouse

S-ENEV 2116 **Jack Gao**
Grade 8 - The Impact of Electric Vehicle Adoption and Electrification

Engineering Technology: Statics and Dynamics (ETSD)

S- ETSD 2202 **Hannah Steines**
Grade 8 - How the Shape of a Car Affects Aerodynamics

S- ETSD 2203 **Espen Duncan**
Grade 8 - What Car Shape is the Most Aerodynamic?

W-ETSD 2207 **Sam Kessler** Grade 8 - Windy Day how does Windspeed impact Drag and Lift?

W-ETSD 2208 **Jackson Goodrich** Grade 8 - Can I make a more efficient rocket?

W-ETSD 2209 **Betsy Weber** Grade 8 - How Does the Design of the Paper Airplane Impact the Flight Distance

W-ETSD 2210 **Logan Ford** Grade 8 - Molecular Motion in Magnets

W-ETSD 2211 **Zabir Dagal** Grade 8 - Can a 3D Printed Water Filter Match the Filtration Quality of a Commercial Water Filter

W-ETSD 2215 **Edward Ginter** Grade 6 - Pickle Ball--Which Brand is the Best?

Mathematics (MATH)

W-MATH 2301 **Piper Casey** Grade 6 - Skittle Sorter

Materials Science (MATS)

S-MATS 2404 **Nolan Rosenberger** Grade 8 - Testing 3D Printing Infill Patterns for Strength, Deformation and Printing Time.

S-MATS 2405 **Mary-Grace Dobie** Grade 8 - How Playground Material and Surfacing Affect Safety

S-MATS 2406 **Claire Young** Grade 8 - What are the Effects of Playing Softball on Different Types of Fields

W-MATS 2407 **Grace Hunt** Grade 6 - Powder Prints

W-MATS 2411 **Javier Pampusch** Grade 7 - That's So Cheesy Different types of cheese and their melting time in seconds.

W-MATS 2414 **Easton Graber** Grade 7 - The purpose of the experiment that I created was to determine…

S-MATS 2415 **Agustin Orezzoli Robinson** Grade 8 - Best Model Airplane Material

W-MATS 2416 **Cora Finck** Grade 6 - Our Sun In Color

Microbiology (MCRO)

W-MCRO 2518 **Fahtima Komara** Grade 8 - Strawberry militaries

W-MCRO 2521T **Kimaya Shah, Vivienne Kane, Kinaari Shah** Grade 6,6,6 - **Team** - The 5 Second Rule

Physics and Astronomy (PHYS)

W-PHYS 2606T **Kaia Salo, Luella Rustad** Grade 7,7 - **Team** - Hopping Hockey Pucks Mass vs. Time

W-PHYS 2607 **Kenzie Hackenmueller** Grade 7 - Falling Fast

W-PHYS 2608 **Brianna Ondicho** Grade 7 - Pushing Pressure

W-PHYS 2609 **Bentley Smith** Grade 7 - Drop and Hop: Drop height & bounce height

W-PHYS 2610 **William Voigt** Grade 7 - Soar With Paper Planes

W-PHYS 2611T **Natalee Daleiden, Emma Bacigalupo** Grade 8,8 - **Team** - Mighty Materials

W-PHYS 2612 **Breckon Sand** Grade 7 - Confliction of Friction

W-PHYS 2613 **Jackson Busch** Grade 7 - The golf tee

W-PHYS 2614 **Austin Karst** Grade 7 - Cruising for time mass and speed

W-PHYS 2615 **Roman Malinskyi** Grade 7 - Propelling Ping Pong Balls

W-PHYS 2616 **Aiden Hoffman** Grade 8 - Helium vs Air

W-PHYS 2619 **Logan Hovanetz** Grade 8 - Weight A Second

S-PHYS 2620 **Lila Finch** Grade 8 - Catapulting Marbles

S-PHYS 2621T **Ar Cha, Nay Moe**
Grade 8,8 - **Team** - Water Bottle Rockets Cones

W-PHYS 2622 **Thomas Velgersdyk**
Grade 7 - Coils and Current

T-PHYS 2624 **Liam O'Keefe**
Grade 7 - Effects of Temperature on Hitting Home Runs

T-PHYS 2625 **Grace Braun**
Grade 7 - More Bounce For Your Basketball

T-PHYS 2626 **William Boerboom**
Grade 7 - Does the Hardness of Skateboard Wheels Affect the Skateboard's Speed?

S-PHYS 2627 **Soleena Jimenez**
Grade 8 - Cameron Obscura

S-PHYS 2628T **Htoo Paw, Servando Najera**
Grade 8,8 - **Team** - Rocket Material Fins

S-PHYS 2629T **Jennifer Calles Vazquez, Keegan Campos**
Grade 8,8 - **Team** - How does the size of fins affect a rockets height when at flight?

S-PHYS 2632 **Yerkong Lor**
Grade 8 - Which thickness level of paper airplane fly the most distance?

Plant Sciences (PLNT)

W-PLNT 2708 **Addison Duppong**
Grade 6 - How Does Light Affect a Plant

W-PLNT 2712 **Sarah Voigt**
Grade 7 - Brillant Beans: Water Type & Germination

W-PLNT 2715 **Josephine Nnadi**
Grade 8 - How do different light sources impact the growth of a plant?

W-PLNT 2716T **Mari Loya, Scarlett Umanah**
Grade 7,7 - **Team** - Can we train plants to grow longer roots under drought conditions

W-PLNT 2717 **Amelia Dyrstad**
Grade 8 - Microplastics Affect On Plant Growth

W-PLNT 2718 **Lalistu Nejo**
Grade 8 - Can we grow more vegetable indoors under grow lights or in natural light?

W-PLNT 2721 **Isaiah Kron**
Grade 7 - CofFEe, Iron (Fe), or FErtilizer. Which -FE- will it be?

S-PLNT 2722 **Amari Hughes**
Grade 8 - How different color of light affects plants through photosynthesis

S-PLNT 2723 **Cassie Howard**
Grade 8 - How plants react too different levels of nutrients

W-PLNT 2724 **Siri Westberg**
Grade 8 - Everlasting Lettuce

T-PLNT 2725 **Alondra Montenegro**
Grade 7 - The Effects of Light Color on Plant Growth

S-PLNT 2726T **Peace Vang, Nathaniel Xiong**
Grade 8,8 - **Team** - Light Affecting Plants

W-PLNT 2727 **Taylor McAmis**
Grade 8 - How to kill Buckthorn naturally

S-PLNT 2728 **Jenna Bowers**
Grade 8 - How does the water make your garden grow

W-PLNT 2729 **Faith Mick**
Grade 7 - Digging Deep to get to the Root of the Issue: The Effect of Fertilizers on Plant Root Growth

Robotics and Intelligent Machines (ROBO)

W-ROBO 2815T **Kale Cufaude, Landyn Perlick**
Grade 7,7 - **Team** - Robot Vs. Maze

Technology Enhances the Arts (TECA)

W-TECA 3001 **Shagun Shrivastava**
Grade 8 - In Search of Sound: Creating Solutions for Sound Localization Challenges Using MicroBit Architecture to Aid Spatial Hearing Loss

Translational Medical Science (TMED)

T-TMED 3103T **Brooke Kelly, Irene Wilson, Sienna Granquist**
Grade 8,8,8 - **Team** - What Lip Product Moisturizes For the Longest

High School

Animal Sciences (ANIM)

W-ANIM 5001   **Elin Wellmann**
Grade 12 - The Microplastic Butterfly Effect: Effects of dietary microplastic on survival and fitness of Cabbage White butterflies (Pieris rapae).

W-ANIM 5002   **Kyvie Welsbacher**
Grade 12 - Effect of Minnesotan plant byproducts on growth and nutrition in Acheta domesticus

T-ANIM 5003T   **Miguel Oliveros Carvajal, Moises Sevilla Cueto**
Grade 11,11 - **Team** - Picky Planaria

S-ANIM 5004   **Lam Le**
Grade 10 - The Solitary Bees' Diet: An Exploration of Megachile Campanulae

T-ANIM 5005   **Isabella Wang**
Grade 9 - Staying Alive: Mitigating the challenge of overwintering bees in Minnesota's harsh climate; a study of beehive wraps, their insulative properties, ability to modulate thermal extremes, and preserve bee populations
Project At Electicity Wall

S-ANIM 5007   **Samantha Gilats**
Grade 12 - Exploring Potential Effects of Theobromine on Girardia tigrina Regeneration

Biochemistry (BCHM)

W-BCHM 5101   **Lindsey Koch**
Grade 12 - Effect of artificial food dyes on levels of serotonin and dopamine in C. elegans

T-BCHM 5103   **Ajmal Abdirahman**
Grade 11 - Exploring Enzyme

S-BCHM 5106   **Annika Lillegard**
Grade 12 - The Effect of Trans-Resveratrol on the Longevity of Caenorhabditis Elegans

Behavioral and Social Sciences (BEHA)

W-BEHA 5201T   **Abigail Endres, Vivian Kinney**
Grade 11,11 - **Team** - Find Your Way: Design and construction of multiple T-maze to assess spatial memory

W-BEHA 5202   **Noah DeMichaelis**
Grade 12 - Music and the Mind (Year Two): the Interection of Reading Readiness and Musical Proficiency

W-BEHA 5204   **Alexander Augustine**
Grade 11 - Comparing speed chess with and without increment

W-BEHA 5205   **Deepti Pillai**
Grade 12 - A comparison of the different language sites employed during bilingual and multilingual language production and comprehension via different acquisition methods.

T-BEHA 5206   **Parvina Yusupova**
Grade 10 - The Impact of Key Changes on Adolescent Moods: A Musical Exploration

T-BEHA 5207   **Winston Ekstrand**
Grade 10 - Tasting the Rainbow? The Effects of Color on Taste.

T-BEHA 5208   **Neela Josephs**
Grade 10 - How does working together on a project affect the accuracy of a response?

T-BEHA 5209   **Vanlyda Bun**
Grade 10 - Do people believe others with authority more than their own memory?

T-BEHA 5210   **Ruth Moses**
Grade 10 - Peppermint Reaction Test

W-BEHA 5212T   **Abigail Getnick, Veda Rao**
Grade 10,10 - **Team** - Food Frenzy: An Investigation on Lunch Popularity and Early Arrival to Lunch

W-BEHA 5213   **Yuchen Shi**
Grade 10 - The effects of music on one's attention and relaxation levels while doing a task.

W-BEHA 5214   **Joseph Martinez**
Grade 12 - Examination of stressed planarian regeneration when exposed to selective serotonin reuptake inhibitors

T-BEHA 5220   **Feven Tesfaye**
Grade 10 - Is Ignorance really Bliss?

S-BEHA 5222   **Annie Zhang**
Grade 11 - The Effects of Natural versus Pharmaceutical Stimulants on Autism Symptoms

T-BEHA 5223   **Shreya Sekar**
Grade 10 - Injury to Admission: An in-depth investigation to college admissions strategies for high school students whose academic success was adversely impacted by acute injuries or illnesses

W-BEHA 5224   **Henry Sabo**
Grade 11 - An Analysis of the Relationship Between IQ and Academic Performance at Breck School

T-BEHA 5225   **Braiden Moher**
Grade 12 - Mindful or Mindless? Understanding Mindfulness Through Self-Perceived Ratings

S-
BEHA
5226
Oliver Chan
Grade 11 - Examining the Impact of Positive Affirmations on the Confidence Perception and Academic Performance of High School Students

W-
BEHA
5227
Ameya Bhaskar
Grade 10 - Beyond Numbers: Investigating the Relationship Between Socioeconomic Status and Big 5 Personality Traits Through Metadata Analysis

W-
BEHA
5228
Farhiyo Awale
Grade 10 - The Effects of Piracetam on Adult Zebrafish

S-
BEHA
5230
Elizabeth Alene
Grade 12 - The Relation Between Human Accuracy and Active Recall When Using Static and Dynamic Imaging
Project At Electicity Wall

W-
BEHA
5237
Henry Miller
Grade 12 - Examination of EEG-derived interhemispheric data in predicting emotional and attentive responses to film

Biomedical and Health Sciences (BMED)

W-
BMED
5301T
Matthew Manacek, Samantha Dvorak
Grade 11,11 - **Team** - Catching the Culprit: Western blot analysis of the relationship between Alzheimer's related proteins Aß*56 and ∆Tau303 in APP transgenic mice

W-
BMED
5302T
Emma Tan, Quinn Mark
Grade 9,9 - **Team** - Super Taster or Super Dud: Can A Supertaster Taste Sweet Better Than The Average Taster?

