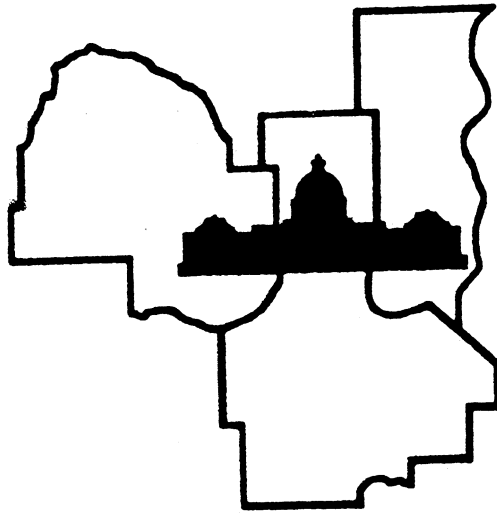


WELCOME TO THE

76th Annual Twin Cities Regional Science Fair
22nd Annual St. Paul Science Fair
20th Annual Western Suburbs Science Fair

Twin Cities Regional Science Fairs



2014

February 28 – March 1



**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 76th ANNUAL TWIN CITIES REGIONAL SCIENCE FAIR,
THE 22nd ANNUAL ST. PAUL REGIONAL SCIENCE FAIR,
THE 20th 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, 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 names being read during the awards program. 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.**

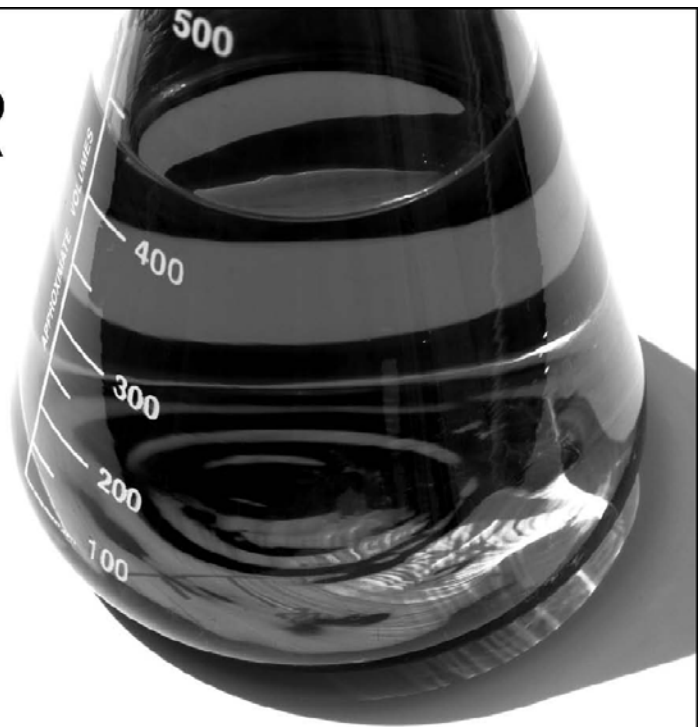


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ATK is proud to sponsor this hands-on event that helps provide an opportunity for Twin Cities' youth to better understand the sciences and technology. By inspiring curiosity and interest today, we develop our future scientists, engineers and astronauts. 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 28, 2014:

<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, March 1, 2014

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 12:00 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. *ISWEEEP Finalists, Alternates and Advisors meet with the Fair Directors & SRC chair.	South end of bleachers Field House
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Everyone: 1:30 p.m.	PLEASE HELP OUR VOLUNTEERS TEAR DOWN TABLES & CHAIRS ALL PROJECTS MUST BE REMOVED	Please help throw trash & leave the Field House clean
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Minnesota State Science & Engineering Fair (grades 6-12 projects, grades 6-8 papers)
March 30-April 1, 2014, **Doubletree by Hilton** (formerly Sheraton Bloomington Hotel)

JSHS: Junior Science & Humanities Symposium (grades 9-12 research papers)
March 29-30, 2014, **Doubletree by Hilton** (formerly Sheraton Bloomington Hotel)

**I-SWEEEP: International Sustainable World Energy Engineering Environment Project
Olympiad** (grades 9-12 projects), Houston, Texas, May 8–13, 2013

ISEF: Intel International Science & Engineering Fair (grades 9-12 projects)
Los Angeles, California, May 11–15, 2014 (Twin Cities flies out May 10th)



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congratulates the students of the
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by curiosity and powered by all
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Chairman and Chief Executive Officer

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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 you. Dismissal will be by 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. If a team is made up of two grades within the same division (MS or HS), the team competes at the highest grade of the team.

