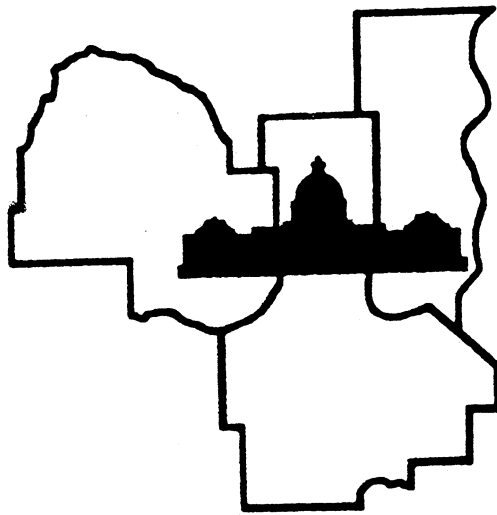


WELCOME TO THE

**77th Annual Twin Cities Regional Science Fair**  
**23rd Annual St. Paul Science Fair**  
**21st Annual Western Suburbs Science Fair**

# **Twin Cities Regional Science Fairs**



**2015**

**February 27 – 28**



**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 77th ANNUAL TWIN CITIES REGIONAL SCIENCE FAIR,  
THE 23rd ANNUAL ST. PAUL REGIONAL SCIENCE FAIR,  
THE 21st ANNUAL WESTERN SUBURBS REGIONAL SCIENCE FAIR.**

Our Host this year is the University of Minnesota.

**YOUR NAME BADGE & SCIENCE FAIR BUTTON** are required for participation.  
**WEAR THEM AT ALL TIMES** - when you are at the Fair, both Friday and Saturday.  
**DO NOT WEAR HEELS WHILE IN THE BUILDING - FLAT SOLES ONLY!**

**Students must have a complete correct set of project forms at their exhibit during competition.** Save your project forms after the fair. They may be needed for next year's project, too. TCRSF will send project forms to state for those projects advancing to state, but you will still need a copy at your project during state. (Alternates, you may be promoted to state presenter. Save your forms & display!)

1. The number by your name is your project number. It shows you where to set up your project. 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. Please drop off the Display & Safety page in the **IN BOX at Display & Safety** (next to SRC & Judges areas). Go back to your project exhibit and wait for a Display & Safety volunteer to check your exhibit so you can be cleared for 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 food, or very carefully in the bleachers. Keep the Field House clean! )
4. Wear your TCRSF button & name badge in a clearly visible place at all times, both Friday and Saturday.

**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 Saturday Awards Ceremony (unless cleared by the fair director and the SRC chair).** Winners of sponsor's awards **must be present** at the Saturday Awards Ceremony to win, have their photo taken with their award at their project, and have a signed parental consent form already on file with TCRSF.

All ISEF winners and all persons interested in traveling with the group to ISEF **MUST** attend the Sunday 1:00 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 Saturday 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.**

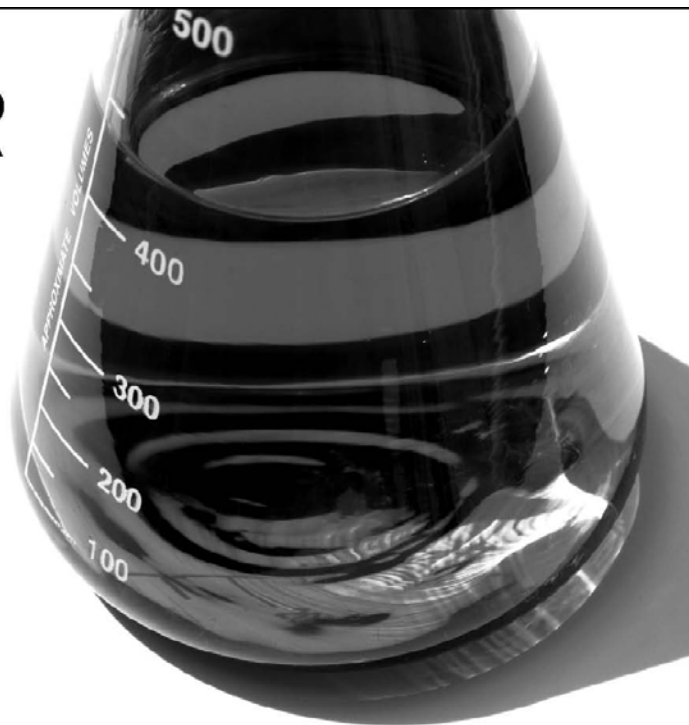


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**ATK** is proud to sponsor this hands-on event that helps provide an opportunity for Twin Cities' youth to better understand the sciences and technology. By inspiring curiosity and interest today, we develop our future scientists, engineers and astronauts. Congratulations and good luck to all participants. Headquartered in Edina, Minnesota, **ATK** is a leading provider of advanced weapon and space systems with \$3.5 billion in annual sales, approximately 15,000 employees, and operations in 21 states. The company is the world's leading supplier of solid rocket motors and the nation's largest manufacturer of ammunition.

## SCHEDULE

### Friday, February 27, 2015:

<u>Time</u>	<u>Activity</u>	<u>Location</u>
1:00 - 3:30 p.m.	Registration	Field House – No heeled Shoes
1:00 - 3:30 p.m.	Set up Projects / Clear Display&Safety Grades 6-8 must be set up by 3:30 Grades 9-12 must be set up by 3:30	Field House – No heeled Shoes
4:00-9:30 p.m.	Judging (grades 6,7,&8 done earlier)	Field House – No heeled Shoes

### Saturday, February 28, 2015

8:00- 10:00a.m.	Exhibits open to the public	Field House - No heeled Shoes
9:00 - 9:30 a.m.	All Paper and Project Participants pick up envelopes containing ribbons & directions to feedback.	Field House - No heeled Shoes

**TEACHERS:**Please arrange for someone to pick up papers, folders, & exhibits of any students not able to attend the award ceremony. Research paper ribbons are also available for pickup.

#### **DO NOT DISMANTLE YOUR PROJECT UNTIL AFTER THE AWARD CEREMONY!**

10:00 a.m. to 12:15 p.m.	Award Ceremony for projects & papers	Field House - University of Minnesota
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Winners of Special Sponsor Awards must be present at the Award Ceremony. ONLY projects with their signed Parental Media Release (generated during registration) turned in before judging starts will be eligible for awards which require a photograph. ALL team members must have signed media release forms on file for a team project to be eligible. Immediately after the awards ceremony, Sponsor Award winners must return to their projects until the official Fair Photographer takes their photo with the award & their display and then dismisses them.

All ISEF winners must be at both the Saturday Awards Ceremony AND the Sunday 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).

After Award Ceremony	*ISEF Finalists, Alternates and Advisors meet with the Fair Directors & SRC chair.	South end of bleachers Field House
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<b>Everyone:</b>	<b>PLEASE HELP OUR VOLUNTEERS TEAR DOWN TABLES &amp; CHAIRS</b>	Please help throw trash & leave the Field House clean.
<b>1:30 p.m.</b>	<b>ALL PROJECTS MUST BE REMOVED</b>	

**Minnesota State Science & Engineering Fair** (grades 6-12 projects, grades 6-8 papers)  
March 20-22, 2015, **Doubletree by Hilton** (formerly Sheraton Bloomington Hotel)

**JSHS: Junior Science & Humanities Symposium** (grades 9-12 research papers)  
March 22-23, 2015, **Doubletree by Hilton** (formerly Sheraton Bloomington Hotel)

**I-SWEEEP: International Sustainable World EnergyEngineering Environment Project Olympiad** (grades 9-12 projects), Houston, Texas, May 7–10, 2015

**ISEF: Intel International Science & Engineering Fair** (grades 9-12 projects)  
Pittsburg, Pennsylvania, May 10–15, 2015 (Twin Cities flies out May 9<sup>th</sup>)



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the wonders of the world.

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## JUDGING RULES AND SCHEDULE

1. Each student must remain with his/her project during the time scheduled for judging. If you are not at your project when a judge arrives, you may miss your chance to be judged.
2. Students must clear both SRC (Scientific Review Committee) & D&S (Display & Safety) before judging begins at 4:00 p.m.
3. ONLY judges and students presenting projects are allowed in the exhibit area during judging.  
**No parents, advisors, teachers, or other non-participants are to be in the exhibit area during judging times, 4:00 PM – close Friday.**
4. Stay at your project until the official announcement over the public address system dismisses your grade. If you leave early you may be missing out on judging for other special awards.
5. TCRSF and the University of Minnesota do not accept responsibility for equipment/instruments brought to the Fair. **DO NOT LEAVE SUCH ITEMS OVERNIGHT OR UNATTENDED.**

	Judging Begins	Estimated Dismissal Time (WAIT for official announcement)
Grade 6	4:00p.m.	6:30p.m.
Grade 7	4:00p.m.	7:30p.m.
Grade 8	4:00p.m.	8:00p.m.
Grades 9-12	4:00p.m.	9:30p.m.

ALL TIMES ARE APPROXIMATE. PLEASE LISTEN FOR ANNOUNCEMENTS!

### PROJECT LISTING

Student projects are listed by number, grade and affiliation and broken down by category within each grade level. Following this listing is an alphabetical list of all entries by grade. To find a project, or to find out where you are to set up your project, look for the signs. Team members must be all in either middle school or all in high school, not a mix. This year, middle school teams compete at the grade of the team leader.

GRADE	PROJECT NUMBERS	AFFILIATION CODES
6	6000-6999	(S) St. Paul Regional Science Fair
7	7000-7999	(W) Western Suburbs Regional Science Fair
8	8000-8999	(T) Twin Cities Regional Science Fair
9-12	1000-1999	<b>All 3 affiliations are collectively known as "Twin Cities Regional Science Fairs"</b>

### RESEARCH PAPERS

All research paper competitors pick up your envelope with your research paper ribbon about 9 AM Saturday before the awards program. Grades 6-8 alternates and competitors advancing to state science fair with their research paper and grades 9-12 alternates and competitors advancing to Junior Science & Humanities Symposium (JSHS) will be posted Saturday morning in the Field House. Additional awards for papers will be handed out at the Award Ceremony on Saturday morning at 10:00 a.m. in the Field House.

TCRSF AND THE UNIVERSITY ARE NOT RESPONSIBLE FOR PAPERS, SRC PAPERWORK, PROJECTS, RIBBONS, AWARDS OR EQUIPMENT LEFT AT THE UNIVERSITY OF MINNESOTA FIELD HOUSE!

REMEMBER - We are guests of the University of Minnesota. Please keep your area clean and respect the property of others. Your actions reflect not only on you, but also on your school, your parents, your advisors and the fair.

## Grade 6

### *Animal Sciences (ANIM)*

- 6001W **Joe M Gathje**  
Why Do Birds Fly in a V-formation?
- 6002S **Olivia G Kelley, Sarah A Diamond Team** - Dog Food Choices
- 6003S **Joseph E Reeder Mr.**  
Mealworm Mania!
- 6004S **Roman Zych**  
Ants, Coke, and Coffee, Oh My!  
**Project At Electricity Wall**

### *Behavioral and Social Sciences (BEHA)*

- 6005W **Georgia N Dobbs**  
What Flavor Do You Favor?
- 6006S **Marina Dykes**  
What is the best approach to stop biting nails?
- 6007W **Meghan M Murphy**  
Stroop Effect
- 6008W **Samuel R Pumarlo**  
Some Good Things Come To Gamers
- 6009W **Anne Stephan**  
Spot That Smile

### *Biomedical and Health Sciences (BMED)*

- 6010S **Madeline Bagdade**  
Does sugar affect children's semantic memory?
- 6011W **Abigail R Casserly**  
Does The Color of Your Eyes Affect How Well You See in Low Light?
- 6012S **Mani Chadaga**  
Fitness in the 'Palm' of Your Hand: Coconut Water as a Sports Drink
- 6013W **Emma D Doughty**  
Activity VS Relaxation
- 6014T **Andrea A Finholt**  
Organic vs. Processed
- 6015S **Leslie Kim**  
Preventing Browning in Apples Using Lemons, Limes, and Oranges
- 6016S **Anindita Rajamani**  
A Study of Artificial and Plant-Based Zero Calorie Sweeteners

### *Cellular and Molecular Biology (CELL)*

- 6017S **Kyrin L Skinaway**  
The amazing taste buds

### *Chemistry (CHEM)*

- 6018S **Allison F Evans, Lilly Bozeman Team** - Chromatography
- 6019S **Hunter Fischbach**  
Laundry Detergent Standoff
- 6020S **Joshua Hoang**  
What liquid evaporates the fastest?
- 6021S **Aine Meaney**  
Does Doing Different Things While Holding an Ice Cube Affect How Long You Can Hold It?
- 6022S **Madelyn I Sinn**  
Which out of six fabrics is the best insulator to cold?
- 6023T **Lee M Younger**  
Milk Rainbow

### *Earth and Environmental Sciences (EAEV)*

- 6024S **Joel Berhe**  
How Does Music Effect Plant Growth Rate
- 6025W **Danny C McCoy**  
Indoors or Outdoors; Which has more air pollution?
- 6026W **Ethan Pitt**  
Water

### *Energy: Chemical (EGCH)*

- 6027W **Eli Andrews**  
Is Horse Manure a Possible Energy Source

### *Energy: Physical (EGPH)*

- 6028T **Josh Biermaier**  
That's Shocking!
- 6029S **Sean Corrie**  
Which type of cellphone charger is the most efficient? Which type of cellphone charger is the most versatile?
- 6030S **Anders Lien**  
The Secrets of Lightbulbs: What type of lightbulb uses the least power?  
**Project At Electricity Wall**
- 6031T **Joshua Waulters**  
Effects of Resistance in a circuit

### *Engineering Mechanics (ENMC)*

- 6032S **Jackson Adkins**  
Do different brands of snowboard wax affect speed?
- 6033S **Isaac Foster**  
Earthquake resistant buildings



- 6034W **Edward M Graczyk**  
Bridges
- 6035W **Harry C Gresser**  
Cement Strength
- 6036S **Nikolas Liepins**  
What kind of tape can withstand the most weight?
- 6037S **Aidan J McGill**  
Which Truss to Trust
- 6038S **Akshay Nambudiripad**  
Permanent Magnets vs Electromagnets: Which is stronger?
- 6039S **Niko Scholtz**  
Points and Fins: Why They Matter When Launching Corks
- 6040W **Samantha Jane Thomas**  
A Helping Hand
- Environmental Engineering (ENEV)*
- 6041T **Milan E Jostes**  
The Mag Prop Train
- 6042W **Matthew R Souka**  
Goo-Be Gone
- 6043T **Alexander J Weigel**  
Safe Ice
- Materials Science (MATS)*
- 6044T **Julian A Byrne**  
Brown Sugar Hardness Testing Optimization  
**Project At Electricity Wall**
- 6045W **Ani Tonoyan**  
Hey, Turn that Down: Finding the best sound insulation
- 6046S **Edie A Weinstein**  
Feelin' The Heat: How Do Different Household Materials Burn?
- Microbiology (MCRO)*
- 6047W **Maria A Davies**  
ICK! That Lives in my House?
- 6048W **Berit E Kobienia**  
Does Bleach Blast Bacteria Best
- 6049W **Taylor C Williams**  
Is It Really Clean?
- Physics and Astronomy (PHYS)*
- 6050S **Sonja Black**  
A Question of Time: Down, Up, or Capped?
- 6051W **Anna Medina**  
Electrolyte Crazy
- 6052T **Connor Niznick**  
Boat Hulls
- 6053S **Stephen M Olk Jr**  
It Is Rocket Science
- 6054W **Genevieve E Ovsak**  
Softball Speedometer  
**Project At Electricity Wall**
- 6055S **Solomon Walker**  
Magnetism Only Gets You So Far
- Plant Sciences (PLNT)*
- 6056T **Ellie Adams**  
What's the Angle?
- 6057S **Chuck M Altier**  
Seed Growth in Minnesota
- 6058W **Jack B Dougherty**  
The Science of Apple Preservation
- 6059W **Rose T Fesenmaier**  
How do Roots Grow When the Direction of Gravity Changes?
- 6060S **Garrett Hollihan**  
Does chemical fertilizer, organic fertilizer, or compost make plants grow the most?
- 6061S **Simon Mulrooney**  
Do GMOs affect nutritional value of corn?
- 6062T **Hussein H Rmaile**  
How is the Growth of Bean Plants Affected by Different Starting Conditions?
- 6063T **Harrison j Wallander**  
Grow Plant Grow
- 6064S **Caroline E Weier, Lauren Hennessey**  
**Team** - From Waste of Nature to Homemade Paper
- Robotics and Intelligent Machines (ROBO)*
- 6065W **Oriana G Sampson**  
Computer Vision for the Blind
- Systems Software (SOFT)*
- 6066W **Daniel Miller**  
Robo Race  
**Project At Electricity Wall**
- Grade 7**
- Animal Sciences (ANIM)*
- 7001W **Matthew J Banovetz**  
"Is it Handed or Pawed?"