W-
BMED
5303
Andrew Hermanson
Grade 12 - In Vitro Study of Commercially Available Probiotics' Survival Rate Through the Gastrointestinal System

W-
BMED
5304
Hemanth Vangala
Grade 12 - Effects of a plyometric program on basketball movement performance

W-
BMED
5305
Elisabeth McCallum
Grade 12 - Examination of the expression of p16ink4a as cervical cells senesce through the utilization of a human dermal fibroblast model

W-
BMED
5306
Sameer Bhatia
Grade 12 - Cell Culture Analysis of Nail Curing Lamp Radiation on A549 Cell Line

W-
BMED
5307
Kyra Martin
Grade 12 - The effect of ubiquitination deubiquitinases on breast cancer metastasis

T-
BMED
5308T
Twinkleben Patel, Adna Ahmed, Amira Abdukadr
Grade 11,11,11 - **Team** - Burning Calories

W-
BMED
5310
Corinne Moran
Grade 12 - Deciphering DUX4 (Year II): Is transient expression of the DUX4 gene sufficient to cause muscular dystrophy?

W-
BMED
5311
Arjav Krishna
Grade 12 - Analyzing the Correlation Between Aerobic and Anaerobic Capabilities in High School Aged Individuals

W-
BMED
5312
Sydney Rupert
Grade 12 - Experimentation of Zinc, Lactobacillus plantarum PS128, and L- Theanine treatments on Faxonius virilis to determine effectiveness at mitigating stimulant withdrawal symptoms

W-
BMED
5313
Brayden Diethelm
Grade 12 - Examination of effects of gamma-secretase inhibitors and methylthioninium chloride in Caenorhabditis elegans modeling of human Alzheimer's disease

T-
BMED
5314
Shalom Chakiso
Grade 10 - Which Soap is the Most Effective at Killing Bacteria?

S-
BMED
5315
Cerena Karmaliani
Grade 11 - The Absorbency of Home-Compounded Transdermal Pain Medication in Comparison to Industrially Manufactured Voltaren Gel

W-
BMED
5316
Anna McKinney
Grade 12 - Cardiovascular Recovery and Strength Variation Coupled With Phases of the Menstrual Cycle

W-
BMED
5319
Kathy Quito
Grade 12 - From Pixels to Proteins: Utilizing Deep Learning to Denoise Images for Enhanced Accuracy in Fluorescence Microscopy and Protein-Protein Interaction Studies
Project At Electicity Wall

W-
BMED
5320
Paige Olson
Grade 12 - The Use of Vagal Maneuvers in the Reduction of Tachycardias

T-
BMED
5321
Ella Yego
Grade 10 - BAC in Business

W-
BMED
5323
Sophia Parmele
Grade 11 - The clinical relevance of oleosin in peanut allergy testing

T-
BMED
5324
Riddhi Singhvi
Grade 9 - Beyond Scans: Predicting Alzheimer's through MRI-Graphology Fusion

T-
BMED
5326
Bersy Yonas
Grade 10 - Optimizing stent design geometry using macro models

T-BMED 5327 **Henry Reinhard**
Grade 11 - Household Beverages vs. Sports Drinks for Hydration and the Effects of Refrigeration

W-BMED 5328 **Snigdha Tungtur**
Grade 12 - Manipulating Fibroblast Function: Reprogramming fibroblasts into vasculature using a lineage mapping genetic mouse model with Col1a2Cre–R26 Tdtomato progeny

T-BMED 5332 **Lynne Hu**
Grade 10 - Tying the Knot: Maximum Force of Dehiscence in Three Surgical Knots

W-BMED 5335 **Anjneya Kumar**
Grade 12 - Prevalence of salivary COVID antibodies among household members: Findings from the Health and Retirement Study

Computational Biology and Bioinformatics (CBIO)

W-CBIO 5401 **Alexander Bartholomew**
Grade 12 - Analysis of machine learning techniques on electroencephalography data to detect mild traumatic brain injury in humans

W-CBIO 5402 **Savanna Larson**
Grade 11 - Evaluating the effects of sympatry on Lynx canadensis and Lynx rufus population dynamics in Minnesota

W-CBIO 5403 **Milan Darji**
Grade 10 - Developing Scaffold Proteins for Functional Proteins Using RFDiffusion, an Artificial Intelligence Denoising Diffusion Probabilistic Model

W-CBIO 5404 **Valerie Nelson**
Grade 12 - Machine learning for growth modeling of MCF7 breast cancer cells

S- CBIO 5405 **Deling Chen**
Grade 11 - A Novel Electrocardiogram-Based Model for Prediction of Dementia—the Atherosclerosis Risk in Communities (ARIC) study

W-CBIO 5406 **Raaga Sirna**
Grade 11 - Magnesium, the Secret Killer: Hypomagnesemia induces TRPM7's kinase function causing oxidative stress, inflammation, atrial fibrillation, leading to heart failure
Project At Electicity Wall

T- CBIO 5407 **Coolsjes Singhvi**
Grade 11 - FutureSight: Machine Learning for Precision Diabetic Retinopathy Prediction

Cellular and Molecular Biology (CELL)

W-CELL 5501 **Brynn Kamp**
Grade 12 - The Effects of Activin-A on Oligodendrocyte Precursor Cell (OPC) Differentiation

W-CELL 5502 **Jasmine Goldsmith**
Grade 12 - Scurvy to stage IV cancer: the efficacy of intravenous vitamin C therapy in combination with paclitaxel and cispaltin treatment on non-small cell lung cancer strain A549

W-CELL 5503 **Darby Allen**
Grade 12 - Examination of the effects of neutralizing monoclonal antibodies on Jurkat cell activation and endocrinal gene expression

W-CELL 5504 **Becker Curry**
Grade 11 - Identification of bisphenol A and bisphenol S endocrine effects through analyzation of the crayfish vitellogenin gene

W-CELL 5505 **William Zhong**
Grade 12 - Circadian rhythm correlated gene expression due to phr1 gene removal in Halobacterium salinarum NRC-1

W-CELL 5506 **Grace Pralle**
Grade 12 - The Effects of LED Light Stimulus on Human Dermal Fibroblast Gene Expression

W-CELL 5507 **Tyseer Nabi**
Grade 12 - The effect of gut micro bacteria on the SNCA gene and release of alpha-synuclein and dopamine

W-CELL 5508 **Keegan Feeley**
Grade 12 - Examination of cytokine levels in the peripheral blood mononuclear cells of people with Ankylosing Spondylitis

W-CELL 5509 **Valerie Kelling**
Grade 12 - The effects of colored noise on sleep quality quantified by the expression of GABA in Drosophila melanogaster

W-CELL 5510 **Georgia Constantin**
Grade 12 - Using iron and graphene oxide nanoparticles to induce targeted apoptosis in cancerous cells.

W-CELL 5511 **Alisha Schaeffer**
Grade 12 - Effects of Centella Asiatica on Human Telomerase

T-CELL 5512T **Julia Bigalke, Emree Jimenez, Lily Langason**
Grade 11,11,11 - **Team** - Is Fel D 1 Found in Hypoallergenic Cats?

Chemistry (CHEM)

W-CHEM 5603 **Gustav Davidson**
Grade 11 - A Study On The Effectiveness On Natural Coagulants

T-CHEM 5604 **Basil Algaddal**
Grade 10 - The Effect of Corrosion on Nails

T-CHEM 5605
Samuel Morgan
Grade 10 - A Study Into Water Desalination

W-CHEM 5607T
Grace Duffy, Ruby Wold, Sohana Morioka
Grade 11,11,11 - **Team** - The Effects of Sodium Polyacrylate on Absorption in Paper

T-CHEM 5608
Alyssa Wang
Grade 9 - Development of Novel Biodegradable Bioplastics Using Mango Peels Intended for Packaging Film

W-CHEM 5641
Abigael Kimaiga
Grade 10 - Making Milk Curdle With Pineapple Enzymes

W-CHEM 5644
Advin Kuloglic
Grade 9 - Exothermic Reactions, What Are They?

Earth and Environmental Sciences (EAEV)

W-EAEV 5701
Owen Barhoover
Grade 12 - The Effect of Silicate Minerals on Soil Sequestration

W-EAEV 5702
Molly O'Neill
Grade 12 - The Exploration of Bio-sealants to Assist the Longevity of Degradable Pineapple Fabric

W-EAEV 5703
Julia Constantineau
Grade 12 - The Measuring and Phytoremediation of PAHs in Relation to Local Plants and Areas

W-EAEV 5704
Rebecca Reeder
Grade 12 - Inhibition effects of B. pilosa extracts on algae from water samples taken from local lakes in Minnetonka, MN

T-EAEV 5705
Olivia Hamann
Grade 10 - I Didn't Start the Fire

W-EAEV 5706
Jack Petrin
Grade 11 - Effects of road deicing salts on select heavy metal mobility in Minnesota soils

W-EAEV 5707
Abigail Bendt
Grade 12 - The impact of atmospheric carbon dioxide on crop yield and fruit quality in Fragaria x ananassa

W-EAEV 5708
Jos Buffington
Grade 11 - Paleoenvironmental and paleoceanographic changes across Ocean Anoxic Event 2 indicated by a southwest Minnesota core section

S-EAEV 5714
Talia Cairns
Grade 11 - Rhizofiltration of Nitrate and Phosphate by Elodea Canadensis Under Varying Temperatures

S-EAEV 5715
David Schumacher
Grade 11 - Bioremediation of Nickel with Chlorella Vulgaris and Chlorella Pyrenoidosa

W-EAEV 5716
Adeenah Vohra
Grade 10 - Effect of the combination of different growth lights, their intensity on the dry weight, wet weight, and root mass of different plants

W-EAEV 5717
Ladan Hassan
Grade 10 - Bioplastics' Degradability and Strength Relative to Plastic Bags Through the Use of Alternative Starch Sources.

W-EAEV 5719T
Laila Abdelhakim, Randa Zahran
Grade 10,10 - **Team** - The Harm of Electromagnetic Radiation on Living Organisms

W-EAEV 5720
Salman Farah
Grade 9 - BPA Estrogen Presence in Tap Water and Its Potential Effects on Human Health

W-EAEV 5721
Sanjana Kollipara
Grade 10 - Meteorological Measurement Mysteries:Quantifying the variability of precipitation and snow depth based on measurement location and wind dynamics as it impacts flood prediction modeling
Project At Electicity Wall

W-EAEV 5723
Adithi Rupireddy
Grade 12 - Prescribed Burn Management Strategies: A Longitudinal Analysis of Decision-Making and Burn Efficacy in Pinus Resinosa Stands at the Cloquet Forestry Center
Project At Electicity Wall

S-EAEV 5729
Alexander Winnett
Grade 12 - Assessing the Influence of Green Space Directly Surround Lakes on Water Quality

Embedded Systems (EBED)

S-EBED 5801
Henry Whelan
Grade 12 - Mind Mobility Management

S-EBED 5802T
Humza Murad, Rishi Bhargava
Grade 12,12 - **Team** - Project WASP: Autonomous Self Watering Planter using Atmospheric Water
Project At Electicity Wall

S-EBED 5803
Connor Overgaard
Grade 12 - Concussion Mitigation Gyroscope For Contact Sports

Energy: Sustainable Materials and Design (EGSD)

W-EGSD 5902
Evelyn Engebretson
Grade 12 - Carbon neutral biofuels: the fermentation of Sargassum macroalgae using Clostridium beijerinckii to create butanol

W-EGSD 5903 **Liam Cassidy**
Grade 12 - Optimizing Algae Biodiesel Parameters for Power Using Chemical Additives

T-EGSD 5904T **Lupe Vergara Mariscal, Michelle Arceo Cedano, Sara Bustos Morales**
Grade 10,11,10 - **Team** - Wonderful Windmills

S-EGSD 5906 **Jacob Colton**
Grade 11 - Effect of Annealing Time on Electrodeposited Zinc Samples for Use in Dye Sensitized Solar Cells

T-EGSD 5908 **Sarah Zamudio**
Grade 11 - Composting Inputs and Outputs.