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	All 3 affiliations are collectively known as “Twin Cities Regional Science Fairs”

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 (AS)

- 6001W **Amelia Ann Gailloux**
Left or Right Paw
- 6002W **Emily Howell**
DogToys; What Makes a Favorite or a Flop

- 6003W **Marley G Webb**
Dogs and Music

Behavioral and Social Sciences (BE)

- 6004S **Tara Barrett**
Why we look at certain ads
- 6005W **Brady Giertsen**
Colorful Or Black and White? What Candy Wrapper Would You Choose?
- 6006S **Ruby R Kyle**
Are You A Supertaster?
- 6007S **Garrett R McDermott**
Does music affect test taking?
- 6008W **Jake C Miller**
Cake-Eating Redshirts, What? The Redshirt Effect on State-Standardized Test Scores in Edina
- 6009S **Claire T Rachac**
How left-handed people adapt in a right handed world
- 6010S **Ana Radoc**
Does age affect the wanting of a reward?
- 6011S **Serafina Rivera**
Are optical illusions affected by right brained and left brained thinking?
- 6012S **Jaden Rodriguez**
The Effects of Citrus on Cognitive Function
- 6013T **Eleanor Sand**
Essential Character Attributes in YA Fiction by Country
- 6014S **Hanna Saveraid**
Does being left or right handed affect handwriting legibility in girls?
- 6015S **Hteemoo Saw**
Does screen time affect human brain function?

Biochemistry (BI)

- 6016S **Carmen Crutchfield**
What toothpaste removes stains the best?
- 6017S **Kate Farber**
New and Old Fruit Batteries

- 6018S **Anders Hanhan**
The effects of using baking soda instead of baking powder
- 6019S **Cali Rivera**
The Acid Test: Assessing the effectiveness of antacids

Cellular and Molecular Biology (CB)

- 6020W **Delson H Hays**
Mushroom DNA
- 6021S **Elise Trail -Johnson**
Which Type of Storage Container Keeps Eggs Fresh the Longest?

Chemistry (CH)

- 6022T **Zachary B Benson**
Homade Plastic
- 6023W **Anna Geherin**
Can You Blame the Cookie Sheet?
- 6024T **Courtney Lillemoen**
Sweet Rocks
- 6025W **Isabel C Miller- Shiell**
How do antacids relieve heartburn
- 6026S **McKenna Reedquist**
Oops! What laundry detergent works the best?
- 6027W **Annika M Schliesman**
Candy Chromatography
- 6028W **Jack J Schutz**
Fruit Piano
- 6029S **Annabelle Sullivan**
Growing Rock Candy
- 6030S **Nicholas Tedder**
Ferro Art
- 6031S **Aidan J Vitek**
How Do Crystals Grow?
- 6032W **Yeukai Zimbwa**
The Effect of Caffeine on Blood Pressure

Earth and Planetary Science (EA)

- 6033W **Maggie J Anderson**
The Greenhouse Effect
- 6034T **Keegan Jared Habegger**
Cast Fossils
- 6035S **John Kiehne**
Magnetite in Minnesota

Energy and Transportation (ET)

- 6036T **Savannah Allen**
Wind + Windmill + Blade Angle = Energy (What's the Best Blade Angle?)
- 6037W **Kobe E Grimm**
Driving on different surfaces
- 6038S **Molly S Silberhorn**
Illuminating Light On Energy Efficient Light Bulbs

Engineering: Electrical and Mechanical (EE)

- 6039W **Sean R Baird**
Racing Bristlebots On Your Mark, Get Set, Go!
- 6040T **Hannah E Farmer**
Moving More Air with Less Energy
Project At Electricity Wall
- 6041W **Kiara Herro**
Popsicle Bridges
- 6042W **John D O'Connell**
Hovercraft Science
- 6043S **Germain Sagbo, Giovounta Hudson, Robert Nabors**
Team - Striving for an Improved Newton Scooter
- 6044S **Luke Wallisch**
What types of gas make an engine run longest?
- 6045S **Joseph Westermeyer**
Orville and Wilbur 2.0

Engineering: Materials and Bioengineering (EN)

- 6046W **Gavin Brass**
Bridge Design and Strength
- 6047W **Sophia H Hamann**
Bridges
Project At Electricity Wall
- 6048T **Max J Vogel**
Warm Fluff - Which Loose-Fill Insulation Insulates the Best?

Environmental Sciences (EV)

- 6049W **Jawein D Cosey-Richmond**
Biomass
- 6050T **David Estrada, Daniel Flores, Francisco Garcia**
Team - Solar Power
- 6051W **Ashley R Halverson**
BPA Detection
- 6052S **Riaz Kelly**
Dangerous Drops: How does acid rain affect plant growth?