7002W **Jennie Ehlert, Sam Detor**  
Team - Squirrels On The Move

7003S **John N Nguyen, Anastasia M Yang, Cindy J Yang**  
Team - The Scale Size of The Rajah Brooke Birdwing and Monarch Butterfly

7004W **Mary O'Grady, Ellie Holt**  
Team - Mammal Activity In A Winter World

7005S **Emilie L Pagel**  
Migratory Birds: Measuring Human Impact on Habitat

7006S **Deshanti D Phillips, Makayla Yang**  
Team - How Can a Fish Learn?

7007T **Josephine L Ramirez**  
Temperatue Vs Dissolved Oxygen

7008S **Jonathan Rangel**  
Investigatin Vibrating Behavior of Cellar Spiders

7009T **Eleanor S Sand**  
Varroa Mite Treatment

*Behavioral and Social Sciences (BEHA)*

7010S **Olivia D Ahrens VIII**  
Do second graders already have gender stereo types?

7011S **Amira M Boler**  
Familiar Or Unfamiliar? That Is The Question

7012W **James Clinton, Declan Fries, Joe Ettawageshik**  
Team - Be Swift With Swift Programming

7013S **Anders Hanhan**  
Blindfold Candy Taste Test

7014T **Kayla M McKane**  
Study Habits

7015S **Jack Molter**  
How music affects exercise

7016S **Natalie Norquist, Anna Grundhoefer**  
Team - A Rainbow of Remembrance

7017T **Griffin J Olson**  
Looks Can Be Deceiving

7018T **Julie diane Pliego-Cuevas**  
Memory vs. Music

7019S **Eloise M Rein VIII**  
Boys vs Girls: Who Has Better Short-term Memory

7020S **Zoe Schearer**  
Painting vs. Photography; What Produces more emotions in Subjects.

*Biochemistry (BCHM)*

7021T **Asiya N Browne, Heba Abuad, Rahma Hussein**  
Team - Extracting Onion DNA

7022W **Abigail Roh**  
Saving The Earth One Bioplastic At A Time

7023S **Chouchi Yang, Lucas Gesuadlo, Trinity Vang**  
Team - How Does Chewing Gum Affect Your Teeths?

*Biomedical and Health Sciences (BMED)*

7024T **Clara N Koloc**  
Caffeine and Blood Pressure

7025S **Madison R Neal**  
Singing your lungs out

7026T **Amanda J Wallman, Ava R Barry**  
Team - Four Drinks, Eight Eggs, One Question

*Cellular and Molecular Biology (CELL)*

7027S **Jared A Ruskin**  
Saline and Red Blood Cells

*Chemistry (CHEM)*

7028T **Andrew L Amell**  
Think Before You Drink.

7029W **Nathan M Amiot**  
Corrosion and It's Effects

7030S **Da'Juan A Avant**  
Mentos Experiment

7031S **Jaquan Ballard**  
Dry Ice Bubble

7032T **Mohamud Barre, Haaruun Khalif**  
Team - Testing pH levels

7033T **David Benson**  
Chemical Reaction

7034S **Solveig O Bjermeland**  
Oobleck is the New Black

7035T **Melinda Bolar**  
Does the Temperature of Soda Affect the Height of a Diet Coke and Mentos Geysers?

7036S **Mariana Cournoyer**  
The Dead Sea Explained

7037S **Claire Dwyer**  
Best Practices in Stain Removal

7038W **Nathan F Kesti**  
Red Cabbage Juice VS. pH Paper

- 7039T **Halle Knipp**  
Does a Colored Candle Burn Faster than a White Candle?
- 7040S **Austen R Lazcano-Stai**  
Battery Drainage
- 7041S **Shauntia S Mccurley**  
Does soda keep its carbonation
- 7042T **Jack Miller**  
Does Salt Water or Tap Water Affect the Rust on an Iron Nail?
- 7043S **Ruby Misok**  
The Effect of Sandpaper on Fingerprint Clarity
- 7044S **Soe Oo, Alyssa Xiong**  
**Team** - Citrus Power
- 7045T **Alexander A. Perez**  
Does the Ratio of Cupric Chloride to Aluminum Affect the Amount of Heat Given Off in the Reaction?
- 7046W **Jack Peterson**  
Coin Corrosion
- 7047S **Sophia A Rabins**  
Corn vs. Fire
- 7048S **Amanye W Reynolds**  
Salt water meltdown
- 7049S **Elsa Snowbeck**  
Sponge Absorption of Liquids
- 7050S **Isabella Vazquez**  
Eggsperiment
- 7051T **Brittany Vega**  
Pop! Pop! Popcorn!
- 7052S **Kira Vega**  
Hand it over! How finger length affects fingerprint width
- 7053S **Sawyer E Wall**  
War of the Fuels
- 7054W **Sy R Wallraf**  
H2O VS. Cold Tablets
- 7055S **Ellie Weston**  
The Affects of Additives on the Thickness of Gelatin
- 7056S **TxujCi Ishtar Yang**  
White candle VS Red Candle

***Computational Biology and Bioinformatics (CBIO)***

- 7057S **Gabe A Hart**  
Simulations on Ebola Outbreaks

***Earth and Environmental Sciences (EAEV)***

- 7058W **Caden J Boike**  
Got Water..Fresh Water
- 7059W **Lily L Cartier**  
Worms in Chemically Fertilized Soil
- 7060W **Callie Joy Ertel**  
Climate Change Affects on Painted Lady Caterpillars
- 7061S **Kaia MJ Hilgendorf-Roost**  
Vials of Vile Water Comparing clarities of agricultural, urban, and natural lakes
- 7062W **Claire E Lorimor**  
Tsunamis: The Effect of Water Depth on Wave Velocity
- 7063T **Bedilia Mata, Ivet Solis**  
**Team** - Is water the only liquid that helps plants grow?
- 7064S **Noah HL Rice**  
It's Easy Being Green
- 7065S **Zac Scandura**  
BLOCK THE FLOOD (It's Done): A Study of Different Sandbags for Blocking Out Floods
- 7066S **Maya R Shepherd**  
Chill Out
- 7067T **Ivon Solis, Alexandra Valencia, Christina Rachel Castaneda**  
**Team** - Differences of Ice
- 7068S **Sarah J Swanson**  
Two Stills, One Job - Creating Safe, Clean Drinking Water
- 7069S **Emma Wolters**  
The Power of Pollutants
- Energy: Chemical (EGCH)***
- 7070S **Maasia S Apet**  
Mud To Electricity
- 7071W **Rajani Lamichhane**  
How do Different Materials Affect the Burn Time of Rocket Fuel
- 7072S **Marquise E Tatum**  
Does a potato
- 7073T **Maxwell J. Vogel**  
Got Gas: Does Ethanol Live up to its Reputation as a Clean Burning Energy Efficient Fuel Additive?

*Energy: Physical (EGPH)*

- 7074S **Will T Altman**  
Solar
- 7075W **Charlie F Erickson**  
How much Height to loop the loop
- 7076S **Mohamed A Geilani**  
Static Electricity With Balloons
- 7077T **Keegan Jared Habegger**  
calorimeters
- 7078S **Avery R Liuzzi, Cinsere Hawkins-Easley Team** - Rest awhile run a mile
- 7079T **Jack R Lowe**  
Aerodynamics
- 7080W **Anika Peterson**  
A Big Splash
- 7081W **Elijah Wolff**  
How different every day poses effect your body temp.
- 7082W **Kerui Yang**  
How Icing on Wind Turbine Blades Affects Power Generation  
**Project At Electricity Wall**

*Engineering Mechanics (ENMC)*

- 7083W **Jonah Paul Caldwell-Tautges**  
Save the Earbuds!
- 7084T **Hannah E Farmer**  
Crumb Catching Cereal Bag
- 7085S **Zachary Glaser, Oliver Paleen Team** - Touche Trebuchet
- 7086S **Nicholas J Jacobsen**  
Tube Runners
- 7087W **Jack Mattera, Max McKoy, Nathan Rockafellow Team** - Dam Efficiency  
**Project At Electricity Wall**
- 7088S **Elliot M Pham**  
DIY: Solar Lighting for Refugees
- 7089W **Morgan Richter, Henry Koch Team** - Toppling Buildings In A Single Blast

*Environmental Engineering (ENEV)*

- 7090S **Lila T Seeba**  
Phosphate Problems
- 7091S **Raina E Sommer**  
Not A Drop To Drink: A study of which low cost, easily accessible water purification methods can effectively remove ammonia from water

- 7092S **Annika Tuma**  
Does Ferrofluid Remove Oil from Water

*Materials Science (MATS)*

- 7093T **Joseph F D'Agostino**  
The Study of Retroreflectivity in road stripes
- 7094S **Livia J Havens**  
Does The Shoe Fit?
- 7095T **Hannah J Hintermeister, Ava R Noack Team** - GreenBags: Great or Garbage?
- 7096S **Alistair B Pattison**  
Blocking WiFi
- 7097T **Gracie C Sevigny**  
Fruits & Vegetables Freshness: Which Container to Use?
- 7098S **John Stolzberg-Schray**  
The Concrete Theory
- 7099W **Julia C Temple**  
Absorption of Sound
- 7100S **Adrian Yang**  
Thermal Conduction of Metal

*Microbiology (MCRO)*

- 7101T **Savannah Allen**  
You Know What's Cool? Dog Drool! Does Dog Saliva Kill Bacteria?
- 7102S **Ainsley Cox**  
Factory vs. Home What Wins the Battle Against Contaminants?
- 7103T **Owen Kray Fuls**  
Does Ultraviolet Radiation Kill Fungus?
- 7104S **Henry J Neufeld**  
School BUGS Me
- 7105S **Nathan D Omodt**  
Bacteria Growth in Mayonnaise at Four Different Temperatures

*Physics and Astronomy (PHYS)*

- 7106T **Julia J Bennett**  
Spin to Win
- 7107W **Jeremiah J Konkel**  
Check out my flex
- 7108S **Davita Lee**  
Measuring Surface Tension of Liquids With a Penny
- 7109T **Keith James Schmitt III**  
Gauss Rifle

*Plant Sciences (PLNT)*

- 7110S **Jillian M Brenner**  
Does Fertilizer effect Soybean growth
- 7111T **Gavin Burns**  
Does WiFi Affect Plant Growth?
- 7112W **Clare Heaton**  
Various Soils and Their Effect on Lepidus Sativa
- 7113W **Lauren Hedman**  
The Effect of NaCl on Grass Seed Germination
- 7114T **Lydia Nash**  
Does Caffeine Affect How Long Roses Stay Fresh?
- 7115S **Hannah E Omodt**  
Wheatgrass Growth Under Four Different Watering Conditions
- 7116T **Manashree S Padiyath**  
Greening Under the Evergreens: A biochar soil amendment study
- 7117S **Pilar Jaqualing Rivera**  
Roses and Liquid
- 7118T **Alejandra R. Segura**  
Do Coffee Grounds Affect Plants?

*Robotics and Intelligent Machines (ROBO)*

- 7119S **James A Carlson**  
Hide and Seek

**Grade 8**

*Animal Sciences (ANIM)*

- 8001S **Raef J Eddins**  
Do dogs really understand what we say?
- 8002T **Haley C Jostes**  
Conserving an Endangered Species, The Monarch Butterfly

*Behavioral and Social Sciences (BEHA)*

- 8003S **Jackie Janelle Barron**  
Pulse Rate and Music
- 8004S **Emma R Esteb**  
Righty or Lefty: Does it affect who you are?
- 8005S **Alex J Hamel-Snapp**  
How does music affect heart rate?
- 8006W **Sophia M Hayden**  
Words or Shape?
- 8007T **Chester J Hearne, Max Stauffer**  
**Team** - What is the accuracy of an Eyewitness Testimony under these circumstances?