W-EGSD 5910 **Yash Dagade**
Grade 12 - SkyWindFarm Harnessing High Altitude Wind Power in a Scalable Manner
Project At Electicity Wall

Biomedical Engineering (ENBM)

W-ENBM 6001T **Charlotte Vasicek, Michael Setterberg**
Grade 11,11 - **Team** - Refining the Ring: Engineering Nanobodies for a Faster Path to CSAN Cancer Immunotherapy

W-ENBM 6002 **Anna Iordanoglou**
Grade 12 - Problematic Packaging: Optimizing a method for dissolving alginate sheaths from cell fibers for 3D bioprinting

W-ENBM 6003 **Melissa Nelson**
Grade 12 - Creation of a left-handed prosthetic for playing violin

W-ENBM 6004 **Anaya Gokarn**
Grade 11 - Looking through the PriSM for Improved Cancer Treatment: Using a Position-Specific Enrichment Ratio Matrix to Score Fibronectins Used in Protein Small Molecules (PriSMs) to Inhibit Carbonic Anhydrases
Project At Electicity Wall

W-ENBM 6005 **Aditya Nair**
Grade 10 - Teratoma Transformers - More than Meets the Eye! Assessing the Efficacy of Stem Cell Differentiation into Skeletal Muscle Tissue for Disease Treatment

W-ENBM 6006 **Muminah Nihaar Mohammed**
Grade 12 - Martian Medicine

W-ENBM 6007 **Swati Menon**
Grade 11 - Unlocking Improved Outcomes: Investigating Treatment for Myeloproliferative Neoplasms Using Biomedically Engineered Blood Vessels and Patient-derived Samples to Measure Platelet Dynamics and Thrombotic Events
Project At Electicity Wall

W-ENBM 6008 **Richard Lin**
Grade 11 - Magnetoresistive Biosensors in Food Safety

W-ENBM 6009 **Fernanda Arreola-Lucio**
Grade 12 - Effects of Impregnation of Zeolite, Methacrylic Anhydride, and Fibrinogen Coagulation Agents to Gelatin Microneedle Adhesive (Gel MNA) Hemostatic for Axial Body Frame Usage

Environmental Engineering (ENEV)

W-ENEV 6101 **Tyler Clair**
Grade 11 - Food waste-based biocoagulants: a novel approach to sustainably remove polystyrene microplastics for future alternatives in water treatment

W-ENEV 6102 **Amelia Erickson**
Grade 12 - Extension and update of Minneapolis and Saint Paul public transportation systems into the suburbs of the metro area to increase usage

W-ENEV 6103 **Olivia Donaldson**
Grade 12 - The permeability and compressive strength of concrete using recycled concrete aggregates

W-ENEV 6104 **Ellison Stroh**
Grade 11 - A potential dike for the Savannah, Georgia region to mitigate storm surge

W-ENEV 6105 **Sabrina Pietrafitta**
Grade 12 - Excess nutrient removal in estuaries - dead zone prevention

S-ENEV 6106 **Milan Mishra**
Grade 11 - Usage of a Convolutional Neural Network in Drone-Based Algae Bloom Monitoring
Project At Electicity Wall

T-ENEV 6107 **John Liu**
Grade 10 - The Use of Sustained Releasing Technology to Reduce Deicing Salt Pollution

S-ENEV 6108 **Nicholas McCarthy**
Grade 11 - The Effect of Synthetic and Composted Manure Fertilizers on the Growth of Brassica Juncea in Copper-Contamianted Soil

S-ENEV 6111 **McKinley Garner**
Grade 12 - The Effectiveness of Aspergillus niger as a Remedy to Microplastic-Contaminated Soil

T-ENEV 6115 **Gabriel Cordova**
Grade 12 - Sky Light

Engineering Technology: Statics and Dynamics (ETSD)

W-ETSD 6201 **Caleb Li**
Grade 10 - Optimizing School Traffic During Morning Drop Off

W-ETSD 6206 **Maximus Ren**
Grade 10 - A New High-Impedance-Fault Detection Method to Prevent Power-Line-Induced Wildfires
Project At Electicity Wall

T-ETSD 6212 **Kieran Kopitzke**
Grade 9 - Building a Hovercraft
Project At Electicity Wall

W-ETSD 6213 **Chuepor Vue**
Grade 10 - The Earthquake-Resisting Pendulums

T-ETSD 6214 **Justin Ma**
Grade 10 - Design and Implementation of A Public Water Area Swimming Safety Monitoring System Based on UAV

W-ETSD 6216 **Daniel Oyeleye**
Grade 10 - How will I curve

Materials Science (MATS)

W-MATS 6401 **Lillian Kowal**
Grade 12 - Using food waste to cost-effectively produce the bioplastic P(3HB) with C. necator

W-MATS 6402 **Lara Granucci**
Grade 12 - Characterization of starch-based films based on mechanical and compostability testing

W-MATS 6403 **Maddie Thurnblom**
Grade 12 - Effects of Glycerol Concentrations on Sargassum and Gracilaria Seaweed Biofilms.

W-MATS 6408 **Vick Tan**
Grade 9 - A Revolutionary Material for Medical and Environmental Applications, Scalable Synthetic Mucins

S-MATS 6409 **Rohan Kharbanda**
Grade 11 - The Effects of Varying Sizes of Polylactic Acid as a Supplement for Concrete Aggregate on the Maximum Stress and Young's Modulus of Concrete

W-MATS 6410 **Noah Measells**
Grade 12 - Testing abrasion-resistant fabrics for their use in dual material glove protectors for skiers and snowboarders

T-MATS 6412 **Devin Flynn**
Grade 10 - How Fast Do Different Types of Fabric Burn?

S-MATS 6413 **Humza Jameel**
Grade 11 - Investigating The Effects of Rubber Aggregate as a Substitute for Natural Aggregate on the Strength of Concrete

Microbiology (MCRO)

W-MCRO 6501 **Isaac Jasper**
Grade 12 - Genetic Modification as a Method of Biofilm Inhibition in Proteus Mirabilis

W-MCRO 6502 **Erika Daniels**
Grade 12 - Yogurt and acne: Investigating the impact of S. salivarius on the phylotype diversity of C. acnes

W-MCRO 6503 **Noah Khemakhem**
Grade 12 - The effect of heavy metals on the expression of antioxidant enzymes in Caenorhabditis elegans

W-MCRO 6504 **Mars Moberg**
Grade 12 - An investigation of bacteriophage function using E. coli k-12 as a model host organism

W-MCRO 6505 **Leander Harrold**
Grade 12 - Examination of ethylene producing activity in bacteria Pseudomonas putida

W-MCRO 6506 **Isabella Tobin**
Grade 12 - Degrading plastic with fungi: The effect of pretreating polyester polyurethane on the rate of biodegradation by Pestalotiopsis microspora

W-MCRO 6507 **Vivian Omar**
Grade 12 - The success of immunotherapy methods in ticks against the transmission of Lyme's disease: a comparative study

T-MCRO 6508 **Jennifer Saidu**
Grade 10 - Effect of Mouthwash on E. coli

T-MCRO 6509 **Fatima Said**
Grade 10 - Effect of Soap on Bacteria

T-MCRO 6510 **Jordan Flores**
Grade 12 - Antibiotic Resistance

T-MCRO 6511 **Ella O'Hanlon**
Grade 11 - Sunscreen Showdown

T-MCRO 6512 **Lillie Hanto**
Grade 11 - Which method of cleaning golf balls is most effective?

T-MCRO 6513 **Muna Said**
Grade 10 - Effect of Salt Solutions on Bacteria

W-MCRO 6514 **Martin Krueger**
Grade 12 - The Effects of Substances and Growth Conditions on Bacteriophage Transmission

W-MCRO 6515 **Campbell DeLuca**
Grade 12 - The effects of Glyphosate on the neurological, behavioral and reproductive behaviors of aquatic organisms

W-MCRO 6516 **Lukas Murdych**
Grade 12 - Efficacy of green synthesized Zinc Nanoparticles in suppressing phytopathogens and fertilizing soil

W-MCRO 6517 **Henry Good**
Grade 12 - Effects of orchid mycorrhizal inoculation in MN Torgy hard red spring wheat

W-MCRO 6519 **Myonghai Choi**
Grade 12 - Evaluating the extent to which Wolbachia induces the activation of the Toll pathway in the Aedes aegypti mosquito

T-MCRO 6520T **Claire Ulvenes, Matthew Higley**
Grade 11,12 - **Team** - Analyzing Bacterial Concentration Among Different Brands of Yogurt

W-MCRO 6522 **Zabida Ahmed**
Grade 10 - You Are What You Eat: Tetracycline in Food

Physics and Astronomy (PHYS)

W-PHYS 6602 **Lux Bodell**
Grade 10 - Unified field theory: manipulating and engineering spacetime

T-PHYS 6603 **Greta Dickhausen**
Grade 10 - The Effect of Tire Pressure on Mountain Biking

T-PHYS 6605 **Abigail Peterson**
Grade 10 - Rebound of Old vs. New tennis balls

W-PHYS 6617 **Alisun Schulstad**
Grade 10 - Defending against Ultraviolet Radiation

T-PHYS 6618 **Grant Pilgrim**
Grade 11 - Optical Tweezers Exploration

T-PHYS 6623 **Sidharth Sharma**
Grade 10 - The Mpemba Effect

T-PHYS 6631T **Dylan Tate, Garrett Garms**
Grade 11,11 - **Team** - The Required Distance between the Fluxonium Qubit and the Ground Plane for Optimal T1 Times

Plant Sciences (PLNT)

W-PLNT 6701 **Juliet Siikarla**
Grade 12 - Comparing the nutrients of lettuce grown in a variety of growth mediums to the nutrients needed by the human body

W-PLNT 6702 **Emily Bodeau**
Grade 12 - Variability in capsaicinoid content of commercially available Kashmiri peppers

W-PLNT 6703 **Julian Lunzer**
Grade 11 - Effects of Plastic Mulch Liners on the Micro and Nano Plastic Content of Minnesota Midget Melons.

W-PLNT 6704 **Anna-Sofia Pedersen**
Grade 12 - The impact of varying electroporation voltages on cell viability and growth in model brown alga Ectocarpus sp. protoplasts

W-PLNT 6705 **Cinar Akakin**
Grade 11 - Production of Solanine In Potatoes

W-PLNT 6706 **Tyler Vos**
Grade 12 - Space plants

W-PLNT 6707 **Maria Rohlfsen**
Grade 10 - Effects of polyester fibers from fleece on the growth and chlorophyll production in hydroponically grown lettuce

W-PLNT 6709 **Quinn Hughes**
Grade 11 - Mars or Bust! A Method to Build a Martian Regolith-Based Substrate for Sustainable Agriculture on Mars

W-PLNT 6710 **Finn Emerson**
Grade 11 - Killing Buckthorn While They Sleep: a Method to Identify and Clear Rhamnus Cathartica During Winter

T-PLNT 6711 **Ilsa Lemke**
Grade 11 - Is a Blanket Good or Bad?

T-PLNT 6713 **Svea Leafblad**
Grade 10 - How ripening affects the sugar content in an organic vs regular banana.

W-PLNT 6714 **Selena Qiao**
Grade 10 - Turf Trouble: Does the DEET in bug repellent really kill grass?

T-PLNT 6719 **Sriram Sureshkumar**
Grade 11 - The effectiveness of biochar as an amendment on the growth of Raphanus Sativus on MGS-1 (Mars Global Stimulant) and the development of a model for regeneration of water and oxygen for Life Support Sustenance on Mars.