- 6053S **Jonathan Rangel**
Spider Prey and Motivation to build Webs
- 6054T **Aiden d Regan**
Water: Drinkable or Unthinkable

- 6055W **Moriah Rooney**
Pass the Salt
- 6056T **Chris Sanchez, Clever Marcelo Nieto**
Team - Solar powered toy car
- 6057T **Julia R Snyder**
Which Roof
- 6058T **Alexandra Valencia, Ivon Solis, Christina Rache Castaneda**
Team - science in snowflakes
- 6059S **Sebastian Williamson**
Impervious vs. Pervious Ecosystems
- 6060S **Tommy Yang**
Spider Movement

Medicine and Health Sciences (ME)

- 6061W **Stephen Betts**
Now is the Time! A Study to Improve Diagnosis and Evaluation of Mild Traumatic Brain Injuries (Concussions) for Children 5-12 years old
- 6062W **Emily Carpenter**
Mechanical Heart Valves Which One Is Quieter
- 6063W **Ryan S. Chea**
Energy of Nuts
- 6064S **Chiamaka Chijioke**
Which exercise increases heart rate the most?
- 6065T **Aaryan Gupta**
Caffeine or Sugar
- 6066S **Janelle Hamilton**
How does weight affect pulse rate?
- 6067S **Aurora Hinze**
Does listening to a tune make you get there very soon?
- 6068T **Griffin J Olson**
30 Grams of Sugar. What Happens Next?
- 6069W **Ty'shon T Pickett**
Measuring Stress
- 6070W **Maria Fay Rossman**
Could your lipstick be killing you?
- 6071S **Aditama Van Dyke**
How does amount of sleep and nutritional value of breakfast affect the energy level of 11 - 12 year olds?

- 6072T **Sophia Weiss**
The effect of classical music on blood pressure and heart rate
- 6073W **Gracie A Wethor**
Brace Yourself
- 6074W **Jedell M Yalartai, Pricess Gataud Team** - Clean Teeth

Microbiology (MI)

- 6075W **Brendan Carter**
Healthy Gum?
- 6076S **Olivia Johnson**
The Bread Mold Race
- 6077W **Meghan Quinlan**
Dogs VS. Humans: Which has a Filthier Mouth
- 6078S **Lauren Welna**
Mummification of fruit

Physics and Astronomy (PH)

- 6079S **Elias Bier**
Parachute Shapes and Sizes
- 6080S **Aidan Dosch**
Catapult vs. Trebuchet
- 6081S **Jeries J Duncan**
Weighting For Flights
- 6082W **Kaya Jacobson**
Technicolor Shadows
- 6083S **Jack T Kelly**
How Bright is Your Light
- 6084S **Anders Lind**
The effect of the mass you are holding on jump height
- 6085W **Cole W McQuinn**
Water clocks: a journey into viscosity
- 6086W **Colee A. Nolen, Trista Deng Team** - Pitch Perfect
- 6087W **Helaina E Sislo**
Ski Goggles Impact on Peripheral Vision
- 6088S **Elias L Sorenson Pearson**
Spray Bottles: Hot or Cold?

Plant Sciences (PS)

- 6089T **Parker A Adams**
The Water War
- 6090S **Solveig O Bjermeland**
What is the best way to preserve a banana

- 6091W **Elinor Glass**
Ragdoll Germination
- 6092S **Molly K Laird**
Ibuprofen Affecting Plants

Grade 7

Animal Sciences (AS)

- 7001S **Flint N Arnett**
Pet Provision Preference
- 7002W **Chloe C Botten**
How does light Pollution Affect Nocturnal Animals?
- 7003W **Anna-Liv K Fredrickson**
Eggstraordinary Eggsperiment
- 7004W **Kate F Meadows**
"Strike Out" Window Strikes
- 7005S **Avery O New**
Colorblind or Not

Behavioral and Social Sciences (BE)

- 7006W **Kristiana J. Adams**
Do Scents Make Sense?
- 7007S **Jacqueline Barron**
Bumping Music
- 7008T **Kozette Carrillo**
Does Using Mnemonics Increase the Memory Rate of Humans?
- 7009W **Natalie Gorwor**
Emotion In Music
- 7010W **Maddie Hannan**
Pricey or Protective
- 7011W **Jack A Holthusen**
Chew All Day, Get an A!
- 7012T **Tommy Jackson**
Memory Mnemonics: How Good is Your Memory?
- 7013W **Luke M Kolar**
The Effect of Signs on Handwashing
- 7014W **Prince N. Kuiah**
Drive Now, Text Later!
- 7015S **Alice C Lesch**
Visual and Audio Memory
- 7016W **Ma'Lynne I. Moore**
Does Color of Paper Improve Learning?
- 7017T **Emily E O'Brien, Lillian E Miettunen Team** - Nutrition Facts

7018S **Celia J Olson**
How does font size and digital media affect reading speed and comprehension

7019T **Gihara M Perera**
The Effects of Texting and Driving

7020S **Drew Strautman**
Does the nose really know?