- 8008S **Rory King**  
The Effect of Time-of-Day on Test Performance Among Math Students
- 8009W **Jake W Mangel**  
Does Color Affect Perception of Taste
- 8010S **Owen Mische**  
How Do Teens React to Authority vs. Peers?
- 8011S **Samira Y Mohamed**  
Stress To The Test
- 8012S **Celia J Olson**  
Does reading on kindle vs paper increase reading speed or recall?
- 8013S **William F Rachac III**  
Total Recall
- 8014W **Sadie L Richardson**  
How Prevalent Is Gender Stereotyping?
- 8015S **Luisa Lea Rubianes**  
The Ruler Drop Test
- 8016S **Carlos X St. Germain**  
Do You Feel Lucky?
- 8017W **Lucas C. Woychick**  
The Color-Word Matching Effect

*Biochemistry (BCHM)*

- 8018W **Dailee M Dearing**  
Which Hemisphere of The Brain is Dominant When doing Certain Activities
- 8019S **Olivia C Gesualdo, Tae'Vion D Wilkins**  
**Team** - Gassy Tummy
- 8020W **Avni Jain**  
To Eat Or Not To Eat? An Innovation To Detect Food Spoilage  
**Project At Electricity Wall**
- 8021S **Sophia A Nash**  
Environmental Effect of Tobacco
- 8022S **Eli S. Powell**  
Does The Color Of Human Hair

*Biomedical and Health Sciences (BMED)*

- 8023S **Quncy D Altman**  
Camo
- 8024T **Isabella C Cucci**  
Carbohydrates and Blood Sugar Levels
- 8025S **Katherine Grimm**  
Vitamin C in Action

- 8026S **Thomas A Heesch**  
Physical Activites Affects on Heart Rate
- 8027T **Isaiah Longe**  
Toothpaste Whitening
- 8028T **Ryan Miler**  
Does Gluten Affect the Quality of Cookies?
- 8029T **Emily E O'Brien**  
Disinfecting a Toothbrush
- 8030S **Isabella Portoghese**  
Does Reaching over the head and touching the opposite ear correspond with a child being 5
- Cellular and Molecular Biology (CELL)*
- 8031S **Ella Leta Vadnais**  
The Truth of Taste Bud Maps
- Chemistry (CHEM)*
- 8032S **Ruby J Beckman**  
Leavening Agents in Muffins
- 8033W **Lina Bergert**  
What Makes Mozzarella So Stretchy?
- 8034T **Grace A Beseman**  
Cookies and Milk
- 8035S **Megan J Danley**  
Saving Your Skin One Spray At A Time
- 8036S **Adam E Ernster**  
Does Temperature Affect the Glow of Luminol?
- 8037T **Tommy G Jackson**  
Nuts! Which One Gives You the Most Energy?
- 8038S **Michaela Kamara**  
Crystalize
- 8039S **Hannah G Lender**  
How Batteries' Voltages are Affected by Different Temperatures
- 8040T **Stephen Mann**  
What Acid creates the best battery
- 8041S **Erin K Matter**  
The Taste Of Fats
- 8042S **Reice Nabors**  
BLOWING IT UP
- 8043W **Devika L Narayan**  
The Effect of Gas Stations in Soil Quality
- 8044S **Eva M Neira**  
Which Whitening Toothpaste Makes Teeth the Whitest
- 8045S **Kathy Tang**  
Operation Fabric Blue
- 8046S **Kang Thao**  
Rainbow Fire
- 8047S **Anny B Tran**  
BubbleMania
- 8048S **Abbigail L Vang I**  
Sugar Cookies
- 8049S **Kelvin Vue**  
Chemical Reactions
- 8050S **Mai Vue**  
Pow! Right on the cap!
- 8051S **Fuqi H Xiong**  
Reactions With Mentos
- 8052S **Lily Fuba Chei Yang , Lajntxiag Sakura Vue Team** - Elephant ToothPaste
- Earth and Environmental Sciences (EAEV)*
- 8053T **Alex C Bloemendal**  
Tracking The Rain
- 8054T **Isabella J Gabriel**  
Which Apple Type Changes the Most After Removal from Cold Storage
- 8055T **David J Gallagher**  
Effects On Evaporation
- 8056S **Alexandra L Harris**  
Meteorology in Minnesota
- 8057W **Sophia G Marcus**  
O3: The impact of temperature on ground level ozone
- 8058W **Kate F Meadows**  
The Effect of Black Carbon and Ground Level Ozone on the Enviroment
- 8059S **Meghan M O'Shea**  
Soil Erosion
- 8060W **Karthik Papisetty**  
Global Environmental Performance and Threat Index  
**Project At Electicity Wall**
- 8061T **Cecilia R Petruconis**  
Water from Arizona to Minnesota
- 8062S **Abigail L Reeder Ms.**  
Power of pH - How do different levels of pH affect Protista?
- 8063S **Audrey C Vidmar**  
Got Contaminants? Filter Them!

- 8064S **Lucia M Wallinga**  
Living With Weeds
- 8065S **Zoe M Ward**  
How does the type of water affect the pH level of soil.
- 8066S **Pa Ia Yang, Gaonoukhu Her, Phranangchaub Xiong**  
**Team** - Effects of Extreme Cold on Benthic Vernal Pond Life
- Energy: Chemical (EGCH)*
- 8067T **Zoe J Fasching**  
A Study In Citrus
- 8068T **Anna M Wolff**  
The Effect of Fruit as a Battery
- 8069S **Yuyi A Yang**  
Potato Power
- Energy: Physical (EGPH)*
- 8070S **Adrian L Ali-Caccamo**  
Solar Ovens: A Simple, Sunny Solution
- 8071S **Zachary E Konkol**  
The Wax Ball Drop
- 8072S **Mitchell Krogman**  
Micro L.E.D.? I think not!
- 8073S **Nicholas R Martinez**  
Generating Electricity Using Sound and Mechanical Vibrations
- 8074T **Joseph J Polak**  
The Effects of Sports Drinks on a Human Heart
- 8075T **Chinmay Sahu**  
Solar Powered Technology  
**Project At Electricity Wall**
- 8076S **Yuepheng Yang**  
Solid to Liquid
- Engineering Mechanics (ENMC)*
- 8077T **Harrison M Boettner**  
3D Printing: Technology Comparison & Impact on Product Development
- 8078S **William B Dusek**  
License to Launch
- 8079S **Joe P Kennedy**  
DIY vs Retail Computers  
**Project At Electricity Wall**
- 8080S **Jackson W Lee**  
Tensile Strength of Fishing Line
- 8081S **Sala Mon, Pha Xiong , Josh Herrington**  
**Team** - Battery Car
- 8082S **Peter V Schik**  
Flywheels
- Environmental Engineering (ENEV)*
- 8083W **Becky Ericson**  
Ozone and Black Carbon: How They're Affected
- 8084W **Alyssa M Flippen**  
The Amount of Electricity Created Based Off of the Level of Wind
- Materials Science (MATS)*
- 8085T **Vanessa A. Wren**  
How Solvent Affects Fruit Rotting
- Mathematics (MATH)*
- 8086W **Elhaan Ali Mohamud**  
The effect of color on addition timed test
- Microbiology (MCRO)*
- 8087S **Valerie C. Bares**  
How do the anatomical structures of different plant species affect their ability to filter water?
- 8088S **Elizabeth Chaney**  
Do You Really Want Fries With That?
- 8089S **Seamus P Foley**  
The Cleaning Trio
- 8090S **Jenna R Kelley**  
Antibiotic resistance in healthy dogs, and dogs that have recently been on antibiotics
- 8091W **Christine O Ohenzuwa**  
Resist The Rays
- 8092S **George B Yetter**  
Sauerkraut: Wild Fermentation
- Physics and Astronomy (PHYS)*
- 8093S **Gavin Butterfield**  
Ping Pong Cannon
- 8094S **Anthony Dahdah**  
How Does Nozzle Size and Amount of Water Affect the Distance a Steam Boat Will Travel?
- 8095S **Justin T de Long-Hersh**  
Which Bridge Won't Fall Down?
- 8096S **Henrie P Friesen**  
Laser Bees - Planetary Defense
- 8097S **Kou Her**  
The Parament

- 8098S **Kenia L Martinez, Katherine E Marty**  
Team - Got Bacteria?
- 8099T **Lilly E Miettunen**  
Arrow Penetration
- 8100S **Conner V Nourse**  
Sound attenuation caused by different materials at different frequency ranges
- 8101S **Jonah O'hara-David**  
Experimenting with Space Between Magnets on a Gauss Gun
- 8102W **Daniel E Schmidt**  
Wacky Liquids

### *Plant Sciences (PLNT)*

- 8103W **Brendan R Burke**  
Ripening tomatoes indoors
- 8104S **Isabel Dieperink**  
Excess Nutrients and Cyanobacteria: The Blue-Green Threat
- 8105S **Tommy E Freberg**  
How does soil pH affect plant growth
- 8106S **Terrell L Jones**  
What effect does soapy water have on plant growth?
- 8107W **Melanie M Roth**  
Growing Grass Seeds in Different Environments
- 8108S **Rajni L Schulz**  
The Grass isn't Always Greener on the Carbon Diox-Side
- 8109S **Cole M Smith-Walter**  
Fish for Fertilizer
- 8110S **Lia J Wallace**  
Two Peas In a Pod?

## **High School**

### *Animal Sciences (ANIM)*

- 1001W **Bridget A Carroll**  
Grade 11 - Endangered Sea Turtle Nesting at Playa Cabuyal, Costa Rica and Tracking Telemetry to Support Effective Conservation Efforts  
**Project At Electricity Wall**
- 1002T **Nathaniel R Farmer**  
Grade 10 - Light stimulated startle response in *Daphnia magna*
- 1003T **Jacob T Spaude**  
Grade 10 - Watching Your Sugars
- 1004S **Tyree Doc Tucker, Lumin F Johnson**  
Grade 9,9 - Team - How does small mammal population affect deer population

- 1005T **Benjamin Vallin**  
Grade 12 - Effectiveness of Essential Oils in Repelling *Drosophila melanogaster*
- 1006T **Jaclyn Weiss**  
Grade 10 - Ocean Acidification
- 1007T **Aja I Wesson**  
Grade 12 - Pesticides and *Drosophila hydei* Reproduction
- 1008T **Dustin J Young**  
Grade 10 - Do Mice Rely on Memory or Vision

### *Behavioral and Social Sciences (BEHA)*

- 1009T **Blake E Andert**  
Grade 10 - Duly Noted
- 1010T **Shoshanna A Beauchamp**  
Grade 12 - Factors Influencing the Native American High School Drop Out Rate
- 1011S **Ellen R Bellamy, Samantha R Harrington**  
Grade 10,10 - Team - Does society influence your perception?
- 1012T **Olivia C Bien**  
Grade 10 - The Effect Gender has in the Memorization of Gender Neutral Objects
- 1013T **Kyra C Bowar**  
Grade 10 - Psychological Stereotypes of Literary Genres and Book Covers
- 1014T **Brian P Bowen**  
Grade 10 - The Relationship Between Fine Motor Skills and Gender
- 1015T **Johnathon W Corcoran**  
Grade 10 - Musical Personalities
- 1016T **Sabirina H Daud**  
Grade 10 - Prejudice in Adolescents
- 1017T **Andrea M Delius**  
Grade 10 - Undressing the Truth
- 1018T **Rachel L Dobrzynski**  
Grade 10 - Tenth Grade Views on Whether Composite or Real Faces are More Beautiful
- 1019T **Natalie M Domek**  
Grade 10 - The Stroop Effect
- 1020T **Edward Dominguez**  
Grade 10 - Addiction to Gaming
- 1021T **Charles H Green**  
Grade 10 - What the Frack!: The Influence of Propaganda on Public Attitudes Towards Fracking
- 1022T **Bashir A Harbi**  
Grade 10 - Texting vs. Calling



- 1023T **Amanda R Jackson**  
Grade 10 - Mint Condition: How will you react?
- 1024T **Amy K Le**  
Grade 10 - Monkey See, Monkey Do
- 1025T **Tyrese C Leverty**  
Grade 10 - The Study of How Stereotypes Affect People's Judgments of Others
- 1026S **Maxine Lightfoot**  
Grade 11 - How does existential angst affect insomnia?
- 1027T **Elena Luu**  
Grade 10 - Light Absorption: Coffee vs. Tea
- 1028T **Jenny M Mannila**  
Grade 10 - Influence of Packaging on Children
- 1029S **Noah M Martin, Christopher J Herrington**  
Grade 9,9 - **Team** - S\*\$# that's cold
- 1030T **Zachary F McGovern**  
Grade 10 - Serious VS. Comedic Commercials
- 1031T **Whitney E Miller**  
Grade 10 - Does Music Affect Concentration While Studying
- 1032T **Sonali Mucherla**  
Grade 10 - Are Three Heads Better Than One?
- 1033T **Josie L Nordgren**  
Grade 10 - Gender Differences in Multitasking
- 1034T **Kara E Odom**  
Grade 10 - A correlation of personality types, views on contemporary issues and animal preference
- 1035T **Alexandra N Pajunen**  
Grade 10 - The Frustration Test: Do males or females get more frustrated during different activities?
- 1036T **Lauren R Sczepanski**  
Grade 10 - Product Packaging Preferences
- 1037T **Samantha E Shadick**  
Grade 10 - Blood Pressure
- 1038S **Juan M Valencia**  
Grade 12 - Does Soccer knowledge equal geographic awareness
- 1039S **Nouchi Vang**  
Grade 9 - How well does your eyes memorize
- 1040T **Anthony M Vang**  
Grade 10 - The Connection Between the Cerebrum and Dance
- 1041T **Jenna White, Summer Ettesvold, Natalie Anderson**  
Grade 12,12,12 - **Team** - Music and it's effects on studying.
- 1042W **Alicia L Wong**  
Grade 12 - Analyses of Gaze Clusters Pertaining to Spatial Cognition
- Biochemistry (BCHM)*
- 1043S **Annie C Conzet**  
Grade 12 - Bacterial Growth with Acidic Solutions
- 1044T **Janani V Narayan**  
Grade 12 - Nano-gene constructs for non-viral gene delivery
- 1045S **Liza M Strom**  
Grade 10 - Enzymes in Laundry Detergent
- 1046T **Colton V Van Dorpe**  
Grade 12 - Low Density Polyethylene Biochemical Degredation
- 1047S **Khong Vang**  
Grade 9 - Measuring Sugar Content
- Biomedical and Health Sciences (BMED)*
- 1048T **Noah M Bachmeier`**  
Grade 10 - Postural Effects on Lung Capacity
- 1049W **John N Chen, Jeffrey He**  
Grade 11,9 - **Team** - The Effects of Caffeinated and Sugared Soft Drinks on Youth Brain
- 1050T **Emma R Fee**  
Grade 10 - Nicotine Effects on Lung Cancer Cells
- 1051T **Benjamin Cole Hensley**  
Grade 10 - Electrolytes in Drinks
- 1052T **Paul V HoangLong**  
Grade 11 - The Effects of Warfarin and Clopidogrel in Treating Occlusion
- 1053T **Taylor R Horner**  
Grade 10 - The Effects of Timed Versus Untimed Tests on Students Performance
- 1054S **Serena Jing**  
Grade 10 - Advancements in Drug Delivery: the development and evaluation of ibuprofen loaded biodegradable hydrogels  
**Project At Electicity Wall**
- 1055W **Ishita Kamboj**  
Grade 12 - Methamphetamine Compromises the Phagocytic Activity of BV2 Murine Microglia without Compromising Cellular Viability  
**Project At Electicity Wall**