W-PLNT 6720 **Bilal Gani**
Grade 9 - Effects of Different Light Intensities on the Reaction Time of Sensitive Plants (Mimosa pudica)

Robotics and Intelligent Machines (ROBO)

W-ROBO 6801T **Evan Johnstone, Noah Getnick**
Grade 12,12 - **Team** - Collision-Free Commutes: Designing a Blind Spot Detection System for Cyclists Using an Ultrasonic Sensor and Computer Vision

W-ROBO 6802 **Andrew Skarohlid**
Grade 12 - Applications of an Active Cross Spherical Gear as a Robotic Wrist Component
Project At Electicity Wall

W-ROBO 6803 **John Malvin**
Grade 11 - Streamlining the Optimization of Object Detection Using Machine Learning

W-ROBO 6804 **Jaden Cai**
Grade 11 - Situational recognition and ensemble learning in the stock market

W-ROBO 6805 **Oliver Nelson**
Grade 10 - Recurrent Neural Networks for the Creation of a Generally Applicable 3-DOF Active Vibration Control System

T-ROBO 6806 **Efrata Eshete**
Grade 10 - Accuracy of Artificial Intelligence Detection

W-ROBO 6807 **Kevin Qiu**
Grade 10 - 3D Tactile Sensor To Provide Artificial Sense of Touch

S-ROBO 6808T **Adam Ebert, Andy Wells**
Grade 11,11 - **Team** - PENGUIN: A Innovative Robotics Platform Assisting Healthcare Workload
Project At Electicity Wall

W-ROBO 6809 **Saif Elkhateeb**
Grade 9 - Building a Driverless Robot

W-ROBO 6810 **Neel Kashyap**
Grade 11 - Reccurant Neural Networks and Sentiment Analysis To Predict Stock Movement

W-ROBO 6811 **Anthony Pu**
Grade 11 - Neuroevolution of spiking neural networks using HyperNEAT

W-ROBO 6812 **Razeen Abdul-Field**
Grade 11 - Evolving neural networks to exploit both problem and problem processing regularities: HyperNEAT plus a fixed chemical substrate

T-ROBO 6813 **Emily Zhou**
Grade 11 - The Tom and Jerry Algorithm for Nonholonomic robots: Optimized and adaptive path planning and dynamic obstacle avoidance based on A* and mathematical predator and prey insights for real-life simulations
Project At Electicity Wall

T-ROBO 6814 **Ethan Finch**
Grade 9 - Evaluating the Efficiency of Different Machine Learning Models in Locating the /s/ Phoneme

S-ROBO 6816 **Finn Cairns**
Grade 11 - ViABL: Visual Assistant for the Blind with VLMs

Systems Software (SOFT)

W-SOFT 6901 **Jason Huang**
Grade 12 - Performance of adaptive keyboards with machine learning and prefix-based word completion for touchscreens

S-SOFT 6902T **Finn Miller-Fimpel, Oliver Thompson**
Grade 11,11 - **Team** - Fisher-MN: Using a Mobile Application to Increase Accessibility to Minnesota's Lakes While Mapping Invasive Species and Diseases Among Fish Populations

W-SOFT 6903 **Sarah Gedi**
Grade 12 - Manage your diabetes better with Glucate

S-SOFT 6904 **Bora Mandic**
Grade 11 - SignalGrab: A Machine Learning Approach to Helping Color Blind Drivers
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S-SOFT 6905 **Huxley Westemeier**
Grade 10 - Project Calliope
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S-SOFT 6906 **Alessandro Fusco**
Grade 12 - Electric Vehicle Charger Demand Prediction using Machine Learning

T-SOFT 6907 **Lakshika Nanda Kumar Reddy**
Grade 12 - Exploring Acetylcholinesterase Inhibitors through QSAR, Molecular Docking, and Structural Analysis

Translational Medical Science (TMED)

W-TMED 7101 **Amanda Webster**
Grade 12 - Effect of cholesterol concentration in liposomes on transfection efficiency of mRNA in model blood brain barrier cells

W-TMED 7102 **Shreshth Shrivastava**
Grade 12 - AccuCellAI: A transformative tool for diagnosing and classifying hematological diseases using convolutional neural networks that demonstrates improved speed, accuracy, and transportability
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NORTHROP GRUMMAN

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Middle School

Adhanom, Divora	T-CHEM1602T
Anani, Cordelia	T-CHEM1637
Arens, Dylan	W-CHEM1616
Aroloye, Favour	W-CHEM1610
Bacigalupo, Emma	W-PHYS2611T
Beachem, Sadie	W-CHEM1624T
Benoit, Leah	W-CHEM1623
Bergerson, Norah	T-ENEV2109
Bilek, Lilly	T-EGSD1901
Bloomfield, Alec	W-BMED1336T
Boakye-danquah, Gavrila	W-CHEM1617T
Boerboom, William	T-PHYS2626
Bohl, Shea	T-EGSD1909
Bowers, Jenna	S-PLNT2728
Braun, Grace	T-PHYS2625
Busch, Jackson	W-PHYS2613
Calles Vazquez, Jennifer	S-PHYS2629T
Campos, Keegan	S-PHYS2629T
Carlson, Claire	W-BEHA1235
Casey, Piper	W-MATH2301
Cha, Ar	S-PHYS2621T
Chang, Kaydence	S-ANIM1006
Chinokoro, Grace	T-BMED1329
Chit, Edison	S-EGSD1913T
Corcoran, Keagan	S-EAEV1710
Cufaude, Kale	W-ROBO2815T
Currier, Lola	T-CHEM1602T
Dagal, Zabir	W-ETSD2211
Dahl, Isabelle	W-CHEM1609T
Daleiden, Natalee	W-PHYS2611T
DeLeo, Sebastian	W-EGSD1911
Denis, Bree	W-BEHA1229
Dixon, Lola	W-CHEM1612
Dobie, Mary-Grace	S-MATS2405
Dow, Lily	W-BMED1337
Duncan, Espen	S-ETSD2203
Duppong, Addison	W-PLNT2708
Dupree, Evelyn	W-CHEM1619
Dyrstad, Amelia	W-PLNT2717
Edson, Samuel	W-CHEM1613
Fahlin, Maren	W-BMED1318
Finch, Lila	S-PHYS2620
Finck, Cora	W-MATS2416
Fleming, Kallen	W-BEHA1236
Ford, Logan	W-ETSD2210
Foster, Lila	W-CHEM1640
Funk, Jasper	W-CHEM1630T
Gao, Jack	S-ENEV2116
Ginter, Edward	W-ETSD2215
Glaser, Makenna	W-CHEM1615
Godina, Natalia	T-BEHA1231
Goodrich, Jackson	W-ETSD2208
Graber, Easton	W-MATS2414
Granquist, Sienna	T-TMED3103T
Griffiths, Jared	W-EGSD1914
Hackenmueller, Kenzie	W-PHYS2607
Hansen, Laura	T-BEHA1221
Harper, Caleb	T-BEHA1233
Hassen, Abdurahman	W-BCHM1104T
Heath, Kallie	W-CHEM1620
Henningsgard, Ella	S-BEHA1217
Hilowle, Hafsa	W-CHEM1627
Hoffman, Aiden	W-PHYS2616
Holmes, Braysen	W-CHEM1628T
Hovanetz, Logan	W-PHYS2619
Howard, Cassie	S-PLNT2723
Hughes, Amari	S-PLNT2722
Hunt, Grace	W-MATS2407
Ibrahim, Luqman	W-ENEV2114T
Impola, Vincent	W-CHEM1642
Jeevanathan, Adlai	W-ANIM1008
Jimenez, Soleena	S-PHYS2627
Johnson, Lucy	W-BMED1317
Johnson, Andrew	W-CHEM1622
Kane, Vivienne	W-MCRO2521T
Kararu, Candice	W-CHEM1626T
Karst, Austin	W-PHYS2614
Kelly, Brooke	T-TMED3103T
Kessler, Sam	W-ETSD2207
Kimaiga, Gianna	W-CHEM1611T
Komara, Fahtima	W-MCRO2518
Kron, Isaiah	W-PLNT2721
Kue, Connor	S-CHEM1633T
Lee, Amerey	W-CHEM1621
Leitner, Cecelia	S-BEHA1215
Lor, Eric	S-CHEM1633T
Lor, Yerkong	S-PHYS2632
Loya, Mari	W-PLNT2716T
Ly, Touathar	W-BCHM1104T
Mader, Elizabeth	T-CHEM1634
Malinskyi, Roman	W-PHYS2615
Martinez Ortiz, Baylee	W-BMED1322
McAmis, Taylor	W-PLNT2727
Mick, Faith	W-PLNT2729
Miley, Maddy	S-BEHA1218
Minke, Ruth	T-BMED1330
Moe, Nay	S-PHYS2621T
Moheet, Emaan	W-ENEV2110
Montenegro, Alondra	T-PLNT2725
Moo, Poe	S-CHEM1632
Moore, Leah	S-CHEM1638T
Morales, Samantha	W-CHEM1625
More, Saee	W-BMED1333
Mortensen, Lilly	W-CHEM1630T
Muktar, Abdumalik	S-EAEV1727
Mulle, Kaitlyn	W-BEHA1211
Mwaga, Natalie	W-CHEM1611T

Nair, Jai	T-BCHM1107	Voigt, William	W-PHYS2610
Najera, Servando	S-PHYS2628T	Weber, Betsy	W-ETSD2209
Nation, Faye	S-CHEM1606	Westberg, Siri	W-PLNT2724
Nejo, Lalistu	W-PLNT2718	William, Adam	S-EAEV1725
Nguyen, Noah	T-EAEV1726	Wilson, Irene	T-TMED3103T
Nnadi, Josephine	W-PLNT2715	Wolde, Kidus	S-EGSD1913T
O'Keefe, Liam	T-PHYS2624	Xiong, Nathaniel	S-PLNT2726T
Ogunsina, Adebola	W-CHEM1617T	Young, Claire	S-MATS2406
Olson, Jake	S-EAEV1711	Yunis, Estella	S-BEHA1234
Ondicho, Brianna	W-PHYS2608	Zhou, Olivia	W-CHEM1643
Orezzoli Robinson, Agustin	S-MATS2415		
Pampusch, Javier	W-MATS2411		
Panko, Angelina	W-ENEV2112		

High School

Paulson, Noah	W-EGSD1905	Abdelhakim, Laila	W-EAEV5719T
Paw, Htoo	S-PHYS2628T	Abdirahman, Ajmal	T-BCHM5103
Peckosh, Ferran	S-EAEV1728	Abdukadr, Amira	T-BMED5308T
Perlick, Landyn	W-ROBO2815T	Abdul-Field, Razeen	W-ROBO6812
Peterson, Liam	W-EAEV1722	Ahmed, Zabida	W-MCRO6522
Pratt, Sandor	W-EGSD1912	Ahmed, Adna	T-BMED5308T
Reil, Harper	W-CHEM1609T	Akakin, Cinar	W-PLNT6705
Rieke, Lydia	W-CHEM1635	Alene, Elizabeth	S-BEHA5230
Robles, Amy	T-BMED1331	Algaddal, Basil	T-CHEM5604
Rodriguez, Natalia	T-BEHA1232	Allen, Darby	W-CELL5503
Rogers, William	W-EGSD1907	Arceo Cedano, Michelle	T-EGSD5904T
Rosenberger, Nolan	S-MATS2404	Arreola-Lucio, Fernanda	W-ENBM6009
Rustad, Luella	W-PHYS2606T	Augustine, Alexander	W-BEHA5204
Salem, Hamza	W-ENEV2114T	Awale, Farhiyo	W-BEHA5228
Salo, Kaia	W-PHYS2606T	Barhoover, Owen	W-EAEV5701
Sand, Breckon	W-PHYS2612	Bartholomew, Alexander	W-CBIO5401
Schafer, Addison	W-CHEM1624T	Bendt, Abigail	W-EAEV5707
Schwarze, Amelia	W-CHEM1626T	Bhargava, Rishi	S-EBED5802T
Secka, Isha	W-CHEM1618	Bhaskar, Ameya	W-BEHA5227
Senay, Bethel	W-BMED1334	Bhatia, Sameer	W-BMED5306
Severt, Mena	W-BMED1325	Bigalke, Julia	T-CELL5512T
Shah, Kinaari	W-MCRO2521T	Bodeau, Emily	W-PLNT6702
Shah, Kimaya	W-MCRO2521T	Bodell, Lux	W-PHYS6602
Shikder, Zakariya	W-ENEV2114T	Boeckermann, Malia	W-ETSD6204T
Shrivastava, Shagun	W-TECA3001	Buffington, Jos	W-EAEV5708
Smith, Fiona	S-BEHA1219	Bun, Vanlyda	T-BEHA5209
Smith, Bentley	W-PHYS2609	Bustos Morales, Sara	T-EGSD5904T
Smith, Hayden	W-CHEM1628T	Cai, Jaden	W-ROBO6804
Spaulding, William	W-BMED1336T	Cairns, Talia	S-EAEV5714
Steines, Hannah	S-ETSD2202	Cairns, Finn	S-ROBO6816
Strehler, Audrey	W-CHEM1614	Cassidy, Liam	W-EGSD5903
Strelchuk, Vinetta	W-EAEV1712	Chakiso, Shalom	T-BMED5314
Sullivan, Daniela	S-CELL1513	Chan, Oliver	S-BEHA5226
Summers, Helen	S-BEHA1216	Chen, Deling	S-CBIO5405
Szenay, Chloe	S-CHEM1638T	Choi, Myonghai	W-MCRO6519
Taha, Batoul	W-EAEV1718	Clair, Tyler	W-ENEV6101
Taha, Taher	W-ENEV2113	Colton, Jacob	S-EGSD5906
Telep, Eloise	T-CHEM1636	Constantin, Georgia	W-CELL5510
Umanah, Scarlett	W-PLNT2716T	Constantineau, Julia	W-EAEV5703
Vang, Peace	S-PLNT2726T	Cordova, Gabriel	T-ENEV6115
Velgersdyk, Thomas	W-PHYS2622	Curry, Becker	W-CELL5504
Voigt, Sarah	W-PLNT2712	Dagade, Yash	W-EGSD5910