Biochemistry (BI)

7021S **Emily M King**
Is That Really Clean?

Cellular and Molecular Biology (CB)

7022S **Serena M Hidalgo Fuentes, Laila R Brown Team** - Death Rays:how much Ultraviolet light exposure kills cells?
Project At Electricity Wall

7023S **Ayanah Nelson**
Osmosis and Eggs

7024W **Jack Ogle**
Elastin: it gives us our bounce

Chemistry (CH)

7025S **Ruby J Beckman**
Muffin Density

7026T **Allison M Biermaier**
Ice Ice Ice

7027S **Cemina Blessing**
Glowing in a Jar

7028T **Katherine E Cullen**
Which Liquid Evaporates the Fastest?

7029T **Haley S Hogan**
Evaporation

7030S **Annie J Kuchenmeister**
Lutefisk: The Science of Soaking Fish in Lye

7031W **Jake Mangel**
Organic or Not?

7032T **Minh C. Nguyen Jr.**
Does the Temperature of Orange Juice Affects Its pH?

7033T **Caitlin M O'Donnell**
Does a Lemon or Potato Produce more Voltage?

7034T **Cecilia Petruconis**
Allergy Alert: NO EGGS!

7035T **Joseph J Polak**
Staying Alive with Electrolytes: Which Drink has the Most Electrolytes?

7036T **Litzy Alejandra Silva Sandoval**
Do Different Types of Liquids Freeze at Different Rates in Alcohol and Dry Ice

7037T **Macreena M Stueve**
Liquid Affects

7038S **Zoe M Ward**
The science of tempering chocolate

7039T **Rory J Westerman**
Temperature and Crystal Growth

7040T **Aidan C Zent**
Which Metal is Most Rust Resistant?

Computer Science (CS)

7041W **Micah J Sybesma**
Varying Amounts of Exposure to Magnetic Fields Corrupting Storage Device Data

Earth and Planetary Science (EA)

7042S **Ben T Bogie**
How do daily changes in the atmosphere affect the travel of AM radio waves?

7043S **Philip P Chervenak**
Volcanoes
Project At Electricity Wall

7044S **Faith Marie Oakgrove**
Volcanos

7045W **Maci J Shatirishvili**
Clouds and Atmosphere

7046W **Ashoka J Zylstra**
Using Water in a Bottle to Model the Vortex of a Tornado

Energy and Transportation (ET)

7047S **Quincy D Altman**
It All Adds Up!

7048S **Noah J Blohm**
Does Size of a Hot Air Balloon Affect it's Flight

7049T **Luis Ojany Cuate Pliego**
Does the size of the hovercraft affect the speed?

7050W **Adam Gillece**
Can the Color of Your House Affect Your Energy Bill

7051S **Katherine E Grimm**
Angle of Heat

7052W **William T Janda**
Converting Mud into an Alternative Energy Source using a Microbial Fuel Cell

- 7053S **Mitchell Krogman**
Electromagnetic Motor
- 7054S **Theodore G Lucy**
Tire Pressure and Gas mileage
- 7055S **Greta S Morlock**
Homemade Hovercrafts and Weight
- 7056W **Hannah E Norman**
Hydropower: Sometimes You Just Have To Go
With The Flow
- 7057S **Kang Thao**
Citrus Energy

Engineering: Electrical and Mechanical (EE)

- 7058S **James G Baker**
At what speed does the phi phenomenon come into
effect?, and does it vary from person to person?
- 7059S **Ender Dillner**
Rainbow Studies
- 7060S **Isaac James Harker**
How Does Wind Turbine Rotor Shape Affect
Power Output
- 7061T **Landon R Knipp**
Efficiency of the Hovercraft
- 7062S **Jackson W Lee**
Propeller Pitch Explored!
- 7063S **Zachary M Maher**
Changing Electromagnetic Strength
- 7064T **Christopher Montgomery**
What brand of fishing line holds what it claims?
- 7065T **Andrew V Phan**
How do Treads and Wheels Affect How a Lego
Robot Climbs a Staircase of Books?
- 7066S **Ashling Quinn**
Electrical Properties of Fruit
- 7067S **Nicolas R Riley**
Red vs. UV
- 7068W **Srivats M Srinivasa**
Bio-Inspired Robot

Engineering: Materials and Bioengineering (EN)

- 7069T **Matthew J Bistram**
What is the fastest way to remove rust from steel
- 7070T **Mitchell J Dahl**
Arch Magic: Egg Bridges!
- 7071T **Michael A Ignacio**
What Type of Sponge Holds the Most Water

- 7072S **Conor L Johnson**
Baseball Bat Materials: Do they Matter?
- 7073S **PaHoua Lee**
Bridge Construction
- 7074W **Keegan Mellema**
Glass of Many Colors
- 7075T **Jack T Parker**
Hockey Wax Protection
- 7076S **Eli S. Powell**
What Fabrics Accumulate Body Odor More Than
Others, And Why?