- 1056T **Nathaniel W Karr**  
Grade 10 - Escherichia coli Production in the Presence of Antibacterial Agents
- 1057W **Arun Kethar**  
Grade 11 - Biomechanics of Aortic and Pulmonary Valve: Implication in Ross Procedure  
**Project At Electricity Wall**
- 1058S **Toni Kong, Lan July, Abenezer Hatte**  
Grade 11,11,11 - **Team** - Bloodsplatter
- 1059W **Annie J McFarland, Grace E Kirkpatrick**  
Grade 12,12 - **Team** - Food for thought: Long-term effects of hyperglycemia on dendrites in the CA1 region of the hippocampus
- 1060W **Adi M. Mittal**  
Grade 11 - Development of Technology for Image-Based Quantification of Pain in Sickle Cell Disease  
**Project At Electricity Wall**
- 1061T **Amrita Mohanty**  
Grade 12 - Schwann Cell Differentiation from Stem Cells of Neurofibromatosis 1 Patients and Normal Controls  
**Project At Electricity Wall**
- 1062T **Stephanie Nkatia**  
Grade 10 - The Effects of Phage T4r on E. coli
- 1063T **Aadarsh S Padiyath**  
Grade 11 - Increasing Cancer-Specific Drug Delivery using Targeted Liposomes
- 1064S **Geeta Rajamani**  
Grade 10 - Which States of Mind Can be Reliably Measured by Heart Rate?
- 1065T **Elizabeth M Tangney**  
Grade 10 - Correlation Between Musical Training and Pitch Perception
- 1066T **Madison K Tyler**  
Grade 10 - The Efficient Heart
- 1067T **Win D Vuong**  
Grade 10 - Bacteria in Raw vs. Cooked Meat
- 1068S **Mai Der Yang**  
Grade 12 - Cardiac Anatomy: Comparing the anatomical differences of normal and hypertensive hearts
- Cellular and Molecular Biology (CELL)*
- 1069W **Sweta Bhoopatiraju**  
Grade 12 - Relationship Between 5hmC and UHRF2 Expression in Normal and Tumor Tissue  
**Project At Electricity Wall**
- 1070W **Prashant S Godishala, Brennan S Clark**  
Grade 11,11 - **Team** - The Next Step Towards a Cure for Diabetes: A Novel Protocol for Culturing Adult Porcine Islets for Transplantation in Type 1 Diabetic Patients
- 1071S **Tatyana L Jenkins**  
Grade 11 - Snowflake Yeast
- 1072W **Harini Kethar**  
Grade 10 - Investigating Functions of Fanconi Anemia (FA) Proteins in Cellular Checkpoint Signaling: A Novel Role for the FANCD2 Protein  
**Project At Electricity Wall**
- 1073S **Pa Nhia Moua, Diane Yang**  
Grade 11,11 - **Team** - Temperature and the cell membrane
- 1074T **Jeyani V Narayan**  
Grade 12 - Determining the role of Bcl-2 protein, NOXA, through inducible expression of the protein and its mutants.
- 1075S **Madianna J Schneider, Daniel Delto-Lopez**  
Grade 11,11 - **Team** - DNA Barcoding
- 1076S **Abel Taye**  
Grade 11 - Enzyme Denaturing
- 1077S **Ja-Lab Yang, Mai Via Her**  
Grade 11,11 - **Team** - DNA and Invasive Species
- Chemistry (CHEM)*
- 1078S **Medinat A Akindele**  
Grade 12 - A study of conversion of labeled Carbon-13 Indole-3-acetyl aspartate to labeled Carbon-13 Indole-3-acetic acid
- 1079T **Andrew L Barton**  
Grade 9 - Are BWCA Lakes Affected by Acid Rain and Can Acidic Lakes Be Restored Using Calcium Carbonate?
- 1080S **Keymani Levar Bellaphant, Robert L Harvin Jr**  
Grade 10,11 - **Team** - Neon Lights
- 1081T **Emily M Berg**  
Grade 11 - Corrosion of Metals in Sulfuric Acid
- 1082T **Aisha Cacique**  
Grade 12 - The Effects of Ceremonial Smudging on Indoor Air Quality
- 1083T **Sam J Carman**  
Grade 10 - The Effects of Temperature Change on Orange Juice pH
- 1084S **Andrew Va Yee Leng Chang, Emi Xiong**  
Grade 9,9 - **Team** - Orange Titration
- 1085S **LaVontris L Copeland, Geormele D Logan, Anthony TM Cribbs**  
Grade 11,12,12 - **Team** - Temperature vs Volcano

- 1086S **Erica Craddock**  
Grade 12 - The Magnetic Attraction of Rust
- 1087S **Nia U Flagler-White, Julianne Onayiga**  
Grade 10,10 - **Team** - The Candy Express
- 1088S **Kachina Henry**  
Grade 11 - The Effect of Pre-Bleaching Hair on Hair Dye Results
- 1089T **Ian M Johnson**  
Grade 10 - A Study of Electrolyte Content in Sports Drinks Versus Other Possible Recovery Drinks
- 1090W **Carolyn K Jons**  
Grade 11 - Improved Efficiency of Steam Generation from Seawater Using Carbon Nanoparticles - Year 2
- 1091W **Sofie Kim, Jacob Levy**  
Grade 12,12 - **Team** - Optimized syntheses of novel, medicinally applicable 1,2,3-triazole derivatives
- 1092T **Jacob A Norring**  
Grade 10 - The Effect Temperature Has on a Battery's Ability to Store Energy
- 1093T **Anastasia Pinney-Valtierra**  
Grade 12 - Heavy Metals in Wild Caught and Commercially Farmed Salmon
- 1094T **Ladan Said**  
Grade 10 - Ibuprofen Dissolution
- 1095T **Madeline G Strey**  
Grade 10 - Effects of Boiling on Vitamin C Content in Vegetables
- 1096S **Ah Thao**  
Grade 9 - Baking soda vs Baking powder
- 1097S **Marina N/A Tipler**  
Grade 9 - EyeLike
- 1098T **Hsin Wang**  
Grade 12 - Making soap from used cooking oil
- 1099T **Jaylin S Wong**  
Grade 10 - What is the Best Cleaner to Use for Removing Salt Stains from Suede Leather?
- 1100S **Bao Yang, Ly Xiong**  
Grade 11,11 - **Team** - Crime Scene Chromatography
- Computational Biology and Bioinformatics (CBIO)*
- 1101W **Darartu M Gamada, Zhuang Miao**  
Grade 11,12 - **Team** - Molecular dynamics simulations of copolymers as molecular band-aids against Duchenne muscular dystrophy
- 1102T **Benjamin G Milhaupt**  
Grade 10 - The Study of DNA and Common Malignancies Within the General Population
- 1103W **Moira Southern, Siddarth Eswarachari**  
Grade 11,11 - **Team** - Cleaner Water: Genomic analysis of the homogenisate catabolic pathway in *Pseudomonas putida* F1 for bioremediation of aromatic hydrocarbons
- Earth and Environmental Sciences (EAEV)*
- 1104S **Destiny L Blanchard, Leia Pullen**  
Grade 9,9 - **Team** - How does soil moisture effect earthworms?
- 1105T **Jacob T Calhoon**  
Grade 10 - How pH affects the rate at which steel corrodes
- 1106S **Samuel T Cojolo , Hyacinthia Akakpo**  
Grade 9,9 - **Team** - How does soil texture and ph affect of earthworms population
- 1107T **Keleta Day**  
Grade 11 - Green Cleaners
- 1108T **Emma C Hakanson**  
Grade 10 - The Impact of Human Proximity to Lakes on Total Phosphate, Turbidity, and Dissolved Oxygen Levels
- 1109S **Cloud Herr**  
Grade 9 - How does the ph effect where white pines grow?
- 1110T **Abigail R Herzog**  
Grade 10 - Can We Foil Oiled Soil?
- 1111T **Noelle M Hinrichs**  
Grade 11 - Testing Greenhouse Gas Absorption in Constructed Wetlands
- 1112T **Connor M Hume**  
Grade 10 - Carbon Dioxide and How it Affects our Atmosphere
- 1113T **Sarah Jasa**  
Grade 10 - The Effect Surface Condition Has on Atmospheric Temperature
- 1114S **Mariyah A Lensing , Maureen K Rein**  
Grade 9,9 - **Team** - How does the age and diameter of a paper birch affect the minerals in the soil
- 1115W **Luke Onopa**  
Grade 12 - Protecting our water supplies: Impacts of biomagnification of the antibiotic triclosan by perfluorooctane sulfonate on the health of vital anaerobic digesters in wastewater
- 1116T **Danielle Pineiro**  
Grade 12 - A Biological and Chemical Profile of a Metro Area Wetland.

- 1117W **Karsten E Salvesson, Eve C Zelickson**  
Grade 12,12 - **Team** - Zebra mussel (*Dreissena polymorpha*) preference for colonization on macrophytes
- 1118W **Grant R Two Bulls**  
Grade 12 - Effects of early Mdewakanton Dakota settlement patterns on the ecology of Lake Calhoun in Minneapolis, MN
- 1119T **AnneMarie R Wells**  
Grade 10 - The Effect of Electromagnetic Radiation on *Lumbricus terrestris*
- Embedded Systems (EBED)*
- 1120W **Rahul Parhi**  
Grade 12 - Fault-Tolerant Arithmetic Computing using Partial Triple Modular Redundancy (PTMR)
- Energy: Chemical (EGCH)*
- 1121T **Max Ylitalo**  
Grade 11 - Landfill to Car Fuel: Using Surfactants to Increase Cellulosic Ethanol Production from Waste Paper  
**Project At Electricity Wall**
- Energy: Physical (EGPH)*
- 1122T **Alexander J Dodd**  
Grade 10 - Light Travel
- 1123T **Hailey E Malone**  
Grade 10 - Sympathetic Vibrations on the Guitar
- 1124T **Maitreya A Mujumdar**  
Grade 11 - Improving Total Energy Production of Photovoltaics Solar Panels using Wavelength Selective Filters and Broadband Mirrors
- Engineering Mechanics (ENMC)*
- 1125T **Benjamin R Anderson**  
Grade 10 - Propeller Efficiency
- 1126T **Thomas G Berglund**  
Grade 12 - Lift Assist Walker  
**Project At Electricity Wall**
- 1127T **Joseph N Koski**  
Grade 10 - Gearing On Rough Terrain
- 1128T **Austin J Miller**  
Grade 10 - Traction Action
- 1129T **Samuel N Pahl**  
Grade 10 - BBcor v.s. Wood
- 1130T **Spencer C Robinson**  
Grade 10 - Robotic Hand
- 1132S **Yang Vang, Minh H Tran**  
Grade 11,11 - **Team** - Wind Power
- 1131S **Aimee Vang, Rebecca R Lindau, Browerti Koffah**  
Grade 11,11,11 - **Team** - Waterbender  
**Project At Electricity Wall**
- Environmental Engineering (ENEV)*
- 1133S **Seven James Armstrong, Shyanna H Carpenter**  
Grade 9,9 - **Team** - Does deet affect the nutrition in the soil
- 1134W **Arush Jain**  
Grade 11 - Improving Environmental Sustainability - Solid Waste To Biofuel Generation Using Pyrolysis  
**Project At Electricity Wall**
- 1135T **Dillon R Keenan**  
Grade 10 - Windmill Efficiency When Wind Blows at it From Different Angles
- 1136T **Braxton A Kukulka**  
Grade 10 - The Degree of LED
- 1137W **Yun (Jeffrey) J Lee**  
Grade 11 - The effectiveness of Benthic Microbial Fuel Cell in the waste water
- 1138T **Joseph Mosoti II**  
Grade 10 - Hydroponic Bean Plants
- 1139T **Thanh T Nguyen**  
Grade 10 - Corrosion On Different Metals
- 1140T **Karl J Seibert**  
Grade 10 - The effects of tire pressure, air conditioning, window resistance, and direction of travel on fuel economy.
- 1141S **Kevin T Tran**  
Grade 10 - Filtering Water with Different Filtering Agent Depths
- Materials Science (MATS)*
- 1142S **Mackenzie Mazhari**  
Grade 10 - Light Speed Through Different Mediums
- 1143T **Emma J Missling**  
Grade 10 - Does Temperature Affect the Strength of a Magnet?
- 1144W **Wolfgang Ofstedal, Easton McChesney**  
Grade 12,12 - **Team** - Engineering crystalline organic semiconducting thin films for use in organic solar cells
- 1145T **Carston A Swenson**  
Grade 10 - Stretch the Mesh
- 1146T **Chris M Tyler**  
Grade 10 - Number of Areas in a Divided Circle

*Mathematics (MATH)*

- 1147W **Daniel Qu**  
Grade 11 - Development of a Portable MRI Machine  
**Project At Electricity Wall**
- 1148T **Jesse Terry**  
Grade 12 - Serious Injuries and High School Boys' Contact Sports

*Microbiology (MCRO)*

- 1149T **Maedin F Abegaz**  
Grade 11 - Testing Wound Dressings with Light Activated Dye to Combat SSIs
- 1150S **Nicholas W. Berg**  
Grade 10 - What type of sugar produces the greatest size balloon
- 1151T **Emily N Carlson**  
Grade 11 - Effects of organic agricultural processes and grass feeding on the bacterial composition of raw ground beef
- 1152T **Jake A Edwards**  
Grade 10 - Are Organic Foods Healthier than Inorganic Foods?
- 1153T **Matthew D Helke III**  
Grade 10 - Bacteria In Schools
- 1154S **Elias P Hodge, David Vo**  
Grade 11,11 - **Team** - Bacteria and Microwaves
- 1155T **Krista L Holmstrom**  
Grade 10 - The Effect of Bacterial Strains on the pH of Yogurt over time
- 1156T **Andrew S Hughes**  
Grade 10 - Lake pH Levels and Temperatures and Their Effect on Microorganisms
- 1157T **Jack Everett Lindsay**  
Grade 10 - Is A Dog's Mouth Really Cleaner Than a Human's Mouth?
- 1158T **Michelle Mao**  
Grade 11 - The Effect of Storage Conditions on Milk Spoilage Due to Bacteria Growth
- 1159W **Evelyn G McChesney, Madeline McCue**  
Grade 11,11 - **Team** - Novel alternatives to antibiotics: Genomic alteration of probiotic bacteria for production of antimicrobial peptides (AMPs) to target antibiotic-resistant pathogens

- 1160T **Haley A Pajunen**  
Grade 10 - Where do Germs Grow in your House?
- 1161T **Lucas M Senta**  
Grade 10 - The Effects of Bacteria Transfer from a Wet Versus a Dry Surface

- 1162T **William J Spaulding**  
Grade 12 - Native American Sacred Medicines and Escherichia coli
- 1163T **Danielle L Thompson**  
Grade 10 - Effects of various water purification methods on E. coli