Daniels, Erika	W-MCRO6502	Kelling, Valerie	W-CELL5509
Darji, Milan	W-CBIO5403	Kharbanda, Rohan	S-MATS6409
Davidson, Gustav	W-CHEM5603	Khemakhem, Noah	W-MCRO6503
DeBilzan, Emma	T-EAEV5713	Kimaiga, Abigael	W-CHEM5641
DeLuca, Campbell	W-MCRO6515	Kinney, Vivian	W-BEHA5201T
DeMichaelis, Noah	W-BEHA5202	Koch, Lindsey	W-BCHM5101
Dickhausen, Greta	T-PHYS6603	Kollipara, Sanjana	W-EAEV5721
Diethelm, Brayden	W-BMED5313	Kopitzke, Kieran	T-ETSD6212
Donaldson, Olivia	W-ENEV6103	Kowal, Lillian	W-MATS6401
Duffy, Grace	W-CHEM5607T	Krishna, Arjav	W-BMED5311
Dvorak, Samantha	W-BMED5301T	Krueger, Martin	W-MCRO6514
Ebert, Adam	S-ROBO6808T	Kuloglic, Advin	W-CHEM5644
Ekstrand, Winston	T-BEHA5207	Kumar, Anjneya	W-BMED5335
Elkhateeb, Saif	W-ROBO6809	Langason, Lily	T-CELL5512T
Emerson, Finn	W-PLNT6710	Larson, Savanna	W-CBIO5402
Endres, Abigail	W-BEHA5201T	Le, Lam	S-ANIM5004
Engebretson, Evelyn	W-EGSD5902	Leafblad, Svea	T-PLNT6713
Erickson, Amelia	W-ENEV6102	Lemke, Ilsa	T-PLNT6711
Eshete, Efrata	T-ROBO6806	Li, Caleb	W-ETSD6201
Eyres, Patrick	W-ETSD6204T	Lillegard, Annika	S-BCHM5106
Farah, Salman	W-EAEV5720	Lin, Richard	W-ENBM6008
Feeley, Keegan	W-CELL5508	Liu, John	T-ENEV6107
Finch, Ethan	T-ROBO6814	Lunzer, Julian	W-PLNT6703
Flores, Jordan	T-MCRO6510	Ma, Justin	T-ETSD6214
Flynn, Devin	T-MATS6412	Malvin, John	W-ROBO6803
Fusco, Alessandro	S-SOFT6906	Manacek, Matthew	W-BMED5301T
Gani, Bilal	W-PLNT6720	Mandic, Bora	S-SOFT6904
Garms, Garrett	T-PHYS6631T	Mark, Quinn	W-BMED5302T
Garner, McKinley	S-ENEV6111	Martin, Kyra	W-BMED5307
Gedi, Sarah	W-SOFT6903	Martinez, Joseph	W-BEHA5214
Getnick, Noah	W-ROBO6801T	McCallum, Elisabeth	W-BMED5305
Getnick, Abigail	W-BEHA5212T	McCarthy, Nicholas	S-ENEV6108
Gilats, Samantha	S-ANIM5007	McKinney, Anna	W-BMED5316
Gokarn, Anaya	W-ENBM6004	Measells, Noah	W-MATS6410
Goldsmith, Jasmine	W-CELL5502	Menon, Swati	W-ENBM6007
Good, Henry	W-MCRO6517	Miller, Henry	W-BEHA5237
Granucci, Lara	W-MATS6402	Miller-Fimpel, Finn	S-SOFT6902T
Hamann, Olivia	T-EAEV5705	Mishra, Milan	S-ENEV6106
Hanto, Lillie	T-MCRO6512	Moberg, Mars	W-MCRO6504
Harrold, Leander	W-MCRO6505	Mohammed, Muminah Nihaar	W-ENBM6006
Hassan, Ladan	W-EAEV5717	Moher, Braiden	T-BEHA5225
Hermanson, Andrew	W-BMED5303	Moran, Corinne	W-BMED5310
Higley, Matthew	T-MCRO6520T	Morgan, Samuel	T-CHEM5605
Hu, Lynne	T-BMED5332	Morioka, Sohana	W-CHEM5607T
Huang, Jason	W-SOFT6901	Moses, Ruth	T-BEHA5210
Hughes, Quinn	W-PLNT6709	Murad, Humza	S-EBED5802T
Iordanoglou, Anna	W-ENBM6002	Murdych, Lukas	W-MCRO6516
Jameel, Humza	S-MATS6413	Nabi, Tyseer	W-CELL5507
Jasper, Isaac	W-MCRO6501	Nair, Aditya	W-ENBM6005
Jimenez, Emree	T-CELL5512T	Nanda Kumar Reddy, Lakshika	T-SOFT6907
Johnstone, Evan	W-ROBO6801T	Nelson, Oliver	W-ROBO6805
Josephs, Neela	T-BEHA5208	Nelson, Valerie	W-CBIO5404
Kamp, Brynn	W-CELL5501	Nelson, Melissa	W-ENBM6003
Karmaliani, Cerena	S-BMED5315	Nguyen, Katie	T-EAEV5709
Kashyap, Neel	W-ROBO6810	O'Hanlon, Ella	T-MCRO6511

O'Neill, Molly	W-EAEV5702	Ulvenes, Claire	T-MCRO6520T
Oliveros Carvajal, Miguel	T-ANIM5003T	Vangala, Hemanth	W-BMED5304
Olson, Paige	W-BMED5320	Vasicek, Charlotte	W-ENBM6001T
Omar, Vivian	W-MCRO6507	Vergara Mariscal, Lupe	T-EGSD5904T
Overgaard, Connor	S-EBED5803	Vohra, Adeenah	W-EAEV5716
Oyeleye, Daniel	W-ETSD6216	Vos, Tyler	W-PLNT6706
Parmele, Sophia	W-BMED5323	Vue, Chuepor	W-ETSD6213
Patel, Twinkleben	T-BMED5308T	Wang, Alyssa	T-CHEM5608
Pedersen, Anna-Sofia	W-PLNT6704	Wang, Isabella	T-ANIM5005
Perez Pliego, Cristal	T-PHYS6604	Webster, Amanda	W-TMED7101
Peterson, Abigail	T-PHYS6605	Wellmann, Elin	W-ANIM5001
Petrin, Jack	W-EAEV5706	Wells, Andy	S-ROBO6808T
Pietrafitta, Sabrina	W-ENEV6105	Welsbacher, Kyvie	W-ANIM5002
Pilgrim, Grant	T-PHYS6618	Westemeier, Huxley	S-SOFT6905
Pillai, Deepti	W-BEHA5205	Whelan, Henry	S-EBED5801
Pralle, Grace	W-CELL5506	Winnett, Alexander	S-EAEV5729
Pu, Anthony	W-ROBO6811	Wold, Ruby	W-CHEM5607T
Qiao, Selena	W-PLNT6714	Yego, Ella	T-BMED5321
Qiu, Kevin	W-ROBO6807	Yonas, Bersy	T-BMED5326
Quito, Kathy	W-BMED5319	Yusupova, Parvina	T-BEHA5206
Rao, Veda	W-BEHA5212T	Zahran, Randa	W-EAEV5719T
Reeder, Rebecca	W-EAEV5704	Zamudio, Sarah	T-EGSD5908
Reinhard, Henry	T-BMED5327	Zhang, Annie	S-BEHA5222
Ren, Maximus	W-ETSD6206	Zhong, William	W-CELL5505
Rohlfsen, Maria	W-PLNT6707	Zhou, Emily	T-ROBO6813
Rupert, Sydney	W-BMED5312		
Rupireddy, Adithi	W-EAEV5723		
Sabo, Henry	W-BEHA5224		
Said, Fatima	T-MCRO6509		
Said, Muna	T-MCRO6513		
Saidu, Jennifer	T-MCRO6508		
Schaeffer, Alisha	W-CELL5511		
Schulstad, Alisun	W-PHYS6617		
Schumacher, David	S-EAEV5715		
Sekar, Shreya	T-BEHA5223		
Setterberg, Michael	W-ENBM6001T		
Sevilla Cueto, Moises	T-ANIM5003T		
Sharma, Sidharth	T-PHYS6623		
Shi, Yuchen	W-BEHA5213		
Shrivastava, Shreshth	W-TMED7102		
Siikarla, Juliet	W-PLNT6701		
Singhvi, Riddhi	T-BMED5324		
Singhvi, Coolsjes	T-CBIO5407		
Sirna, Raaga	W-CBIO5406		
Skarohlid, Andrew	W-ROBO6802		
Stroh, Ellison	W-ENEV6104		
Sureshkumar, Sriram	T-PLNT6719		
Tan, Vick	W-MATS6408		
Tan, Emma	W-BMED5302T		
Tate, Dylan	T-PHYS6631T		
Tesfaye, Feven	T-BEHA5220		
Thompson, Oliver	S-SOFT6902T		
Thurnblom, Maddie	W-MATS6403		
Tobin, Isabella	W-MCRO6506		
Tungtur, Snigdha	W-BMED5328		