Environmental Management (EM)

- 7077W **Becky R Ericson**
Recycling and Shredding
- 7078W **James Lukas Haugen**
Waters Dramatic Effects on Beach Erosion

Environmental Sciences (EV)

- 7079W **Ashay K Joseph**
Does Trash Trash Water
- 7080W **Brittney Kuntz**
The Effect of Chloride on a Water Supply
- 8072T **Ebony Morales , Daisy G Clemente
Team** - Clean water
- 7081T **Jack D Murray**
What is the Effect of Phosphorus on the
Environment
- 7082S **Jonah O'hara-David**
Sinkholes and Acid Levels in Water
- 7083W **Karthik Papisetty**
Risk Model for Natural Geographic Hazards
Project At Electricity Wall
- 7084S **Kadetra Smith, Ra'Eisah Clark, Carter Hobbs
Team** - Composting Worms Finding a Safe Place
- 7085S **Bright Stone**
Water Condition Preferences of Fairy Shrimp
- 7086S **Huav Tung Fei Vang**
Dispersion of Fairy Shrimp eggs in a Vernal Pond
- 7087S **Bobby Yang**
Water Temperature Preferences of Fairy Shrimp

Medicine and Health Sciences (ME)

- 7088T **Nealeigh G Carbone**
The Facts About Junk Food You May Not Have
Known

- 7089T **Ruby Rose Davis - Nelson**
Preserving Organic Fruit with Organic Vitamins
- 7090W **Isabel Fleming**
Are Fingerprints Genetically Inherited?
- 7091S **Cinsere A Hawkins, Mai Nou Lor Team** - How Caffeine In Red Bull Affect The Heart Rate Of People In Different Age Ranges?
Project At Electricity Wall
- 7092W **Avni Jain**
Allergen Alert! An Innovation to assist people with finding the correct food
Project At Electricity Wall
- 7093T **Haley C Jostes**
The Popeye Challenge, Is spinach really the best food to increase your performance
- 7094W **Molly K McCollow**
Does Running in Water Affect Heart Rate?
- 7095T **Ryan P Miler**
Which Toothpaste Whitens Best?
- 7096T **Kelly S. O'Connor**
Does Gatorade Affect Your Heart Rate While Exercising?
- 7097W **Sadie L Richardson**
When Looks Can Kill
- 7098T **Margaret M Roberts**
Prolonging Petals
- 7099T **Alexandra L Walker**
Does Nail Polish Affect Nail Growth?
- Microbiology (MI)*
- 7100S **Valerie C. Bares**
How do winter temperatures affect the growth and life cycle of the tar spot fungus
- 7101W **Annie M Fesenmaier**
Which is More Effective, Hand Sanitizer or Soap
- 7102W **Grace A Knoer**
Heart rate in Daphnia
- 7103W **Molly R Paulison**
Bacteria in Public
- 7104S **Isak J Stillwell-Jardine**
Does the Flavor of Mint Affect the Amount of Mouth Bacteria?
- Physics and Astronomy (PH)*
- 7105W **Natalia Alfonso**
Sticky Situation
- 7106T **Alex C Bloemendal**
What Liquid Reduces Friction
- 7107T **Ryan T Bowlin**
Will a Big, Medium or Small basketball bounce the highest?
- 7108T **R.J. (Ronald) Brothen**
Wood vs. Composite Hockey Sticks
- 7109T **Garrett T. Burns**
Can Different Liquids Make Glass Objects Less Visible?
- 7110W **Mia K Dusek**
A Battery That Makes Cents
- 7111T **Melissa M Fellrath**
Float
- 7112T **Peter T. Foley**
Does the Air Pressure in a Basketball Affect the Made Shot Percentage?
- 7113W **Joshua Hansen**
How the type of rocket affects how far it goes
Project At Electricity Wall
- 7114W **Ezra J. Kettersmith**
Physics of Kendama
- 7115W **Jacob E. Lexvold**
Water Bottle Rockets
- 7116W **Joe P McMahon**
The Long Jump And Distance
- 7117T **Darlene Ann McPherson, Evynn Jane Hall Team** - The S.M.A.R.T. Camera
- 7118W **Michael James Miller Jr**
Burr cold toes. What is the best material of sock is best at keeping you warm.
- 7119T **Megan E. Pattee**
The Science of Siege Warfare: How Does the Shape of the Projectile Affect How Far It Will Travel
- 7120W **Ava V Spooner**
Spoon Catapult Ammunition
- 7121S **Katrina M. Sweet**
Pitch Perfect
- 7122S **Jaime Upton**
Lenz's Field of Physics
- 7123T **Michael R Warner III**
Does the size of a basketball affect someone's shot percentage?
- 7124T **Sarah Woida**
Blowing Bottle Tops
- 7125T **Jack Wold**
That's the Way the Ball Bounces