*Physics and Astronomy (PHYS)*

- 1164T **Bridget N Armstrong**  
Grade 10 - The Effect of Speed on the Distance of a Softball Bunt
- 1165T **Matthew R Baisch**  
Grade 10 - Can Modifications On a Baseball Create More Movement?
- 1166T **Luke W Bjork**  
Grade 10 - What Ball Should You Play?
- 1167T **Mark G Fesenmaier**  
Grade 10 - What Materials Reduce the Most Amount of Friction?
- 1168T **Seth Galyon**  
Grade 12 - Lacrosse Shot Efficiency and Effectivity
- 1169T **Tyler R.M. Ofstad**  
Grade 10 - How is a Wing's Performance Affected by the Altering of It's Camber  
**Project At Electricity Wall**
- 1170S **Gerardo Perales Jr.**  
Grade 9 - Electrolysis Conductivity
- 1171S **Holton Phung**  
Grade 9 - Speed of Height
- 1172T **Daniel E Sandvig**  
Grade 10 - Puck is Life
- 1173T **Robin K Stauffer**  
Grade 10 - A Comparison of Oak, Maple, and Hickory Drumstick Rebound Height
- 1174S **Asha N/A Suvarna**  
Grade 9 - Acoustics: The Study of Sound
- 1175S **Ramona J White**  
Grade 10 - The Human Black Hole
- 1176W **Leighton Zhao**  
Grade 12 - Normal Mode Analysis of a Seven-Particle Hexagonal Mini-Crystal System  
**Project At Electricity Wall**

*Plant Sciences (PLNT)*

- 1177T **Ryan S Brunner**  
Grade 10 - How do Magnets Affect the Growth of Plants

1178S **Emilia F Topp-Johnson**  
Grade 9 - Behind the Kernels II: A Reevaluation of Fungal Endophytes as Biocontrol Agents Against the Common Maize Pathogen Ustilago maydis

1179T **Theresa Tourtillott**  
Grade 10 - Seed Germination in Various Environmental Solutions

*Systems Software (SOFT)*

1180W **Rustam Kosherbay**  
Grade 12 - Programming a flight simulator with a drone to generate energy-efficient paths over farm fields to monitor agricultural crops

1181T **Stephen J Mylabathula**  
Grade 12 - Touch-Free Control of a Computer Using Combined Alternative Inputs, Visual and Auditory  
**Project At Electricity Wall**

1182T **Evan D Sand**  
Grade 10 - Steganographic Optimization

1183W **Andrew D Sit, John E Dickinson**  
Grade 12,12 - **Team** - Engineering a spaceflight fabrication tracking system for manufacturing the James Webb Space Telescope and the Geostationary Operational Environmental Satellite Series-R

1184T **Connor h Van Dorpe**  
Grade 10 - Dictionary Attacks With Varying Wordlists



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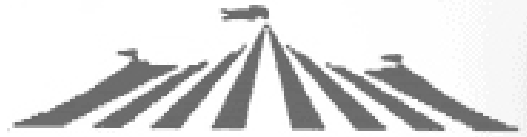
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HOSPITALITY GROUP

## 2015 TCRSF Students by Last Name

Abegaz, Maedin F	1149T	Boettner, Harrison M	8077T	Detor, Sam	7002W
Abuad, Heba	7021T	Boike, Caden J	7058W	Diamond, Sarah A	6002S
Adams, Ellie	6056T	Bolar, Melinda	7035T	Dickinson, John E	1183W
Adkins, Jackson	6032S	Boler, Amira M	7011S	Dieperink, Isabel	8104S
Ahrens VIII, Olivia D	7010S	Bowar, Kyra C	1013T	Dobbs, Georgia N	6005W
Akakpo, Hyacinthia	1106S	Bowen, Brian P	1014T	Dobrzynski, Rachel L	1018T
Akindele, Medinat A	1078S	Bozeman, Lilly	6018S	Dodd, Alexander J	1122T
Ali-Caccamo, Adrian L	8070S	Brenner, Jillian M	7110S	Domek, Natalie M	1019T
Allen, Savannah	7101T	Browne, Asiya N	7021T	Dominguez, Edward	1020T
Altier, Chuck M	6057S	Brunner, Ryan S	1177T	Dougherty, Jack B	6058W
Altman, Will T	7074S	Burke, Brendan R	8103W	Doughty, Emma D	6013W
Altman, Quncy D	8023S	Burns, Gavin	7111T	Dusek, William B	8078S
Amell, Andrew L	7028T	Butterfield, Gavin	8093S	Dwyer, Claire	7037S
Amiot, Nathan M	7029W	Byrne, Julian A	6044T	Dykes, Marina	6006S
Anderson, Benjamin R	1125T	Cacique, Aisha	1082T	Eddins, Raef J	8001S
Anderson, Natalie	1041T	Caldwell-Tautges, Jonah Paul	7083W	Edwards, Jake A	1152T
Andert, Blake E	1009T	Calhoon, Jacob T	1105T	Ehlert, Jennie	7002W
Andrews, Eli	6027W	Carlson, James A	7119S	Erickson, Charlie F	7075W
Apet, Maasia S	7070S	Carlson, Emily N	1151T	Ericson, Becky	8083W
Armstrong, Bridget N	1164T	Carman, Sam J	1083T	Ernster, Adam E	8036S
Armstrong, Seven James	1133S	Carpenter, Shyanna H	1133S	Ertel, Callie Joy	7060W
Avant, Da'Juan A	7030S	Carroll, Bridget A	1001W	Esteb, Emma R	8004S
Bachmeier`, Noah M	1048T	Cartier, Lily L	7059W	Eswarachari, Siddarth	1103W
Bagdade, Madeline	6010S	Casserly, Abigail R	6011W	Ettawageshik, Joe	7012W
Baisch, Matthew R	1165T	Castaneda , Christina Rachel	7067T	Ettesvold, Summer	1041T
Ballard, Jaquan	7031S	Chadaga, Mani	6012S	Evans, Allison F	6018S
Banovetz, Matthew J	7001W	Chaney, Elizabeth	8088S	Farmer, Hannah E	7084T
Bares, Valerie C.	8087S	Chang, Andrew Va Yee Leng	1084S	Farmer, Nathaniel R	1002T
Barre, Mohamud	7032T	Chen, John N	1049W	Fasching, Zoe J	8067T
Barron, Jackie Janelle	8003S	Clark, Brennan S	1070W	Fee, Emma R	1050T
Barry, Ava R	7026T	Clinton, James	7012W	Fesenmaier, Mark G	1167T
Barton, Andrew L	1079T	Cojolo , Samuel T	1106S	Fesenmaier, Rose T	6059W
Beauchamp, Shoshanna A	1010T	Conzet, Annie C	1043S	Finholt, Andrea A	6014T
Beckman, Ruby J	8032S	Copeland, LaVontris L	1085S	Fischbach, Hunter	6019S
Bellamy, Ellen R	1011S	Corcoran, Johnathon W	1015T	Flagler-White, Nia U	1087S
Bellaphant, Keymani Levar	1080S	Corrie, Sean	6029S	Flippen, Alyssa M	8084W
Bennett, Julia J	7106T	Cournoyer, Mariana	7036S	Foley, Seamus P	8089S
Benson, David	7033T	Cox, Ainsley	7102S	Foster, Isaac	6033S
Berg, Emily M	1081T	Craddock, Erica	1086S	Freberg, Tommy E	8105S
Berg, Nicholas W.	1150S	Cribbs, Anthony TM	1085S	Fries, Declan	7012W
Bergert, Lina	8033W	Cucci, Isabella C	8024T	Friesen, Henrie P	8096S
Berglund, Thomas G	1126T	D'Agostino, Joseph F	7093T	Fuls, Owen Kray	7103T
Berhe, Joel	6024S	Dahdah, Anthony	8094S	Gabriel, Isabella J	8054T
Beseman, Grace A	8034T	Danley, Megan J	8035S	Gallagher, David J	8055T
Bhoopatiraju, Sweta	1069W	David, Sabirina H	1016T	Galyon, Seth	1168T
Bien, Olivia C	1012T	Davies, Maria A	6047W	Gamada, Darartu M	1101W
Biermaier, Josh	6028T	Day, Keleta	1107T	Gathje, Joe M	6001W
Bjermeland, Solveig O	7034S	de Long-Hersh, Justin T	8095S	Geilani, Mohamed A	7076S
Bjork, Luke W	1166T	Dearring, Dailee M	8018W	Gesuadlo, Lucas	7023S
Black, Sonja	6050S	Delius, Andrea M	1017T	Gesualdo, Olivia C	8019S
Blanchard, Destiny L	1104S	Delto-Lopez, Daniel	1075S	Glaser, Zachary	7085S
Bloemendal , Alex C	8053T			Godishala, Prashant S	1070W



Graczyk, Edward M	6034W	Johnson, Ian M	1089T	Malone, Hailey E	1123T
Green, Charles H	1021T	Johnson, Lumin F	1004S	Mangel, Jake W	8009W
Gresser, Harry C	6035W	Jones, Terrell L	8106S	Mann, Stephen	8040T
Grimm, Katherine	8025S	Jons, Carolyn K	1090W	Mannila, Jenny M	1028T
Grundhoefer, Anna	7016S	Jostes, Milan E	6041T	Mao, Michelle	1158T
Habegger, Keegan Jared	7077T	Jostes, Haley C	8002T	Marcus, Sophia G	8057W
Hakanson, Emma C	1108T	July, Lan	1058S	Martin, Noah M	1029S
Hamel-Snapp, Alex J	8005S	Kamara, Michaela	8038S	Martinez, Nicholas R	8073S
Hanhan, Anders	7013S	Kamboj, Ishita	1055W	Martinez, Kenia L	8098S
Harbi, Bashir A	1022T	Karr, Nathaniel W	1056T	Marty, Katherine E	8098S
Harrington, Samantha R	1011S	Keenan, Dillon R	1135T	Mata, Bedilia	7063T
Harris, Alexandra L	8056S	Kelley, Olivia G	6002S	Matter, Erin K	8041S
Hart, Gabe A	7057S	Kelley, Jenna R	8090S	Mattera, Jack	7087W
Harvin Jr, Robert L	1080S	Kennedy, Joe P	8079S	Mazhari, Mackenzie	1142S
Hatte, Abenezer	1058S	Kesti, Nathan F	7038W	McChesney, Evelyn G	1159W
Havens, Livia J	7094S	Kethar, Arun	1057W	McChesney, Easton	1144W
Hawkins-Easley, Cinsere	7078S	Kethar, Harini	1072W	McCoy, Danny C	6025W
Hayden, Sophia M	8006W	Khalif, Haaruun	7032T	McCue, Madeline C	1159W
He, Jeffrey	1049W	Kim, Sofie	1091W	Mccurley, Shauntia S	7041S
Hearne, Chester J	8007T	Kim, Leslie	6015S	McFarland, Annie J	1059W
Heaton, Clare	7112W	King, Rory	8008S	McGill, Aidan J	6037S
Hedman, Lauren	7113W	Kirkpatrick, Grace E	1059W	McGovern, Zachary F	1030T
Heesch, Thomas A	8026S	Knipp, Halle	7039T	McKane, Kayla M	7014T
Helke III, Matthew D	1153T	Kobienia, Berit E	6048W	McKoy, Max	7087W
Hennessey, Lauren	6064S	Koch, Henry	7089W	Meadows, Kate F	8058W
Henry, Kachina	1088S	Koffah, Browerti	1131S	Meaney, Aine	6021S
Hensley, Benjamin Cole	1051T	Koloc, Clara N	7024T	Medina, Anna	6051W
Her, Gaonoukhu	8066S	Kong, Toni	1058S	Miao, Zhuang	1101W
Her, Kou	8097S	Konkel, Jeremiah J	7107W	Miettunen, Lilly E	8099T
Her, Mai Yia	1077S	Konkol, Zachary E	8071S	Miler, Ryan	8028T
Herr, Cloud	1109S	Kosherbay, Rustam	1180W	Milhaupt, Benjamin G	1102T
Herrington, Christopher J	1029S	Koski, Joseph N	1127T	Miller, Whitney E	1031T
Herrington, Josh	8081S	Krogman, Mitchell	8072S	Miller, Austin J	1128T
Herzog, Abigail R	1110T	Kukulka, Braxton A	1136T	Miller, Daniel	6066W
Hilgendorf-Roost, Kaia MJ	7061S	Lamichhane, Rajani	7071W	Miller, Jack	7042T
Hinrichs, Noelle M	1111T	Lazcano-Stai, Austen R	7040S	Mische, Owen	8010S
Hintermeister, Hannah J	7095T	Le, Amy K	1024T	Misok, Ruby	7043S
Hoang, Joshua	6020S	Lee, Yun (Jeffrey) J	1137W	Missling, Emma J	1143T
HoangLong, Paul V	1052T	Lee, Jackson W	8080S	Mittal, Adi M.	1060W
Hodge, Elias P	1154S	Lee, Davita	7108S	Mohamed, Samira Y	8011S
Hollihan, Garrett	6060S	Lender, Hannah G	8039S	Mohamud, Elhaan Ali	8086W
Holmstrom, Krista L	1155T	Lensing , Mariyah A	1114S	Mohanty, Amrita	1061T
Holt, Ellie	7004W	Leverty, Tyrese C	1025T	Molter, Jack	7015S
Horner, Taylor R	1053T	Levy, Jacob	1091W	Mon, Sala	8081S
Hughes, Andrew S	1156T	Lien, Anders	6030S	Mosoti II, Joseph	1138T
Hume, Connor M	1112T	Liepins, Nikolas	6036S	Moua, Pa Nhia	1073S
Hussein, Rahma	7021T	Lightfoot, Maxine	1026S	Mucherla, Sonali	1032T
Jackson, Amanda R	1023T	Lindau, Rebecca R	1131S	Mujumdar, Maitreya A	1124T
Jackson, Tommy G	8037T	Lindsay, Jack Everett	1157T	Mulrooney, Simon	6061S
Jacobsen, Nicholas J	7086S	Liuzzi, Avery R	7078S	Murphy, Meghan M	6007W
Jain, Avni	8020W	Logan, Geormele D	1085S	Mylabathula, Stephen J	1181T
Jain, Arush	1134W	Longe, Isaiah	8027T	Nabors, Reice	8042S
Jasa, Sarah	1113T	Lorimor, Claire E	7062W	Nambudiripad, Akshay	6038S
Jenkins, Tatyana L	1071S	Lowe, Jack R	7079T	Narayan, Devika L	8043W
Jing, Serena	1054S	Luu, Elena	1027T	Narayan, Janani V	1044T