2024 Research Papers

Name	Grade	Title
Piper Casey	6	Skittle Sorter
Laura Hansen	6	Music Magic: Using electroencephalography and surveys to investigate the therapeutic value of music
Grace Chinokoro	7	Trace Amounts of Sugar: How is Your Blood Pressure Affected
Ruth Minke	7	Which Mask is More Hydrating?
Liam O'Keefe	7	Effects of Temperature on Hitting Home Runs
Amy Robles	7	The Effects of Caffeine According to Your Age
Zakariya Shikder, Hamza Salem, Luqman Ibrahim	7,7,7	Building a miniature Greenhouse
Taher Taha	7	How to generate water out of air?
Eloise Telep	7	Some Sweet Sugar Cookies
Zabir Dagal	8	Can a 3D Printed Water Filter Match the Filtration Quality of a Commercial Water Filter?
Jack Gao	8	The Impact of Electric Vehicle Adoption and Electrification
Taylor McAmis	8	How to kill Buckthorn naturally
Emaan Moheet	8	Developing and Testing Permeable Pavement Material to Prevent Urban Flooding
Saee More	8	The Fight Against Cardiovascular Disease
Mithun Raj Sambasiva Rajan	8	The Relationship Between Genetics and Diabetes
Bethel Senay	8	Blood Sugar High? Why?
Batoul Taha	8	Measuring Tap Water Qualities In Different Cities (Fridley, Blaine, New Brighton, Brooklyn Park, Columbia Heights) From Public Facilities (Library, Clinic, Schools)
Saif Elkhateeb	9	Building a Driverless Robot
Salman Farah	9	BPA Estrogen Presence in Tap Water and Its Potential Effects on Human Health
Ethan Finch	9	Evaluating the Efficiency of Different Machine Learning Models in Locating the /s/ Phoneme
Bilal Gani	9	Effects of Different Light Intensities on the Reaction Time of Sensitive Plants (Mimosa pudica)
Advin Kuloglic	9	Exothermic Reactions, What Are They?
Alyssa Wang	9	Development of Novel Biodegradable Bioplastics Using Mango Peels Intended for Packaging Film
Laila Abdelhakim, Randa Zahran	10,10	The Harm of Electromagnetic Radiation on Living Organisms
Basil Algaddal	10	The Effect of Corrosion on Nails
Farhiyo Awale	10	The Effects of Piracetam on Adult Zebrafish
Ella Banasik	10	Color Psychology
Solyana Bein	10	Bacteria vs Mouthwash
Ezra Bekele	10	Best Types of Light
Ameya Bhaskar	10	Beyond Numbers: Investigating the Relationship Between Socioeconomic Status and Big 5 Personality Traits Through Metadata Analysis
Elizabeth Birch	10	What micro green seed will produce the most consumable product?
Lexi Bruesehoff	10	A Soundproofing Experiment
Vanlyda Bun	10	Do people believe others with authority more than their own memory?
Shalom Chakiso	10	Which Soap is the Most Effective at Killing Bacteria?
Vincent Dao	10	How do different preservatives affect the lasting freshness of a cut flower?

Name	Grade	Title
Leonardo David	10	A Quiet Place
Emma DeBilzan	10	How does stream velocity affect the deposition process?
Greta Dickhausen	10	The effect of Tire Pressure on Mountain Biking
Evan Duong	10	Do peanuts or potato chips contain more kilocalories?
Andy Duong	10	Distance Effect on Light
Winston Ekstrand	10	Tasting the Rainbow? The Effects of Color on Taste
Abigail Erickson	10	Determining the Flammability of Fabrics
Efrata Eshete	10	Accuracy of Artificial Intelligence Detection
Abdimalik Farah	10	Bernoulli's Principle
Isaias Flores MIranda	10	How does color affect memory?
Devin Flynn	10	How fast do different types of fabrics burn?
Brooke Gerber	10	Organic vs Non-organic
Greta Griffin	10	What Acids Will Clean Tarnished Pennies the Best?
Olivia Hamann	10	I Didn't Start the Fire
Ladan Hassan	10	Bioplastics' Degradability and Strength Relative to Plastic Bags Through the Use of Alternative Starch Sources.
Lynne Hu	10	Tying the Knot: Maximum Force of Dehiscence in Three Surgical Knots
Neela Josephs	10	How does working together on a project affect the accuracy of a response?
Ryan Kennedy	10	Geothermal Energy
Sanjana Kollipara	10	Meteorological Measurement Mysteries:Quantifying the variability of precipitation and snow depth based on measurement location and wind dynamics as it impacts flood prediction modeling
Lam Le	10	The Solitary Bees' Diet: An Exploration of Megachile Campanulae
Svea Leafblad	10	How ripening affects the sugar content in an organic vs regular banana.
John Liu	10	The Use of Sustained Releasing Technology to Reduce Deicing Salt Pollution
Justin Ma	10	Design and Implementation of a public water area swimming safety monitoring system based on UAV
Ryan Mercer	10	How does the age of baseballs and material of bats affect the power of a hit?
Lliam Merrell	10	Are 'Green' detergents better for the environment than conventional detergents?
Spencer Miller	10	Which Brand of Hand Soaps is the Best?
Hamdi Mohamed	10	Measuring Fat in fruit chips
Ilhan Mohamud	10	Which Type of Nail Is Most Corrosion-Resistant?
Samuel Morgan	10	A Study Into Water Desalination
Ruth Moses	10	Peppermint Reaction Test
Huda Mume	10	Table Sugar vs Artificial Sugar and Yeast
Alex Nachand	10	Correlation Between Brands of Dish Soap Against Bacteria
Zuri Navarrete-Garcia	10	Yogurt
Katie Nguyen	10	What effect does vermicomposting have on radishes?
Abigail Peterson	10	Rebound of old vs. new tennis balls
Kimberly Ponce Trejo	10	Effect of Soap on Bacteria
Maximus Ren	10	A New High-Impedance-Fault Detection Method to Prevent Power-Line-Induced Wildfires

Name	Grade	Title
Krystal Reyes	10	Burning materials
Owen Rimbo	10	How does the kind of popcorn affect how many kernels are left after it is popped?
Gage Route	10	How do different types of tape react to bearing weight?
Brian Russell	10	How do different temperatures of water affect the growth of watersprite?
Fatima Said	10	Effect of Soap on Bacteria
Muna Said	10	Effects of Salt solutions on bacterial growth
Jennifer Saidu	10	Effects of Mouthwash on E. coli
Adam Schaeffer	10	Angle of Airplane Wings
Raiden Sengmany	10	The effect of temperature on UV beads discoloration
Exie Soundara	10	How does soap affect bacteria?
Paige Stone	10	Visual vs Auditory Memory
Feven Tesfaye	10	Is Ignorance really Bliss?
Kaylene Thao	10	How Chlorine Affects Hair
Caroline Thoresen	10	How Sweet It Is; Making Sweet Bananas
Giancarlo Urzua Parra	10	Sugar Content in a Ripe Banana and Organic Banana
Adeenah Vohra	10	Effect of the combination of different growth lights, their intensity on the dry weight, wet weight and root mass of different plants
Ella Yego	10	BAC in business
Lydia Yonas	10	How different oils affect the taste of food
Bersy Yonas	10	Optimizing Stent Design Geometry using Macro Models
Parvina Yusupova	10	The Impact of Key Changes on Adolescent Moods: A Musical Exploration
Julia Bigalke, Emree Jimenez, Lily Langason	11,11,11	Is Fel d 1 Found In Hypoallergenic Cats?
Finn Cairns	11	ViABL: Visual Assistant for the Blind with VLMs
Talia Cairns	11	Rhizofiltration of Nitrate and Phosphate by Elodea Canadensis Under Varying Temperatures
Oliver Chan	11	Examining the Impact of Positive Affirmations on the Confidence Perception and Academic Performance of High School Students
Deling Chen	11	A Novel Electrocardiogram-Based Model for Prediction of Dementia—the Atherosclerosis Risk in Communities (ARIC) study
Tyler Clair	11	Food waste-based biocoagulants: a novel approach to sustainably remove polystyrene microplastics for future alternatives in water treatment
Jacob Colton	11	Effect of Annealing Time on Electrodeposited Zinc Samples for Use in Dye Sensitized Solar Cells
Matthew Manacek, Samantha Dvorak	11,11	Catching the Culprit: Western blot analysis of the relationship between Alzheimer's related proteins Aß*56 and ?Tau303 in APP transgenic mice
Finn Emerson	11	Killing Buckthorn While They Sleep: a Method to Identify and Clear Rhamnus Cathartica During Winter
Abigail Endres, Vivian Kinney	11,11	Find Your Way: Design and construction of a multiple T-maze to assess spatial memory
Quinn Hughes	11	Mars or Bust! A Method to Build a Martian Regolith-Based Substrate for Sustainable Agriculture on Mars

Name	Grade	Title
Humza Jameel	11	Investigating The Effects of Rubber Aggregate as a Substitute for Natural Aggregate on the Strength of Concrete
Cerena Karmaliani	11	The Absorbency of Home-Compounded Transdermal Pain Medication in Comparison to Industrially Manufactured Voltaren Gel
Rohan Kharbanda	11	The Effects of Varying Sizes of Polylactic Acid as a Supplement for Concrete Aggregate on the Maximum Stress and Young's Modulus of Concrete
Bora Mandic	11	SignalGrab: A Machine Learning Approach to Helping Color Blind Drivers
Nicholas McCarthy	11	The Effect of Synthetic and Composted Manure Fertilizers on the Growth of Brassica Juncea in Copper-Contamianted Soil
Milan Mishra	11	Usage of a Convolutional Neural Network in Drone-Based Algae Bloom Monitoring
Henry Reinhard	11	Household Beverages vs. Sports Drinks for Hydration and the Effects of Refrigeration
David Schumacher	11	Exploring the effect of Nickel Sulfate and Nickel Chloride on the growth of Chlorella Pyrenoidosa and Chlorella Vulgaris
Finn Miller-Fimpel, Oliver Thompson	11,11	Fisher-MN: Using a Mobile Application to Map Invasive Species and Diseases Among Fish Populations in Minnesota's Lakes
Claire Ulvenes, Matthew Higley	11,12	Analyzing Bacterial Concentration Among Different Brands of Yogurt
Charlotte Vasicek, Michael Setterberg	11,11	Refining the Ring: Engineering Nanobodies for a Faster Path to CSAN Cancer Immunotherapy
Annie Zhang	11	The Effects of Natural versus Pharmaceutical Stimulants on Autism Symptoms
Elizabeth Alene	12	The Relation Between Human Accuracy and Active Recall When Using Static and Dynamic Imaging
Yash Dagade	12	SkyWindFarm: Harnessing High Altitude Wind Power in Scalable Manner
Noah DeMichaelis	12	Music and the Mind (Year Two): the Interection of Reading Readiness and Musical Proficiency
McKinley Garner	12	The Effectiveness of Aspergillus niger as a Remedy to Microplastic-Contaminated Soil
Sarah Gedi	12	Manage your diabetes better with Glucate
Evan Johnstone, Noah Getnick	12,12	Collision-Free Commutes: Designing a Blind Spot Detection System for Cyclists Using an Ultrasonic Sensor and Computer Vision
Samantha Gilats	12	Exploring Potential Effects of Theobromine on Girardia tigrina Regeneration
Jasmine Goldsmith	12	A comparison of bamboo and conifer species' efficiency at removing contamination from water similar to that of Southeast Asia
Quinn Harvey	12	The Intersection of Climate Change and Dissolved Oxygen in Minneapolis Lakes
Anna Iordanoglou	12	Problematic Packaging: Optimizing a method for dissolving alginate sheaths from cell fibers for 3D bioprinting
Corinne Moran	12	Deciphering DUX4 (Year II): Is transient expression of the DUX4 gene sufficient to cause muscular dystrophy?
Isabella Pfankuch	12	Boundary Waters Canoe Area and the Conservation Concerns of Mining

Name	Grade	Title
Zora Vorhes	12	The Effect Various Quantities of Caffeine Have on the Germination of Vigna radiata (Mung Bean) Seeds after 72 Hours
Elin Wellmann	12	The Microplastic Butterfly Effect: Effects of dietary microplastic on survival and fitness of Cabbage White butterflies (Pieris rapae).
Alexander Winnett	12	Assessing the Influence of Green Space Directly Surrounding Lakes on Water Quality

TWIN CITIES REGIONAL SCIENCE FAIR "ISEF" ALUMNI
Students Chosen to Represent the Twin Cities Fairs at International Science & Engineering Fair