Grade 8

7126W **Zuva Zimbwa**
Magnet Strength in Various Temperatures

Plant Sciences (PS)

7127S **James Belitz-Shomion**
Bananas Passing Gas

7128W **Bianca Byfield**
The time it takes different food to go bad in different containers

7129T **Ian I. Delgadillo**
Does applying fruit DNA to a plant affect its growth rate?

7130W **Emma R DePape**
The effects of using different substrates on the time of plant growth.

7131S **Kathryn Foley**
The Effect of Colored Light on Plants

7132S **Henrie P. Friesen**
Edamame Bean Seed Germination

7133T **David J Gallagher**
A Ripening World

7134S **Olive Hart**
Plant Growth in Different Soils

7135S **Ally R Kelly**
A musical experiment: Stimulating the growth of plants

7136T **MyKala M Kempenich**
It's a Flytrap

7137W **Rose O Lammer**
Electrical Fruit?

7138T **Shannon Mary Leahy**
Plant Growth

7139S **Anjolie Lo**
Plant Feelings

7140W **Sophia G Marcus**
The Ratio of Worm Castings to Topsoil and It's Effect Upon the Growth of Purple Petra

7141T **Maggie M Mogren**
How Does Your Fruit Rot?

7142T **Maggie M Raverty**
Energy Drinks Effects On Plant Growth

7143W **Zach Sennentz**
Fertilizer Frenzy

7144W **Sophia Michelle Tomlinson**
Algae Alternatives

Animal Sciences (AS)

8001W **Caroline G Bowen**
The Effects of a Genetically Modified Vs. an Organic Papaya Diet on the Longevity and Fertility of Fruit Flies

8002S **Sophia Faacks**
Is your dog a lefty or a righty?

8003S **Eva M Hanson**
Which Animal Repellent works Best When Protecting Pumpkins

8004W **Bergen R Kobienia, Catherine E King Team** - Do Magnets Affect Healing?

8005W **Jacob F Marsan**
Winter Birds' Choice of Suet Fat

Behavioral and Social Sciences (BE)

8006W **Annie M Busch**
Does Weather Really Affect Your Mood?

8007W **Isabel L Busyn, Megan Murphy Olk Team** - Celebrity Endorsement

8008T **Miski A Dayib, Habsa A Gulet, Sara M Sugule Team** - Winter Blues...Myth or Fact?

8009S **Killian Dillner**
Clock Watching

8010W **Josh C Dolezal**
Does Color Affect Perception?

8011W **Josie E Flanagan, Caroline M Hansen Team** - Stroop It!

8012S **Beth S Fryxell**
How does gender affect the ability to determine between a real or fake smile?

8013W **Paige E Greeley, Claire A Folkestad Team** - Color Vs. Black and White

8014W **Ellen T Grubbs**
Is The Smile Real or Fake?

8015W **Grace E Kopischke, Ellie A Scheid Team** - Think Fast!

8016W **Elizabeth A. Kruchten**
Visual Memory: Can You Trust Your Brain?

8017S **Alice S. Lightfoot**
How Do Free Will Beliefs Affect Attitudes Toward High School Success?