Narayan, Jeyani V	1074T	Portoghese, Isabella	8030S	Solis, Ivett	7063T
Nash, Sophia A	8021S	Powell, Eli S.	8022S	Solis, Ivon	7067T
Nash, Lydia	7114T	Pullen, Leia	1104S	Sommer, Raina E	7091S
Neal, Madison R	7025S	Pumarlo, Samuel R	6008W	Souka , Matthew R	6042W
Neira, Eva M	8044S	Qu, Daniel	1147W	Southern, Moira	1103W
Neufeld, Henry J	7104S	Rabins, Sophia A	7047S	Spaude, Jacob T	1003T
Nguyen, Thanh T	1139T	Rachac III, William F	8013S	Spaulding, William J	1162T
Nguyen, John N	7003S	Rajamani, Geeta	1064S	St. Germain, Carlos X	8016S
Niznick, Connor	6052T	Rajamani, Anindita	6016S	Stauffer, Robin K	1173T
Nkatia, Stephanie	1062T	Ramirez, Josephine L	7007T	Stauffer, Max	8007T
Noack, Ava R	7095T	Rangel, Jonathan	7008S	Stephan, Anne	6009W
Nordgren, Josie L	1033T	Reeder Ms., Abigail L	8062S	Stolzberg-Schray, John	7098S
Norquist, Natalie	7016S	Reeder Mr., Joseph E	6003S	Strey, Madeline G	1095T
Norrning, Jacob A	1092T	Rein VIII, Eloise M	7019S	Strom , Liza M	1045S
Nourse, Conner V	8100S	Rein, Maureen K	1114S	Suvarna, Asha N/A	1174S
O'Brien, Emily E	8029T	Reynolds, Amanye W	7048S	Swanson, Sarah J	7068S
Odom, Kara E	1034T	Rice, Noah HL	7064S	Swenson, Carston A	1145T
Ofstad, Tyler R.M.	1169T	Richardson, Sadie L	8014W	Tang, Kathy	8045S
Ofstedal, Wolfgang	1144W	Richter, Morgan	7089W	Tangney, Elizabeth M	1065T
O'Grady, Mary	7004W	Rivera, Pilar Jaqualing	7117S	Tatum, Marquise E	7072S
O'hara-David, Jonah	8101S	Rmaile, Hussein H	6062T	Taye, Abel	1076S
Ohenzuwa, Christine O	8091W	Robinson, Spencer C	1130T	Temple, Julia C	7099W
Olk Jr, Stephen M	6053S	Rockafellow, Nathan	7087W	Terry, Jesse	1148T
Olson, Griffin J	7017T	Roh, Abigail	7022W	Thao , Ah	1096S
Olson, Celia J	8012S	Roth, Melanie M	8107W	Thao, Kang	8046S
Omodt, Hannah E	7115S	Rubianes, Luisa Lea	8015S	Thomas, Samantha Jane	6040W
Omodt, Nathan D	7105S	Ruskin, Jared A	7027S	Thompson, Danielle L	1163T
Onayiga , Julianne	1087S	Sahu, Chinmay	8075T	Tipler, Marina N/A	1097S
Onopa, Luke	1115W	Said, Ladan	1094T	Tonoyan, Ani	6045W
Oo, Soe	7044S	Salveson, Karsten E	1117W	Topp-Johnson, Emilia F	1178S
O'Shea, Meghan M	8059S	Sampson, Oriana G	6065W	Tourtillott, Theresa	1179T
Ovsak, Genevieve E	6054W	Sand, Eleanor S	7009T	Tran, Minh H	1132S
Padiyath, Aadarsh S	1063T	Sand, Evan D	1182T	Tran, Anny B	8047S
Padiyath, Manashree S	7116T	Sandvig, Daniel E	1172T	Tran, Kevin T	1141S
Pagel, Emilie L	7005S	Scandura, Zac	7065S	Tucker, Tyree Doc	1004S
Pahl, Samuel N	1129T	Schearer, Zoe	7020S	Tuma, Annika	7092S
Pajunen, Haley A	1160T	Schik, Peter V	8082S	Two Bulls, Grant R	1118W
Pajunen, Alexandra N	1035T	Schmidt, Daniel E	8102W	Tyler, Madison K	1066T
Paleen, Oliver	7085S	Schmitt III, Keith James	7109T	Tyler, Chris M	1146T
Papisetty, Karthik	8060W	Schneider, Madianna J	1075S	Vadnais, Ella Leta	8031S
Parhi, Rahul	1120W	Scholtz, Niko	6039S	Valencia, Alexandra	7067T
Pattison, Alistair B	7096S	Schulz, Rajni L	8108S	Valencia , Juan M	1038S
Perales Jr., Gerardo	1170S	Sczepanski, Lauren R	1036T	Vallin, Benjamin	1005T
Perez, Alexander A.	7045T	Seeba, Lila T	7090S	Van Dorpe, Colton V	1046T
Peterson, Anika	7080W	Segura, Alejandra R.	7118T	Van Dorpe, Connor h	1184T
Peterson, Jack	7046W	Seibert, Karl J	1140T	Vang, Anthony M	1040T
Petruconis, Cecilia R	8061T	Senta, Lucas M	1161T	Vang I, Abbigail L	8048S
Pham, Elliot M	7088S	Sevigny, Gracie C	7097T	Vang, Yang	1132S
Phillips, Deshanti D	7006S	Shadick, Samantha E	1037T	Vang, Aimee	1131S
Phung, Holton	1171S	Shepherd, Maya R	7066S	Vang, Trinity	7023S
Pineiro, Danielle	1116T	Sinn, Madelyn I	6022S	Vang, Nouchi	1039S
Pinney-Valtierra, Anastasia	1093T	Sit, Andrew D	1183W	Vang, Khong	1047S
Pitt, Ethan	6026W	Skinaway, Kyrin L	6017S	Vazquez, Isabella	7050S
Pliego-Cuevas, Julie diane	7018T	Smith-Walter, Cole M	8109S	Vega, Brittany	7051T
Polak, Joseph J	8074T	Snowbeck, Elsa	7049S	Vega, Kira	7052S

Vidmar, Audrey C 8063S  
 Vo, David 1154S  
 Vogel, Maxwell J. 7073T  
 Vue, Lajntxiag Sakura 8052S  
 Vue, Mai 8050S  
 Vue, Kelvin 8049S  
 Vuong, Win D 1067T  
 Walker, Solomon 6055S  
 Wall, Sawyer E 7053S  
 Wallace, Lia J 8110S  
 Wallander, Harrison j 6063T  
 Wallinga, Lucia M 8064S  
 Wallman, Amanda J 7026T  
 Wallraf, Sy R 7054W  
 Wang, Hsin 1098T  
 Ward, Zoe M 8065S  
 Waulters, Joshua 6031T  
 Weier, Caroline E 6064S  
 Weigel, Alexander J 6043T  
 Weinstein, Edie A 6046S  
 Weiss, Jaclyn 1006T  
 Wells, AnneMarie R 1119T  
 Wesson, Aja I 1007T  
 Weston, Ellie 7055S  
 White, Ramona J 1175S  
 White, Jenna 1041T  
 Wilkins, Tae'Vion D 8019S  
 Williams, Taylor C 6049W  
 Wolff, Anna M 8068T  
 Wolff, Elijah 7081W  
 Wolters, Emma 7069S  
 Wong , Jaylin S 1099T  
 Wong, Alicia L 1042W  
 Woychick, Lucas C. 8017W  
 Wren, Vanessa A. 8085T  
 Xiong, Alyssa 7044S  
 Xiong, Ly 1100S  
 Xiong, Phranangchaub 8066S  
 Xiong, Emi 1084S  
 Xiong , Pha 8081S  
 Xiong, Fuqi H 8051S  
 Yang, Pa Ia 8066S  
 Yang, Yuyi A 8069S  
 Yang, Yuepheng 8076S  
 Yang, TxujCi Ishtar 7056S  
 Yang , Lily Fuba Chei 8052S  
 Yang, Makayla 7006S  
 Yang, Cindy J 7003S  
 Yang, Anastasia M 7003S  
 Yang, Bao 1100S  
 Yang, Adrian 7100S  
 Yang, Chouchi 7023S  
 Yang, Mai Der 1068S  
 Yang, Ja-Lab 1077S  
 Yang, Diane 1073S

Yang, Kerui 7082W  
 Yetter, George B 8092S  
 Ylitalo, Max 1121T  
 Young, Dustin J 1008T  
 Younger, Lee M 6023T  
 Zelickson, Eve C 1117W  
 Zhao, Leighton 1176W  
 Zych, Roman 6004S



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## 2015 Research Papers

<b>Name</b>	<b>Grade</b>	<b>Title</b>
Maya Anderson	6	Plastic Comparisons: Natural versus Synthetic
Kanishk Kacholia	6	Does age affect memory?
Aidan J McGill	6	Which Truss to Truss
Hussein H Rmaile	6	How is the Growth of Bean Plants Affected by Different Starting Conditions?
Solomon Walker	6	Magnetism Only Gets You So Far
Spencer West-Hest	6	What natural fertilizer makes grass seed grow fastest?
Solveig O Bjermeland	7	Oobleck is the New Black
Callie Joy Ertel	7	Climate Change Affects on Painted Lady Caterpillars
Hannah E Farmer	7	Crumb Catching Cereal Bag
Lauren Hedman	7	The Effect of NaCl on Grass Seed Germination
Kaia MJ Hilgendorf-Roost	7	Vials of Vile Water Comparing clarities of agricultural, urban, and natural lakes
Jeremiah J Konkel	7	The effect of hockey stick flex on accuracy and speed and comparison to a mechanical flex device.
Mary H Kracht	7	Food vs Temperature: Food consumption in New Zealand white rabbits at Thermoneutral ambient temperatures
Henry J Neufeld	7	School BUGS Me
Manashree S Padiyath	7	Greening Under the Evergreens: A biochar soil amendment study
Alexander A. Perez	7	Does the Ratio of Cupric Chloride to Aluminum Affect the Amount of Heat Given Off in the Reaction?
Noah HL Rice	7	It's Easy Being Green
Zac Scandura	7	Block the Flood (It's Done): A Study of Different Sandbags for Blocking Out Floods
Amelia A Schucker	7	The Rubber Band Powered Airplane and Stress on its Motor
Maya R Shepherd	7	Chill Out
Raina E Sommer	7	Not A Drop To Drink: A study of which low cost, easily accessible water purification methods can effectively remove ammonia from water
Sarah J Swanson	7	Two Stills, One Job - Creating Safe, Clean Drinking Water
Maxwell J. Vogel	7	Got Gas: Does Ethanol Live up to its Reputation as a Clean Burning Energy Efficient Fuel Additive?
Kerui Yang	7	How Icing on Wind Turbine Blades Affects Power Generation
Adrian L Ali-Caccamo	8	Solar Ovens: A Simple, Sunny Solution
Valerie C. Bares	8	How do the anatomical structures of different plant species affect their ability to filter water?
Elizabeth Chaney	8	The Affects Preservatives Have On Mold Growth
Isabel Dieperink	8	Excess Nutrients and Cyanobacteria: The Blue-Green Threat
Seamus P Foley	8	Do Norwex Rags Clean as Effective as Regular Rags with Cleaner?
Chester J Hearne, Max Stauffer	8	What is the accuracy of an Eyewitness Testimony under these circumstances?
Avni Jain	8	To Eat Or Not To Eat? An Innovation To Detect Food Spoilage

## 2015 Research Papers (continued)

<b>Name</b>	<b>Grade</b>	<b>Title</b>
Kenia L Martinez, Katherine E Marty	8	Got Bacteria?
Christine O Ohenzuwa	8	Resist The Rays
William F Rachac III	8	Can Memory Training Improve Memory Recall?
Chinmay Sahu	8	Can household light bulbs be used to recharge batteries?
Rajni L Schulz	8	The Grass isn't Always Greener on the Carbon Diox-Side
Cole M Smith-Walter	8	Fish for Fertilizer
Audrey C Vidmar	8	Got Contaminants? Filter Them!
Meghan Walsh	8	The DOGAVATOR
Andrew L Barton	9	Are BWCA Lakes Affected by Acid Rain and Can Acidic Lakes Be Restored Using Calcium Carbonate?
Emilia F Topp-Johnson	9	Behind the Kernels II: A Reevaluation of Fungal Endophytes as Biocontrol Agents Against the Common Maize Pathogen Ustilago maydis
Simeon R Amos	10	Getting scared could save your life?
Benjamin R Anderson	10	Propeller Efficiency
Blake E Andert	10	Duly Noted
Bridget N Armstrong	10	The Effect of Speed on the Distance of a Softball Bunt
Noah M Bachmeier`	10	Postural Effects on Lung Capacity
Matthew R Baisch	10	Can Modifications On a Baseball Create More Movement?
Jack F Bardwell	10	Can Sound Be Made Visible?
Maria S Berger	10	Cell Phone Radiation
Olivia C Bien	10	The Effect Gender has in the Memorization of Gender Neutral Objects
Luke W Bjork	10	What Ball Should You Play?
Kyra C Bowar	10	Psychological Stereotypes of Literary Genres and Book Covers
Brian P Bowen	10	The Relationship Between Fine Motor Skills and Gender
Ryan S Brunner	10	How do Magnets Affect the Growth of Plants
Jacob T Calhoon	10	How pH affects the rate at which steel corrodes
Brendan P Callery	10	Biochemistry: Bacterial Resistance to Disinfectant Dilutions
Samuel N Carlson	10	Our Everyday Problems: Electromagnetic Radiation
Sam J Carman	10	The Effects of Temperature Change on Orange Juice pH
Ouafae Chahir	10	How the Strength of a Magnet Varies with Temperature
Johnathon W Corcoran	10	Musical Personalities
Amy Crawford	10	Frequency Dependent Sound Absorption
Angelica I Cruz	10	What is the Fastest Way to Cool Down After Exercise?
Sabirina H Daud	10	Prejudice in Adolescents
Andrea M Delius	10	Undressing the Truth
Ryan D Dobrzynski	10	Texting versus Talking: Which one Causes Slower Reaction Times
Rachel L Dobrzynski	10	Tenth Grade Views on Whether Composite or Real Faces are More Beautiful
Alexander J Dodd	10	Light Travel
Natalie M Domek	10	The Stroop Effect
Edward Dominguez	10	Addiction to Gaming
Daniel S Duea	10	The effect of chord length on the efficiency of propellers