1973   Timara Kulzer Underbakke
Harding High School, St. Paul
1974   Craig Johnson
Harding High School, St. Paul
1975   Dennis Scanlon
Harding High School, St. Paul
1976   Mark Foertsch
Grace High School, Fridley
1976   Linda Ann MacDonald
Mounds View High School, Arden Hills
1977   Steve Rabatin
Benilde-St. Margaret, St. Louis Park
1977   Charles Clevenger
Westonka High School, Mound
1978   Mitchell Voechl
1978   Charles Clevenger
Westonka High School, Mound
1979   Jeffrey Rabatin
Benilde-St. Margaret, St. Louis Park
1979   Joseph Rabatin
Benilde-St. Margaret, St. Louis Park
1980   Jeffrey Rabatin
Beniide-St. Margaret, St. Louis Park
1980   Joseph Rabatin
Benilde-St. Margaret, St. Louis Park
1981   Jeffrey Rabatin
Benilde-St. Margaret, St. Louis Park
1981   Joseph Rabatin
Benilde-St. Margaret, St. Louis Park
1982   Micheal Rabatin
Benilde-St. Margaret, St. Louis Park
1982   Brian Hallberg
Harding High School, St. Paul
1983   Thinh Hoang Tran
Westonka High School, Mound
1983   UNKNOWN
1984   Susan Kain
Edina High School, Edina
1984   Steve Herrman
Mahtomedi High School, Mahtomedi
1985   Brenda Zenk
Sibley High School, West St. Paul
1985   Steve Herrman
Mahtomedi High School, Mahtomedi
1986   Brenda Zenk
Sibley High School, West St. Paul
1986   Steve Herrman
Mahtomedi High School, Mahtomedi

1987   Brenda Zenk
Sibley High School, West St. Paul
1987   Ann Bailey
Mahtomedi High School, Mahtomedi
1988   Sara Greenslit
Mounds View High School, Arden Hills
1988   Ann Marie Gentes
Westonka High School, Mound
1989   Ann Marie Gentes
Westonka High School, Mound
1989   Todd Capistrant
Minnesota Zoo School
1990   Cynthia Schaumburger
Harding High School, St. Paul
1990   Ryan Egeland
Wayzata High School, Wayzata
1991   Ryan Egeland
Wayzata High School, Wayzata
1991   Jonathon Kubik
Sibley High School, West St. Paul
1992   Heidi Konkler
Wayzata High School, Wayzata
1992   Ryan Egeland
Wayzata High School, Wayzata
1993   Ryan Egeland
Wayzata High School, Wayzata
1993   Andrew Grande
St. Thomas Academy, Mendota Heights
1993   Kelley Lohman
Harding High School, St. Paul
1993   Jens Strand
St. Paul Academy, St. Paul
1994   John Hassett
Burnsville High School, Burnsville
1994   Ana Navarro
Minnetonka High School, Minnetonka
1994   Victoria Miller
St. Agnes High School, St. Paul
1994   Julia Goetzke
Harding High School, St. Paul
1995   John Hassett
Burnsvilie High School, Burnsvilie
1995   Adam Tatarynowicz
Burnsville High School, Burnsville
1995   Victoria R. Miller
St. Agnes High School, St. Paul
1995   Marcus Rollins
St. Paul Open School, St. Paul

TWIN CITIES REGIONAL SCIENCE FAIR "ISEF" ALUMNI
Students Chosen to Represent the Twin Cities Fairs at International Science & Engineering Fair

1995   Anna Navarro
Minnetonka High School, Minnetonka

1995   Samuel Rush
Minnetonka High School, Minnetonka

1996   Laurie Louis Parker
Roseville High School, Roseville

1996   David Loy Bowe
Burnsville Senior High School, Burnsville

1996   Michael Scott Lohman
Expo Ill High School, St. Paul

1996   Victoria Reynolds Miller
St. Agnes High School, St. Paul

1996   Anna Navarro
Minnetonka High School, Minnetonka

1996   Michelle Lee Monnens
Minnetonka High School, Minnetonka

1996   James Justin Wilson
Minnetonka High School, Minnetonka-Team

1996   Michael Gary Grotenhuis
Minnetonka High School, Minnetonka-Team

1997   Nguyen Trung
Burnsville Senior High School, Burnsville

1997   Samuel Rush
Minnetonka High School, Minnetonka

1997   Anna Navarro
Minnetonka High School, Minnetonka

1997   Victoria Reynolds Miller
St. Agnes High School, St. Paul

1997   Michael Scott Lohman
Expo Ill High School, St. Paul

1997   Travis Smith
Burnsville Senior High School, Burnsville

1997   James Justin Wilson
Minnetonka High School, Minnetonka-Team

1997   Justin Rainey
Minnetonka High School, Minnetonka-Team

1998   Dean Harvey
Burnsville Senior High School-Team

1998   Dan Harakh
Burnsville Senior High School-Team

1998   Bryce Gillespie
Breck School, Minneapolis

1998   Preeya Kshettry
Breck School, Minneapolis

1998   Phally Seak
Burnsville Senior High School

1998   Raj Pai
Burnsville Senior High School

1998   Michael Scott Lohman
Expo Ill High School, St. Paul

1998   A. Ben Suri
Harding High School, St. Paul

1999   Michael Scott Lohman
Expo Ill High School, St. Paul

1999   Alison Boutin
Burnsville High School, Burnsville

1999   Jennica Slattery
Minnehaha Academy, Minneapolis

1999   Chrissy Jones
Minnetonka High School, Minnetonka-Team

1999   Elizabeth Larkin
Breck School, Minneapolis

1999   Melissa Borken
Minnetonka High School, Minnetonka

1999   Alli Kellogg
Minnetonka High School, Minnetonka-Team

2000   Mark Galatowitsch
Highland High School, St. Paul

2000   Jennica Slattery
Minnehaha Academy, Minneapolis

2000   Chrissy Jones
Minnetonka High School, Minnetonka

2000   Michael Chansky
Burnsville High School, Burnsville

2000   A. Ben Suri
Harding High School, St. Paul

2000   Emily Letourneau
Central High School, St. Paul-Team

2000   Anna Bishop
Como Park, St. Paul-Team

2001   Megan Bailey
Breck School, Minneapolis

2001   Kathryn Gieselman
Burnsville High School, Burnsville

2001   A. Ben Suri
Harding High School, St. Paul

2001   Li Mei
Wayzata High School, Wayzata

2001   Laura Egerdal
Burnsville High School, Burnsville

2001   Anna Bishop
Como High School, St. Paul-Team

2001   Emily Letourneau
Central High School, St. Paul-Team

2002   Jacob Fitzpatrick
Burnsville High School, Burnsville

TWIN CITIES REGIONAL SCIENCE FAIR "ISEF" ALUMNI
Students Chosen to Represent the Twin Cities Fairs at International Science & Engineering Fair

2002   Kaonhou Her
Johnson High School, St. Paul-Team
2002   PaCha Yang
Johnson High School, St. Paul-Team
2002   Stephen Morris
Breck School, Minneapolis
2002   Arun Saini
Burnsville High School, Burnsville
2002   A. Noel Suri
Harding High School, St. Paul
2003   Jessica Swatrz
ISD 287
2003   Ning Zhou
ISD 287
2003   PaCha Yang
Johnson High School, St. Paul
2003   A. Noel Suri
Harding High School, St. Paul
2003   Brendan Doms
Breck School, Minneapolis
2003   Javier Cabrera-Perez
Breck School, Minneapolis
2004   Adam Yock
Breck School, Minneapolis
2004   William Mitchell
Breck School, Minneapolis
2004   Noel Suri
Harding High School, St. Paul
2004   Adam Hahn
Robbinsdale Armstrong High School, Robbinsdale
2004   Akash Kumar
Wayzata High School, Wayzata
2004   Laura Heeter
Breck School, Minneapolis - Team
2004   Kristina Naranjo-Rivera
Breck School, Minneapolis - Team
2005   Kyrstin Underbakke
Maranatha Christian Academy, Brooklyn Park
2005   Janet Li
Wayzata High School, Plymouth
2005   Heidi Chun
St. Paul Academy, St. Paul
2005   Zachary Howland
Burnsville High School, Burnsville
2005   Eric Halverson
Como Park Senior High, St. Paul
2005   Kahli Her
Johnson High School, St. Paul

2006   Jenna Johnson
Burnsville High School, Burnsville
2006   Andrea Jensen
Burnsville High School, Burnsville
2006   Daniel Zeng
St. Paul Academy & Summit School
2006   Matthew Weiss
Breck School, Minneapolis
2006   Katherine Schaeffer
Breck School, Minneapolis
2007   Ummul Kathawalla
Blake High School, Minneapolis
2007   Daniel Zeng
St. Paul Academy & Summit School
2007   Kyra Underbakke
Maranatha Christian Academy, Brooklyn Park
2007   Brandon Lew
Breck School, Minneapolis
2007   John Earl
Harding High School, St. Paul - Team
2007   Lucas Gabrielson
Harding High School, St. Paul - Team
2007   Jacob Stramer
Harding High School, St. Paul - Team
2008   Prithwis Mukhopadhyay
Lake Junior High, Woodbury
2008   Michael Cherkassky
Edina High School, Edina
2008   Madeline Taft-Ferguson
Breck School, Minneapolis
2008   Kyra Underbakke
Maranatha Christian Academy, Brooklyn Park
2008   Aly Xiong
Johnson High School, St. Paul
2008   Iola Edwards
Johnson High School, St. Paul
2008   Stephen Trusheim
Breck School, Minneapolis - Team
2008   Daniel Mohktari
Breck School, Minneapolis - Team
2009   Prithwis Mukhopadhyay
Woodbury Sr High School, Woodbury
2009   Tiffanie Stone
AFSA High School, Vadnais Heights
2009   Michael Fuad
Breck School, Minneapolis
2009   Stephen Trusheim
Breck School, Minneapolis

TWIN CITIES REGIONAL SCIENCE FAIR "ISEF" ALUMNI
Students Chosen to Represent the Twin Cities Fairs at International Science & Engineering Fair

2009   Chee Xiong
Como Park Senior High, St. Paul
2009   Martin Camacho
Central Senior High School, St. Paul
2009   Sahar Hakim-Hashemi
Breck School, Minneapolis - Team
2009   Sierra Danforth
Breck School, Minneapolis - Team
2009   Nicholas NaSal
Burnsville High School, Burnsville - Team
2009   Joseph Lane
Burnsville High School, Burnsville - Team
2010   Prithwis Mukhopadhyay
Woodbury Sr High School, Woodbury
2010   Tiffanie Stone
AFSA High School, Vadnais Heights
2010   Martin Camacho
Central Senior High School, St. Paul
2010   Houa Xiong
Johnson High School, St. Paul
2010   Gavin Ovsak
Eden Prairie Senior High School, Eden Prairie
2010   Charles Morris
Breck School, Minneapolis
2010   Ava Mokhtari
Breck School, Minneapolis - Team
2010   Addison Weiler
Breck School, Minneapolis - Team
2010   Ashley Santilli
Burnsville High School, Burnsville - Team
2010   Emily Bostrom
Burnsville High School, Burnsville - Team
2011   Alysia Flores
Johnson High School, St. Paul
2011   Andrew Ylitalo
Stillwater Area High School, Stillwater
2011   Martin Anderson
Burnsville High School, Burnsville
2011   Redeat Abegaz
Burnsville High School, Burnsville
2011   Gavin Ovsak
Eden Prairie Senior High School, Eden Prairie
2011   (Ernst) Tom Erdmann
Breck School, Minneapolis
2012   Andrew Ylitalo
Stillwater Area High School, Stillwater
2012   Keshav Mangalick
Mounds View High School

2012   Margaret Green
Burnsville High School, Burnsville - Team
2012   Laura Landgraf
Burnsville High School, Burnsville - Team
2012   Caleb Kumar
Breck School, Minneapolis
2012   Taylor McCanna
Breck School, Minneapolis
2012   Alejandro Fenn
Breck School, Minneapolis - Team
2012   William Engel
Breck School, Minneapolis - Team
2012   Thomas Vennemann
Johnson High School, St. Paul
2013   Andrew Ylitalo
Stillwater Area High School, Stillwater
2013   Aditi Das
Roseville Area High School, Roseville
2013   Connor Duffy
Mounds View High School, Arden Hills
2013   Graham Gabrielson
Harding High School, St. Paul
2013   Mai Moua
Harding High School, St. Paul
2013   Carolyn Jons
Eden Prairie Senior High School - Eden Prairie
2013   Jessica Ryvlin
Breck School, Minneapolis
2013   Apurv Hirsh Shekhar
Blake High School - Northrop campus
2014   Carolyn Jons
Eden Prairie Senior High School - Eden Prairie
2014   Jason Sylvestre
Benilde-St. Margaret's, St. Louis Park
2014   Jacob W Levy
Breck School, Minneapolis - Team
2014   Sofie M Kim
Breck School, Minneapolis - Team
2014   Aditi Das
Roseville Area Senior High, Roseville
2014   Heather J Stone
Mounds View High School, Arden Hills
2014   Amrita Mohanty
Woodbury Sr High School, Woodbury
2014   Nicolina Mao
Harding High School, St. Paul
2014   Rosemary O Olatunbosun
Harding High School, St. Paul