8018W **Olivia J Liteky**
Favorite Lightbulb Technology
Project At Electricity Wall

- 8019S **Talia S Malka**
The Music to my Heart
- 8020T **Beah V Mariano**
Hello Gorgeous (What's in a Face?)
- 8021T **Kellie M McKane**
McCullough Effect
- 8022S **Caroline J Robinson**
The Rate of Speed When Reading on a Traditional Book Versus an E-Book
- 8023T **Grace E Rohleder**
The Power of Reading
- 8024S **Pasia Vang**
Run, Devil, Run
- 8025W **Lily E Vanner**
Lie Detection
- 8026S **Jacob M Weinstein**
How Do Older and Younger Children React to Indicating Stimuli in Their Choices?
- 8027W **Charles S Wylie**
Music and Emotion

Biochemistry (BI)

- 8028S **William Benjamin**
Yeast And Bread
- 8029S **Andrei M Konieczny**
Mold Vs. Preservatives
- 8030S **Lucille K Omwena**
Catalyzed Reactions

Cellular and Molecular Biology (CB)

- 8031W **Alex J Coleman**
Does honey affect bacterial growth

Chemistry (CH)

- 8032T **Jacob Daniel Carlson**
Orange Juice vs. pH Level
- 8033S **Mariah DelCastillo**
Extraction...Extraction...
- 8034S **Noah J Frese**
How Does Adding Solid or Liquid Additives to Warm or Cold Water Affect the Surface Tension of Water
- 8035W **Kylie M Nevells**
Psoriasis: DermaPal UVB Narrow Band Comb

- 8036W **Molly C O'Laughlin**
What Effect, If Any, Will Different Methods of Lifting Latent Fingerprints Have On the Clarity of the Print?
- 8037S **Lana L Parke-Reimer**
Crystals Growing: How rate of cooling affects crystal size and clarity
- 8038T **Anne M. Sikora**
What is that Smell?
- 8039T **Moira R Weiland**
House of Bases and Acids
- 8041S **Lily Xiong**
How does the amount of ammonium nitrate affect the temperature of water?
- 8040S **Tou Ger Xiong**
Stains Go Away !

Computer Science (CS)

- 8042T **Steven J Franklin**
Audio Game: Adapted Video Game for the Visually Impaired
Project At Electricity Wall

Energy and Transportation (ET)

- 8043T **James O Gunderson**
Model Rocket Fuel
- 8044S **Bernadette Lauber**
Which Airplane Wing Shape Has the Most Lift?
- 8045T **Megan A Wolf**
Enlightening Your Knowledge About Light Bulbs

Engineering: Electrical and Mechanical (EE)

- 8046S **Forrest C Ahrens**
How Does the Strength of the Permanent Magnetic Field of an Electric Motor Affect the Rotations Per Minute (RPM) of the Motors Armature?
- 8047T **Keith P Calvin-Stokes**
Shedding Light on Solar Panels
- 8048S **David C Jaksha**
What type of water conducts electricity the best
- 8049S **Addison R Keely**
Rocket Fins
- 8050S **Helen F Leach**
Wind Turbine Blade Design
- 8051W **Elijah C Nelson, James M Jurek Team** - Electromagnetic Interference
- 8052W **Brady T Solomon**
An A-MAZE-ing Robot

Engineering: Materials and Bioengineering (EN)

- 8053T **Katherine L Dick**
Rumble & Roll
- 8054S **Vivian Obee**
Effectiveness of Insulation
- 8055T **Bennett Poganski**
Substance that Breaches the Gap Between Liquid
and Solid
Project At Electricity Wall
- 8056S **Essence Thao, Neesha Moore**
Team - Best Candle Buy

Environmental Management (EM)

- 8057S **Samuel L Warner**
Acid Raindrops Keep Falling on My Head

Environmental Sciences (EV)

- 8058S **Hawa Abbajebel, Madeline Timm**
Team - Water Filtration
- 8059W **Cassidy Deng**
Salt Runoff
- 8060S **Eliza M Donnelly**
Finding the Best Renewable and Abundant
Insulator
- 8061S **Clare T Fitzpatrick**
The Effect of Different Amounts of Fertilizer on
Algae
- 8062T **Ethan M Heinrichs**
The Earth is Slowly Washing Away
- 8063W **Yoshi Her**
Soap and Algae Growth
- 8064S **Cara C Husnik**
How does Microwave Radiation affect different
organisms?
- 8065W **Gwen D Kelley**
Do Organic Powders Promote Good Health in
Plants?
- 8066S **Analia Kroonblawd**
Leeching Time of Water
- 8067W **Nya L Macn**
Warm It Up
- 8068T **Angel Maldonado, Jesus Antonio Maldonado**
Team - The Effects of Different Liquids on Plant
Growth
- 8069T **Lauren K Massengale**
The Effects of Diet on Worm Growth

- 8070S **Joseph McConville**
Is Green Really Green?
- 8071W **Emma M Meyer**
Testing Effectiveness of Insulation
- 8073S **Abigail R Moseman**
The Carbon Dioxide effect
- 8074W **James E. Qualah**
Fight the Invaders! Water Your Tree!
- 8075W **David B Segelstrom III**
Air Pollution
- 8076S **Gloria Yang**
Saturation of Soil

Mathematical Sciences (MA)