## 2015 Research Papers (continued)

<b>Name</b>	<b>Grade</b>	<b>Title</b>
Jake A Edwards	10	Are Organic Foods Healthier than Inorganic Foods?
Andrew T Ernst	10	The true test of reaction time and distractions
Nathaniel R Farmer	10	Light stimulated startle response in Daphnia magna
Emma R Fee	10	Nicotine Effects on Lung Cancer Cells
Mathew Feil	10	Burning Calories
Mark G Fesenmaier	10	What Materials Reduce the Most Amount of Friction?
Nia U Flagler-White, Julianne Onayiga	10	How does different liquids affect candy overtime ?
Jenna R Flanders	10	Will the brand of tennis balls affect my game?
Alyssa I Ford	10	White Noise on Memory
Steven M Gillen	10	The effect of temperature on aluminum corrosion
Charles H Green	10	What the Frack!: The Influence of Propaganda on Public Attitudes Towards Fracking
Emma C Hakanson	10	The Impact of Human Proximity to Lakes on Total Phosphate, Turbidity, and Dissolved Oxygen Levels
Cole J Hansen	10	Water Piping
Max Robert Hanson	10	The Effect of EMF on Plants
Bashir A Harbi	10	Texting vs. Calling
Matthew D Helke III	10	Bacteria In Schools
Benjamin Cole Hensley	10	Electrolytes in Drinks
Abigail R Herzog	10	The Effectiveness of Oil-Absorbing Polymer at Rehabilitating Soil Environments Contaminated with Motor Oil
Krista L Holmstrom	10	The Effect of Bacterial Strains on the pH of Yogurt over time
Taylor R Horner	10	The Effects of Timed Versus Untimed Tests on Students Performance
Andrew S Hughes	10	Lake pH Levels and Temperatures and Their Effect on Microorganisms
Connor M Hume	10	Carbon Dioxide and How it Affects our Atmosphere
Husni A Hussein	10	Group vs. Individual
Kalen Iommazzo	10	The Effects of Detergents with Enzymes and Detergents without Enzymes
Amanda R Jackson	10	Mint Condition: How will you react?
Sarah Jasa	10	The Effect Surface Condition Has on Atmospheric Temperature
Serena Jing	10	Advancements in Drug Delivery: the development and evaluation of ibuprofen loaded biodegradable hydrogels
Ian M Johnson	10	A Study of Electrolyte Content in Sports Drinks Versus Other Possible Recovery Drinks
Nathaniel W Karr	10	Escherichia coli Production in the Presence of Antibacterial Agents
Dillon R Keenan	10	Windmill Efficiency When Wind Blows at it From Different Angles
Harini Kethar	10	Investigating Functions of Fanconi Anemia (FA) Proteins in Cellular Checkpoint Signaling: A Novel Role for the FANCD2 Protein
Kathleen A Kilinski	10	The Scoop on the Stroop
Cullen Kittams	10	The Effect of the Media on an Adolescent's Occupational Aspirations

## 2015 Research Papers (continued)

<b>Name</b>	<b>Grade</b>	<b>Title</b>
Joseph N Koski	10	Gearing On Rough Terrain
Braxton A Kukulka	10	The Degree of LED
Katelynn L Larson	10	The Speed of Story Telling
Amy K Le	10	Monkey See, Monkey Do
Tyrese C Leverty	10	The Study of How Stereotypes Affect People's Judgments of Others
Jack Everett Lindsay	10	Is A Dog's Mouth Really Cleaner Than a Human's Mouth?
Brian Lu	10	The Effects of the Usage of Card Counting in Blackjack
Bailey M Lundgren	10	Hand Sanitizer Alcohol Effectivness
Elena Luu	10	Light Absorption: Coffee vs. Tea
Hailey E Malone	10	Sympathetic Vibrations on the Guitar
Jenny M Mannila	10	Influence of packaging on Children
Marissa K Marsolek	10	The Sense of Memory
Kathryn A McDavid	10	Prepping for Paint
Zachary F McGovern	10	Serious VS. Comedic Commercials
Benjamin G Milhaupt	10	The Study of DNA and Common Malignancies Within the General Population
Whitney E Miller	10	Does Music Affect Concentration While Studying
Austin J Miller	10	Traction Action
Emma J Missling	10	Does Temperature Affect the Strength of a Magnet?
Mohamedsaid A Mohamed	10	Music and Math
Joseph Mosoti II	10	Hydroponic Bean Plants
Sonali Mucherla	10	Are Three Heads Better Than One?
Jeremy TK Nelson	10	Reaction while texting
Thanh T Nguyen	10	Corrosion On Different Metals
Viet Q Nguyen	10	The Effect of Temperature Change on the Elasticity of Rubber
Stephanie Nkatia	10	The Effects of Phage T4r on E. coli
Josie L Nordgren	10	Gender Differences in Multitasking
Jacob A Norring	10	The Effect Temperature Has on a Battery's Ability to Store Energy
Kara E Odom	10	A correlation of personality types, views on contemporary issues and animal preference
Tyler R.M. Ofstad	10	How is a Wing's Performance Affected by the Altering of It's Camber
Blake A Orth	10	Making batteries out of pocket change
Samuel N Pahl	10	BBcor v.s. Wood
Alexandra N Pajunen	10	The Frustration Test: Do males or females get more frustrated during different activities?
Haley A Pajunen	10	Where do Germs Grow in your House?
Brandon K Remarcik	10	Sleeps Effect on Reaction Time
Henry C Ristvedt	10	The Effect of Arm Angle on Pitching
Spencer C Robinson	10	Robotic Hand
Blake Robinson	10	The Effect of Distractions on Math Ability
Griffin J Rozek	10	The Effects of Wheels against Coated Surfaces
Ladan Said	10	Which liquid dissolves Ibuprofen the fastest?

## 2015 Research Papers (continued)

<b>Name</b>	<b>Grade</b>	<b>Title</b>
Daniel E Sandvig	10	Puck is life
Paige A Schultz	10	The Effects of Wood Submerged in Water
Madison V Schwab	10	Which Colors of Paper are Most Conducive in Task Completion?
Katelyn E Schwab	10	Glow Sticks Aren't Just For Play
Lauren R Szczepanski	10	Product Packaging Preferences
Karl J Seibert	10	The effects of tire pressure, air conditioning, window resistance, and direction of travel on fuel economy.
Lucas M Senta	10	The Effects of Bacteria Transfer from a Wet Versus a Dry Surface
Samantha E Shadick	10	Blood Pressure
Nikolas J Slep	10	Correlation between different tempo music and student's test scores
Kendall L Smith	10	Think Fast
Tony S Southa	10	The Effects of Vitamins on Plant Growth
Jacob T Spaude	10	Watching Your Sugars
Robin K Stauffer	10	A Comparison of Oak, Maple, and Hickory Drumstick Rebound Height
Madeline G Strey	10	Effects of Boiling on Vitamin C Content in Vegetables
Carston A Swenson	10	Stretch the Mesh
Elizabeth M Tangney	10	Correlation Between Musical Training and Pitch Perception
Derek J Thellin	10	Comparing the Amount of Drag on Model Birds in V-formation
Danielle L Thompson	10	Effects of various water purification methods on E. coli
Theresa Tourtillott	10	Seed Germination in Various Environmental Solutions
Trang M Truong	10	The Effects of Temperature on the Strength of Magnets
Madison K Tyler	10	The Efficient Heart
Chris M Tyler	10	Number of Areas in a Divided Circle
Connor h Van Dorpe	10	Dictionary Attacks With Varying Wordlists
Anthony M Vang	10	The Connection Between the Cerebrum and Dance
Win D Vuong	10	Bacteria in Raw vs. Cooked Meat
Jaclyn Weiss	10	Ocean Acidification
AnneMarie R Wells	10	The Effect of Electromagnetic Radiation on Lumbricus terrestris
Ramona J White	10	The Human Black Hole
Erin M Williams	10	The Effectiveness of Different Types of Practice on a Musical Instrument
Jaylin S Wong	10	What is the Best Cleaner to Use for Removing Salt Stains from Suede Leather?
Dustin J Young	10	Do Mice Rely on Memory or Vision
Maedin F Abegaz	11	Testing Wound Dressings with Light Activated Dye to Combat SSIs
Emily M Berg	11	Corrosion of Metals in Sulfuric Acid
Emily N Carlson	11	Effects of organic agricultural processes and grass feeding on the bacterial composition of raw ground beef
John N Chen, Jeffrey He	11,9	The Effects of Caffeinated and Sugared Soft Drinks on Youth Brain
Darartu M Gamada, Zhuang Miao	11	Molecular dynamics simulations of copolymers as molecular band-aids against Duchenne muscular dystrophy
Prashant S Godishala, Brennan S Clark	11,11	A novel protocol for culturing adult porcine islets for transplantation in type 1 diabetic patients



## 2015 Research Papers (continued)

<b>Name</b>	<b>Grade</b>	<b>Title</b>
Noelle M Hinrichs	11	Testing Greenhouse Gas Absorption in Constructed Wetlands
Paul V HoangLong	11	The Effects of Warfarin and Clopidogrel in Treating Occlusion
Carolyn K Jons	11	Improved Efficiency of Steam Generation from Seawater Using Carbon Nanoparticles - Year 2
Arun Kethar	11	Biomechanics of Aortic and Pulmonary Valve: Implication in Ross Procedure
Yun (Jeffrey) J Lee	11	The effectiveness of Benthic Microbial Fuel Cell in the waste water
Maxine Lightfoot	11	How does existential angst affect insomnia?
Evelyn G McChesney, Madeline McCue	11	Novel antibiotic alternatives: Genomic alteration of probiotic bacteria for production of antimicrobial peptides to target antibiotic-resistant pathogens
Adi M. Mittal	11	Development of Technology for Image-Based Quantification of Pain in Sickle Cell Disease
Maitreya A Mujumdar	11	Improving Total Energy Production of Photovoltaic Solar Panels using Wavelength Selective Filters and Broadband Mirrors
Aadarsh S Padiyath	11	Increasing Cancer-Specific Drug Delivery using Targeted Liposomes
Daniel Qu	11	Development of a Portable MRI Machine
Moira Southern, Siddarth Eswarachari	11	Cleaner Water: Genomic analysis of the homogentisate catabolic pathway in Pseudomonas putida F1 for bioremediation of aromatic hydrocarbons
Max Ylitalo	11	Landfill to Car Fuel: Using Surfactants to Increase Cellulosic Ethanol Production from Waste Paper
Thomas G Berglund	12	Lift Assist Walker
Sweta Bhoopatiraju	12	The Effects of Betaine on Patients Intolerant to Maintenance Chemotherapy Due to Deficiency of S-Adenosyl Methionine
Alan H Chiang	12	Sensor Optimization by Adjusting Volume Fractions of Superparamagnetic Nanoparticles in Hydrogel
Seth Galyon	12	Lacrosse Shot Efficiency and Effectivity
Ishita Kamboj	12	Methamphetamine Compromises the Phagocytic Activity of BV2 Murine Microglia without Compromising Cellular Viability
Sofie Kim, Jacob Levy	12	Optimized syntheses of novel, medicinally applicable 1,2,3-triazole derivatives
Rustam Kosherbay	12	Programming a flight simulator with a drone to generate energy-efficient paths over farm fields to monitor agricultural crops
Annie J McFarland, Grace E Kirkpatrick	12	Long-term effects of hyperglycemia on dendrites in the CA1 region of the hippocampus
Amrita Mohanty	12	Schwann Cell Differentiation from Stem Cells of Neurofibromatosis 1 Patients and Normal Controls
Stephen J Mylabathula	12	Touch-Free Control of a Computer Using Combined Alternative Inputs, Visual and Auditory
Wolfgang Ofstedal, Easton McChesney	12	Engineering crystalline organic semiconducting thin films for use in organic solar cells

## 2015 Research Papers (continued)

Name	Grade	Title
Luke Onopa	12	How safe are our water supplies? Impacts of biomagnification of the antibiotic triclosan by perfluorooctane sulfonate on the health of vital anaerobic digesters in wastewater
Rahul Parhi	12	Fault-Tolerant Arithmetic Computing using Partial Triple Modular Redundancy (PTMR)
Karsten E Salvesson, Eve C Zelickson	12	Zebra mussel ( <i>Dreissena polymorpha</i> ) preference for colonization on macrophytes in lake Minnetonka, MN
Andrew D Sit, John E Dickinson	12,12	Engineering a spaceflight fabrication tracking system for manufacturing the James Webb Space Telescope and the Geostationary Operational Environmental Satellite Series-R
Grant R Two Bulls	12	Effects of early Mdewakanton Dakota settlement patterns on the ecology of Lake Calhoun in Minneapolis, MN
Benjamin Vallin	12	Effectiveness of Essential Oils in Repelling <i>Drosophila melanogaster</i>
Colton V Van Dorpe	12	Low Density Polyethylene Biochemical Degredation
Hsin Wang	12	Making soap from used cooking oil
Jenna White, Summer Ettesvold, Natalie Anderson	12	Music and it's effects on studying.
Leighton Zhao	12	Normal Mode Analysis of a Seven-Particle Hexagonal Mini-Crystal System



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## 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	1987	Ann Bailey Mahtomedi High School, Mahtomedi
1974	Craig Johnson Harding High School, St. Paul	1988	Sara Greenslit Mounds View High School, Arden Hills
1975	Dennis Scanlon Harding High School, St. Paul	1988	Ann Marie Gentes Westonka High School, Mound
1976	Mark Foertsch Grace High School, Fridley	1989	Ann Marie Gentes Westonka High School, Mound
1976	Linda Ann MacDonald Mounds View High School, Arden Hills	1989	Todd Capistrant Minnesota Zoo School
1977	Steve Rabatin Benilde-St. Margaret, St. Louis Park	1990	Cynthia Schaumburger Harding High School, St. Paul
1977	Charles Clevenger Westonka High School, Mound	1990	Ryan Egeland Wayzata High School, Wayzata
1978	Mitchell Voechl	1991	Ryan Egeland Wayzata High School, Wayzata
1978	Charles Clevenger Westonka High School, Mound	1991	Jonathon Kubik Sibley High School, West St. Paul
1979	Jeffrey Rabatin Benilde-St. Margaret, St. Louis Park	1992	Heidi Konkler Wayzata High School, Wayzata
1979	Joseph Rabatin Benilde-St. Margaret, St. Louis Park	1992	Ryan Egeland Wayzata High School, Wayzata
1980	Jeffrey Rabatin Benilde-St. Margaret, St. Louis Park	1993	Ryan Egeland Wayzata High School, Wayzata
1980	Joseph Rabatin Benilde-St. Margaret, St. Louis Park	1993	Andrew Grande St. Thomas Academy, Mendota Heights
1981	Jeffrey Rabatin Benilde-St. Margaret, St. Louis Park	1993	Kelley Lohman Harding High School, St. Paul
1981	Joseph Rabatin Benilde-St. Margaret, St. Louis Park	1993	Jens Strand St. Paul Academy, St. Paul
1982	Micheal Rabatin Benilde-St. Margaret, St. Louis Park	1994	John Hassett Burnsville High School, Burnsville
1982	Brian Hallberg Harding High School, St. Paul	1994	Ana Navarro Minnetonka High School, Minnetonka
1983	Thinh Hoang Tran Westonka High School, Mound	1994	Victoria Miller St. Agnes High School, St. Paul
1983	UNKNOWN	1994	Julia Goetzke Harding High School, St. Paul
1984	Susan Kain Edina High School, Edina	1995	John Hassett Burnsville High School, Burnsville
1984	Steve Herrman Mahtomedi High School, Mahtomedi	1995	Adam Tatarynowicz Burnsville High School, Burnsville
1985	Brenda Zenk Sibley High School, West St. Paul	1995	Victoria R. Miller St. Agnes High School, St. Paul
1985	Steve Herrman Mahtomedi High School, Mahtomedi	1995	Marcus Rollins St. Paul Open School, St. Paul
1986	Brenda Zenk Sibley High School, West St. Paul	1995	Anna Navarro Minnetonka High School, Minnetonka
1986	Steve Herrman Mahtomedi High School, Mahtomedi	1995	Samuel Rush Minnetonka High School, Minnetonka
1987	Brenda Zenk Sibley High School, West St. Paul		