TWIN CITIES REGIONAL SCIENCE FAIR "ISEF" ALUMNI
Students Chosen to Represent the Twin Cities Fairs at International Science & Engineering Fair

2015   Amrita Mohanty
Woodbury Sr High School, Woodbury
2015   Maxwell Ylitalo
Stillwater Area High School, Stillwater
2015   Aadarsh Padiyath
Woodbury Sr High School, Woodbury
2015   Carolyn Jons
Eden Prairie Senior High School - Eden Prairie
2015   Arush Jain
Eden Prairie Senior High School - Eden Prairie
2015   Emilia Topp-Johnson
St Paul Academy and Summit School, St. Paul
2015   Serena Jing
Central Senior High School, St. Paul
2016   Maxwell Ylitalo
Stillwater Area High School, Stillwater
2016   Nathaniel R Farmer
Stillwater Area High School, Stillwater
2016   Claire E Wentzlaff
Burnsville High School, Burnsville
2016   Prashant Godishala
Breck School, Minneapolis - Team
2016   Brennan Clark
Breck School, Minneapolis - Team
2016   Avni Jain
Eden Prairie Senior High School - Eden Prairie
2016   Jessica Weng
Wayzata High School, Plymouth
2016   Emilia Topp-Johnson
St Paul Academy and Summit School, St. Paul
2016   Serena Jing
Central Senior High School, St. Paul
2017   Alex Li
Mounds View High School, Arden Hills - Team
2017   Rebecca Li
Mounds View High School, Arden Hills - Team
2017   Everett Kroll
Stillwater Area High School, Stillwater
2017   Claire E Wentzlaff
Burnsville High School, Burnsville
2017   Archana Murali
Breck School, Minneapolis
2017   Gauri Binoy
Wayzata High School, Plymouth
2017   Meghana Iyer
Edina High School, Edina
2017   Serena Jing
Central Senior High School, St. Paul

2017   Geeta Rajamani
Highland Park Senior High, St. Paul
2018   Everett Kroll
Stillwater Area High School, Stillwater
2018   Manashree Padiyath
Woodbury Sr High School, Woodbury
2018   Justin Duffy
Mounds View High School, Arden Hills
2018   Flannery Enneking-Norton
St.Paul Academy and Summit School, St. Paul
2018   Michael Hall
St.Paul Academy & Summit School, St.Paul-Team
2018   Daniel Ellis
St.Paul Academy & Summit School, St.Paul-Team
2018   Cole Maxwell
Breck School, Minneapolis
2018   Siyuan Ma
Breck School, Minneapolis - Team
2018   Alexander Anderson
Breck School, Minneapolis - Team
2018   Leonardo Clarke
Minnetonka Senior High School, Minnetonka
2019   Manashree Padiyath
Woodbury Sr High School, Woodbury
2019   Haley Jostes
Stillwater Area High School, Stillwater
2019   Osman Warfa
Burnsville High School, Burnsville
2019   Melissa Nie
St.Paul Academy and Summit School, St. Paul
2019   Ethan Dincer
St.Paul Academy and Summit School, St. Paul
2019   Parthiv Krishna
Minnetonka Senior High School, Minnetonka
2019   Kerui Yang
Edina Senior High School, Edina
2019   Rachel Gunderson
Breck School, Minneapolis - Team
2019   Boatemaa Agyeman-Mensah
Breck School, Minneapolis - Team
2020   Milan Jostes
Stillwater Area High School, Stillwater
2020   Bingsheng "Andrew" Guo
Mounds View High School, Arden Hills
2020   Eric Feng
Mounds View High School, Arden Hills
2020   Anindita Rajamani
Highland Park Senior High, St. Paul

TWIN CITIES REGIONAL SCIENCE FAIR "ISEF" ALUMNI
Students Chosen to Represent the Twin Cities Fairs at International Science & Engineering Fair

2020   Mani Chadaga
Central Senior High School, St. Paul - Team
2020   Akshay Nambudiripad
Central Senior High School, St. Paul - Team
2020   Quentin "Xander" Hughes
Minnetonka Senior High School, Minnetonka
2020   William Sepesi
Minnetonka Senior High School, Minnetonka
2020   Abigail Roh
Breck School, Minneapolis - Team
2020   Samantha Detor
Breck School, Minneapolis - Team
2021   Tarun Kota
Eastview Senior High, Apple Valley
2021   Ellen Guo
Mounds View High School, Arden Hills
2021   Johnny Yue
Mounds View High School, Arden Hills - Team
2021   Sydney Peng
Mounds View High School, Arden Hills - Team
2021   Naci Konar-Steenberg
St.Paul Academy and Summit School, St. Paul
2021   Levi Mellin
St.Paul Academy & Summit School, St.Paul-Team
2021   Nikolas Liepins
St.Paul Academy & Summit School, St.Paul-Team
2021   Quentin "Xander" Hughes
Minnetonka Senior High School, Minnetonka
2021   Austin Hunter
Minnetonka Senior High School, Minnetonka
2021   Atreyus Bhavsar
Blake High School - Northrop campus
2021   Fiona Kinney
Breck School, Minneapolis - Team
2021   Simren Samba
Breck School, Minneapolis - Team
2022   Karen Nakamura
Math and Science Academy, Woodbury
2022   Caroline Schlehuber
Convent of the Visitation School, Mendota Heights
2022   Nickolas Zander
New Life Academy, Woodbury
2022   Srinath Hariharan
Woodbury High School, Woodbury
2022   Maggie Banks
Mounds Park Academy, St. Paul

2022   Ruth Mellin
St.Paul Academy & Summit School, St.Paul-Team
2022   Alexander Moore
St.Paul Academy & Summit School, St.Paul-Team
2022   Krish Inba Rajashankar
Minnetonka Senior High School, Minnetonka
2022   Elizabeth Levinshteyn
Spring Lake Park HS, Spring Lake Park
2022   Ava Jaffe
Breck School, Minneapolis - Team
2022   Amrit Menon
Breck School, Minneapolis - Team
2022   Shreshth Shrivastava
Eden Prairie High School, Eden Prairie
2022   Jared Geppert
Blaine HS Ctr for Eng., Math., & Science, Blaine
2023   Sarah Zamudio
Burnsville High School, Burnsville
2023   John Liu
Mounds View High School, Arden Hills
2023   Sriram Sureshkumar
Mahtomedi High School, Mahtomedi
2023   Lakshika Nanda Kumar Reddy
Math and Science Academy, Woodbury
2023   Maggie Banks
Mounds Park Academy, St. Paul
2023   Henry Choi
St.Paul Academy & Summit School, St.Paul
2023   Shreshth Shrivastava
Eden Prairie High School, Eden Prairie
2023   Arreh Jain
Wayzata High School, Wayzata
2023   Andrew Zhang
Wayzata High School, Wayzata
2023   Ana Stewart
Minnetonka Senior High School, Minnetonka
2023   Sarah Peterson
Breck School, Minneapolis

DuPont Water Solutions congratulates your achievements in competing at the Twin Cities Regional Science Fairs.

We thank DuPont water Systems for their sponsorship of this event!

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Parents, Judges and
Volunteers!

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Schools Participating in 2024

Al-Amal School
Avail Academy (Blaine)
Avail Academy (Edina)
Blaine High School – Center for Engineering, Mathematics, and Science
Blessed Trinity Catholic School
Breck School
Burnsville High School
Carondelet Catholic School
Concordia Academy--Roseville
DaVinci Academy of Arts & Science
East Ridge High School
Eden Prairie Central Middle School
Eden Prairie High School
Edina High School
Highland Park High School
International School of Minnesota
Lake Middle School
Lake Nokomis Community-Keewaydin Campus
Lakeville North High
Magnuson Christian School
Mahtomedi Senior High
Maple Grove Senior High School

Math and Science Academy
Minnehaha Academy North Campus
Minnetonka East Middle School
Minnetonka High School
Minnetonka Middle School West
Mounds View High School
Murray Middle School
Nativity of Our Lord
New Life Academy
PT Homeschool
Rosemount High School
Salk Middle School
Scandia Elementary IB World School
St. Croix Preparatory Academy
St. Paul Academy & Summit School
St. Peter Catholic School in Forest Lake
St. Thomas More Catholic School
Stillwater Area High School
Stillwater Middle School
Wayzata High School
Wayzata West Middle School

Thank you to our financial sponsors:

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Ecolab Foundation
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We are an all-volunteer 501c3 educational nonprofit.

Twin Cities Regional Science Fair Awards

(This list is an expected list of awards to be given from this fair but
does not constitute a guarantee that the award will be given this year.)

3M Display Materials and Systems Division
3M Engineering and Manufacturing
    Technology, Global Manufacturing
    Technology
3M Specialty Materials Development Lab
3M Personal Safety Division Award
3M Young Inventor Recognition Award
American Chemical Society - MN
American Psychological Association
ASM Materials Award – MN Chapter
Association of Women Geoscientists
College of Pharmacy – University of
    Minnesota
DoD STEM Leadership Prize
Genius Olympiad
Inspiring Excellence Awards
Integrated Science Award
International Science & Engineering Fair
    (ISEF)
ISEF Alumni Awards – Timara Underbakke
    (1973)
Lemelson Early Inventor Prize
Minnesota Chapter of American Fisheries
    Society
Minnesota Academy of Science STEM
    Advocacy Award
Minnesota Space Frontier Society
Minnesota State Science & Engineering Fair
NASA EARTH System Science Award
NOAA National Oceanic and Atmospheric
    Administration – Taking the Pulse of the
    Planet

Regeneron Biomedical Science Award
Research Paper trophies
Ricoh Sustainable Development Award
Schools trophies
Science Potential Award
Society for In Vitro Biology
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Sponsor: Northrop Grumman
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Sponsor: Premier Bank
Sponsor: City of St. Paul Youth Fund
Stockholm Junior Water Prize
Teacher Excellence Award
Thermal Fisher Scientific Junior Innovator's
    Challenge
Twin Cities Meteorological Society
United States Department of Agriculture
    Research Service
USAID – US Agency for International
    Development
US Air Force
US Metric Association
US Navy/Marine Office of Naval Research
USDA Research Service
Yale Science and Engineering Association

Thanks to all our volunteers, new & old, especially thank you to 3M employees!

THANK YOU TO OUR PLATINUM SPONSORS:

2023-2024 Twin Cities Regional Science Fair Committee

Director:	Timara Underbakke
SRC Chair:	Karin Ostrand,
SRC Co-Chair	Betsy Hughes
Treasurer:	Dr. Gary Kwong
Development Director	Karilyn Jons
Public Relations:	Michael Lohman, Sr.
Funding	Michael Lohman, Sr, Karilyn Jons, & Timara Underbakke
Special Awards Chair:	*position open*
Awards Coordinator:	Dr. Caroline Ylitalo
Display & Safety Chair:	Connie Clair
Judging Coordinator:	David & Timara Underbakke
Website & Databases:	David & Timara Underbakke
Data Processing:	David Underbakke
IT Department:	David Underbakke
Volunteer Coordinator:	Denise Jostes
Educational Outreach:	Dr. Steven Jons
Social Media Coordinator:	*position open*
Science Clubs Outreach:	Mike Lohman, Gary Kwong & Timara Underbakke

Committee At Large:
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Erik Jostes
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We have additional volunteer openings for those interested. We are currently looking for a Special Awards chair and Assistant Special Awards chair, a Social Media Coordinator, a Logistics person, and a Judge Coordinator. We need additional IT and SRC volunteers as well.

Do you have other ideas or talent to contribute?

If you have time to help, we are 100% Volunteer educational 501c3 non-profit. All donations are tax deductible & are invested in our youth!