## TWIN CITIES REGIONAL SCIENCE FAIR "ISEF" ALUMNI

*Students Chosen to Represent the Twin Cities Fairs at International Science & Engineering Fair*

1996	Laurie Louis Parker Roseville High School, Roseville	1999	Alison Boutin Burnsville High School, Burnsville
1996	David Loy Bowe Burnsville Senior High School, Burnsville	1999	Jennica Slattery Minnehaha Academy, Minneapolis
1996	Michael Scott Lohman Expo III High School, St. Paul	1999	Chrissy Jones Minnetonka High School, Minnetonka-Team
1996	Victoria Reynolds Miller St. Agnes High School, St. Paul	1999	Elizabeth Larkin Breck School, Minneapolis
1996	Anna Navarro Minnetonka High School, Minnetonka	1999	Melissa Borken Minnetonka High School, Minnetonka
1996	Michelle Lee Monnens Minnetonka High School, Minnetonka	1999	Alli Kellogg Minnetonka High School, Minnetonka-Team
1996	James Justin Wilson Minnetonka High School, Minnetonka-Team	2000	Mark Galatowitsch Highland High School, St. Paul
1996	Michael Gary Grotenhuis Minnetonka High School, Minnetonka-Team	2000	Jennica Slattery Minnehaha Academy, Minneapolis
1997	Nguyen Trung Burnsville Senior High School, Burnsville	2000	Chrissy Jones Minnetonka High School, Minnetonka
1997	Samuel Rush Minnetonka High School, Minnetonka	2000	Michael Chansky Burnsville High School, Burnsville
1997	Anna Navarro Minnetonka High School, Minnetonka	2000	A. Ben Suri Harding High School, St. Paul
1997	Victoria Reynolds Miller St. Agnes High School, St. Paul	2000	Emily Letourneau Central High School, St. Paul-Team
1997	Michael Scott Lohman Expo III High School, St. Paul	2000	Anna Bishop Como Park, St. Paul-Team
1997	Travis Smith Burnsville Senior High School, Burnsville	2001	Megan Bailey Breck School, Minneapolis
1997	James Justin Wilson Minnetonka High School, Minnetonka-Team	2001	Kathryn Gieselman Burnsville High School, Burnsville
1997	Justin Rainey Minnetonka High School, Minnetonka-Team	2001	A. Ben Suri Harding High School, St. Paul
1998	Dean Harvey Burnsville Senior High School-Team	2001	Li Mei Wayzata High School, Wayzata
1998	Dan Harakh Burnsville Senior High School-Team	2001	Laura Egerdal Burnsville High School, Burnsville
1998	Bryce Gillespie Breck School, Minneapolis	2001	Anna Bishop Como High School, St. Paul-Team
1998	Preeya Kshetry Breck School, Minneapolis	2001	Emily Letourneau Central High School, St. Paul-Team
1998	Phally Seak Burnsville Senior High School	2002	Jacob Fitzpatrick Burnsville High School, Burnsville
1998	Raj Pai Burnsville Senior High School	2002	Kaonhou Her Johnson High School, St. Paul-Team
1998	Michael Scott Lohman Expo III High School, St. Paul	2002	PaCha Yang Johnson High School, St. Paul-Team
1998	A. Ben Suri Harding High School, St. Paul	2002	Stephen Morris Breck School, Minneapolis
1999	Michael Scott Lohman Expo III High School, St. Paul	2002	Arun Saini 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	A. Noel Suri Harding High School, St. Paul	2007	Ummul Kathawalla Blake High School
2003	Jessica Swatrz ISD 287	2007	Daniel Zeng St. Paul Academy & Summit School
2003	Ning Zhou ISD 287	2007	Kyra Underbakke Maranatha Christian Academy, Brooklyn Park
2003	PaCha Yang Johnson High School, St. Paul	2007	Brandon Lew Breck School
2003	A. Noel Suri Harding High School, St. Paul	2007	John Earl Harding High School, St. Paul - Team
2003	Brendan Doms Breck School, Minneapolis	2007	Lucas Gabrielson Harding High School, St. Paul - Team
2003	Javier Cabrera-Perez Breck School, Minneapolis	2007	Jacob Stramer Harding High School, St. Paul - Team
2004	Adam Yock Breck School, Minneapolis	2008	Prithwis Mukhopadhyay Lake Junior High, Woodbury
2004	William Mitchell Breck School, Minneapolis	2008	Michael Cherkassky Edina High School, Edina
2004	Noel Suri Harding High School, St. Paul	2008	Madeline Taft-Ferguson Breck School, Minneapolis
2004	Adam Hahn Robbinsdale Armstrong High School	2008	Kyra Underbakke Maranatha Christian Academy, Brooklyn Park
2004	Akash Kumar Wayzata High School, Wayzata	2008	Aly Xiong Johnson High School, St. Paul
2004	Laura Heeter Breck School, Minneapolis - Team	2008	Iola Edwards Johnson High School, St. Paul
2004	Kristina Naranjo-Rivera Breck School, Minneapolis - Team	2008	Stephen Trusheim Breck School, Minneapolis - Team
2005	Kyrstin Underbakke Maranatha Christian Academy, Brooklyn Park	2008	Daniel Mohktari Breck School, Minneapolis - Team
2005	Janet Li Wayzata High School, Plymouth	2009	Prithwis Mukhopadhyay Woodbury Sr High School, Woodbury
2005	Heidi Chun St. Paul Academy, St. Paul	2009	Tiffanie Stone AFSA High School, Vadnais Heights
2005	Zachary Howland Burnsville High School, Burnsville	2009	Michael Fuad Breck School, Minneapolis
2005	Eric Halverson Como Park Senior High, St. Paul	2009	Stephen Trusheim Breck School, Minneapolis
2005	Kahli Her Johnson High School, St. Paul	2009	Chee Xiong Como Park Senior High, St. Paul
2006	Jenna Johnson Burnsville High School, Burnsville	2009	Martin Camacho Central Senior High School, St. Paul
2006	Andrea Jensen Burnsville High School, Burnsville	2009	Sahar Hakim-Hashemi Breck School, Minneapolis - Team
2006	Daniel Zeng St. Paul Academy & Summit School	2009	Sierra Danforth Breck School, Minneapolis - Team
2006	Matthew Weiss Breck School, Minneapolis	2009	Nicholas NaSal Burnsville High School, Burnsville - Team
2006	Katherine Schaeffer Breck School, Minneapolis	2009	Joseph Lane Burnsville High School, Burnsville - Team

## TWIN CITIES REGIONAL SCIENCE FAIR "ISEF" ALUMNI

*Students Chosen to Represent the Twin Cities Fairs at International Science & Engineering Fair*

2010	Prithwis Mukhopadhyay Woodbury Sr High School, Woodbury	2013	Andrew Ylitalo Stillwater High School, Stillwater
2010	Tiffanie Stone AFSA High School, Vadnais Heights	2013	Aditi Das Roseville Area High School, Roseville
2010	Martin Camacho Central Senior High School, St. Paul	2013	Connor Duffy Mounds View High School, Arden Hills
2010	Houa Xiong Johnson High School, St. Paul	2013	Graham Gabrielson Harding High School, St. Paul
2010	Gavin Ovsak Eden Prairie Senior High School	2013	Mai Moua Harding High School, St. Paul
2010	Charles Morris Breck School, Minneapolis	2013	Carolyn Jons Eden Prairie Senior High School
2010	Ava Mokhtari Breck School, Minneapolis - Team	2013	Jessica Ryvlin Breck School, Minneapolis
2010	Addison Weiler Breck School, Minneapolis - Team	2013	Apurv Hirsh Shekhar Blake High School - Northrop campus
2010	Ashley Santilli Burnsville High School, Burnsville - Team	2014	Carolyn Jons Eden Prairie Senior High School
2010	Emily Bostrom Burnsville High School, Burnsville - Team	2014	Jason Sylvestre Benilde-St. Margaret's, St. Louis Park
2011	Alysia Flores Johnson High School, St. Paul	2014	Jacob W Levy Breck School, Minneapolis - Team
2011	Andrew Ylitalo Stillwater High School, Stillwater	2014	Sofie M Kim Breck School, Minneapolis - Team
2011	Martin Anderson Burnsville High School, Burnsville	2014	Aditi Das Roseville Area Senior High, Roseville
2011	Redeat Abegaz Burnsville High School, Burnsville	2014	Heather J Stone Mounds View High School, Arden Hills
2011	Gavin Ovsak Eden Prairie Senior High School	2014	Amrita Mohanty Woodbury Sr High School, Woodbury
2011	(Ernst) Tom Erdmann Breck School, Minneapolis	2014	Nicolina Mao Harding High School, St. Paul
2012	Andrew Ylitalo Stillwater High School, Stillwater	2014	Rosemary O Olatunbosun Harding High School, St. Paul
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		

3M Community Giving



Open Minds  
Spark Success

Scientists and engineers make it happen.  
You have what it takes. Congratulations,  
Science Fair Finalists!

**3M**

## 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 Aerospace Award  
3M Inventor Award  
3M Renewable Energy Award  
American Chemical Society  
American Psychological Association  
American Council of Engineering Companies  
American Meteorological Society  
American Psychology Association  
ASM Materials Education International  
Foundation  
Association of Women Geoscientists  
ASU Walton Sustainability Solutions  
Initiatives  
Bright Future Award - Carolyn Jons  
Broadcom MASTERS (Math, Applied Science,  
Technology, and Engineering for Rising Stars)  
Caffeinated Student Award – Kyra  
Underbakke  
East Side Science Club Alumni  
Excellence Award  
Frog Impact Award in memory of Penny  
Lohman  
Glen & Jacob Domeier Memorial  
Graduate Women in Science  
Integrated Approach to Science  
Intel Excellence in Computer Science  
International Science & Engineering Fair  
(ISEF)  
ISEF Alumni Award – Mike Lohman, Jr.  
(1996, 1997, 1998, 1999)  
ISEF Alumni Awards – Kyra Underbakke  
(2007, 2008)  
ISEF Alumni Awards – Kyrstin Underbakke  
Ball (2005)  
ISEF Alumni Awards – Timara Underbakke  
(1973)  
I SWEEEP  
Joel Wagner Caring Bridge Award  
Junior Science & Humanities Symposium  
Killeen Memorial Award  
Leeward Space Foundation Twin Cities  
Space Award  
Minnesota Agriculture in the Classroom  
Minnesota Astronomical Society  
Minnesota Chapter of American Fisheries  
Society  
Minnesota Horticulture Society

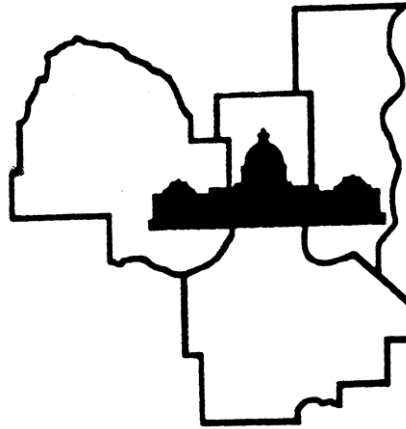
Minnesota Space Frontier Society  
Minnesota State Science & Engineering Fair  
Mu Alpha Theta Mathematics  
National Society of Professional Engineers  
NOAA National Oceanic and Atmospheric  
Administration  
North Central Tri-state Junior Science &  
Humanities Symposium Research Papers  
Penny Lohman Memorial Award  
Radio City  
Research Paper trophies  
Ricoh Sustainable Development Award  
Schools trophies  
Society for In Vitro Biology  
Sponsor: 3M Foundation  
Sponsor: ATK Alliant Techsystems  
Sponsor: Dow Chemical  
Sponsor: Ecolab  
Sponsor: Isthmus Engineering &  
Manufacturing  
Sponsor: Medtronic  
Sponsor: Midway Party Rental  
Sponsor: Mintáhoe Hospitality Services  
Sponsor: Office Max  
Sponsor: Slattery Sales  
Sponsor: St. Paul Youth Fund  
Sponsor: University of Minnesota  
State Science Fair – Research Papers  
State Science Fair - Projects  
Stockholm Junior Water Prize  
Teacher Excellence Award  
University of Minnesota College of Science  
and Engineering Award  
University of Minnesota School of Social  
Work Research for the Common Good  
Award  
US Air Force  
US Army  
US Department of Health and Human  
Services  
US Metric Association  
US Navy/Marine  
USDA Forest Service  
USDA Research Service  
West Metro Medical Society Alliance  
Yale Science and Engineering Association

**Project presentation hosted by the University of Minnesota**

**Research paper program hosted on our website at [www.tcrsf.org](http://www.tcrsf.org)**

**Special thanks to all our volunteers, new & old, especially the U.S.S. Nokomis**

**Special thanks to the University of Minnesota US Military ROTC for their assistance in setting up, judging, and tear down.**



**2014-2015 Twin Cities Regional Science Fair Committee**

<b>Science Fair Director:</b>	Timara Underbakke	<b>Committee At Large:</b>	<b>Scientific Review:</b>
<b>SRC Chair:</b>	Karin Ostrand	Nancy Day	Karin Ostrand, Chair
<b>Facilities:</b>	Michael Lohman, Sr.	Jess Day	Dr. Denise Beusen
<b>Public Relations:</b>	Michael Lohman, Sr & Terry Slattery	Phill Goldmann	Kyrstin Underbakke Ball
<b>Funding</b>	Michael Lohman, Sr	Lynne Tauer	Dr. Douglas Erbeck
<b>Treasurer:</b>	Dr. Gary Kwong	Amy Stone	Dr. Wendy Slattery
<b>Special Awards Chair:</b>	Nancy Day	Gary Ostrand	Timara Underbakke
<b>Judging Coordinator:</b>	David & Timara Underbakke	Dr. Douglas Erbeck	Sonja Dunlap
<b>Website &amp; Databases:</b>	David Underbakke & Timara Underbakke	Faye Erbeck	Dr. Caroline Ylitalo
<b>Data Processing:</b>	David Underbakke	Sonja Dunlap	Dr. Gary Kwong
<b>Display &amp; Safety:</b>	Anu Jain	Lois Fruen	Dr. Steven Jons
<b>Board of Directors:</b>	Timara Underbakke	Kyrstin Underbakke Ball	Michael Lohman, Sr.
	Michael Lohman, Sr.	Kyra Underbakke	David Underbakke
	Karin Ostrand	Dr. Jennifer Hugstad-Vaa	Amy Stone
	Dr. Gary Kwong	Dr. Caroline Ylitalo	Tim Ford
	David Underbakke	Arthur C. Johnson	Dr. Jyothsna Rayadurg
	Nancy Day	Karilyn Jons	
	Amy Stone	Dr. Steven Jons	We have additional
		Michael Lohman, Jr	volunteer openings for
		Jacinda Lohman	those interested.
		Jessica Mader Cavazos	
		Anu Jain	