- 8077T **Joey Paul Petronack**
Bouncy Basketballs
- 8078S **Vincent A Portuese**
The Monty Hall Problem

Medicine and Health Sciences (ME)

- 8079W **Amalia R Baca**
Does age Affect Peripheral Vision?
- 8080W **Julia F Erickson**
Exercise: Good for the body, and the brain?
- 8081W **Julia A Eubanks**
Does eating GMO cause inflammation?
- 8082W **Blessed D Folley, Honory E Fyne**
Team - Ashy Feet
- 8083W **Lauren E Hartley**
Does Eating Breakfast Affect a Student's
performance in School?
- 8084S **Ana G Kurzer-zlotnick**
How does taster status affect food preference
- 8085S **Fiona E McKenna**
Staining Blood Smears
- 8086S **Alaina R Portoghese**
How Does Eye Color Affect the Occurrence of Red
Eye in Photos?
- 8087W **Dajonai N. Rohlf**
Eye Color and Sight
- 8088S **Kerry Schneeman**
Does height affect longevity?
- 8089T **Courtney Smith**
Egg substitutions in Brownies
- 8090S **Trinity Vang**
Do You C The Vitamin C?

8091W **Morgan E Williams**
Perioral Dermatitis: Prescription Vs. Natural Treatments

Microbiology (MI)

8092S **Gayathri Dileepan**
Preventing Food-borne Illnesses

8093W **Nicole Dorn, Florencia Padilla Team** - Hand Sanitizer vs. Anti-bacterial Soap

8094S **Jackson S Kerr**
It's Not Easy Being "Green"

8095S **Jamie T Lackay**
Escherichia coli at Differing Temperatures.

8096S **Kyle E Moriarty**
Bread, Light, Mold

8097S **Emilia F Topp-Johnson**
Behind the Kernels, A Study of 5 Fungal Endophytes and their use in Biocontrol Against the Common Maize Pathogen Ustilago maydis

Physics and Astronomy (PH)

8098S **Christian R Berger**
How does the type of surface atop two beakers, one filled with cold water and one filled with hot water, affect which one reaches zero degrees Celsius first?

8099S **Daniel B Ellis**
How does the temperature of a tuning fork affect its frequency

8100T **Matthew Gellerman**
Candy Waterfall: Can Solids Flow Like Liquids?

8101S **Ryan J Gibbs**
Absorption, Re-emission, and Wavelength of Radiant Energy By Different Colors

8102S **Maryn C Hetzel**
Jumping Into Physics

8103W **Jack M Knapp**
Super Cool Beer

8104S **Charles H Lamont**
The ideal trebuchet ratio

8105W **Meredith E LaVine**
Insulation

8106S **Maggie A Mir**
The Best Crest

8107W **Anthony M Palmer**
Shoot! It's Trajectory

8108S **Alex A Payne**
Impact of a Meteorite

8109S **Melissa Teal**
Up, Up and away

8110S **Nou Vang**
Light Traveling through Air vs. Water

8111S **Melinda Vang**
Popcorn

8112W **Ella M Vickerman**
What a Drag

8113W **Alexander C Walczak**
Take Me Out to the Ballgame

Plant Sciences (PS)

8114W **Korinna M Bakey**
Catnip Calamity

8115W **Lauren M Copland**
Grow Green, Mycorrhizal Fungi and Rhizobium Bacteria Inoculation of Seeds and Soil

8116W **Audrey V Gorman**
Minimizing Nitrate Leaching from Fertilizer

8117S **Spencer D Marx**
An Effervescent Approach to Improve Plant Growth

8118T **Declyn J Walters**
Here We Grow!

8119S **Dominic Wolters**
Making Barley Better

High School

Animal Sciences (AS)

1001S **Alyssa Brown, Kari Gurney, Xavier T McCoy**
Grade 9,9,9 - **Team** - Small Mammal Trapping

1002T **Benjamin A Farmer**
Grade 9 - Do Cats Recognize Their Owner's Voice?

1003S **Gabrielle Joyce**
Grade 11 - Daphnia and Nicotine

1004T **Natalie A Kauls**
Grade 10 - Food Preference of Mealworms

1005T **Alex M Schatz**
Grade 9 - Does Heat Affect the Amount that Hermit Crabs Eat?

1006S **Lazeah Shields, Jeremy Xiong, William Toney**
Grade 9,9,9 - **Team** - Small Mammals in Different Biomes

1007S **Meng (Michael) Thao**
Grade 9 - Brine Shrimp Survival

1008S **Xeehlue Vang, Savin Mao, Drake T Sutta**
Grade 9,9,9 - **Team** - How does the time of day affect the intensity of frogs calls

Behavioral and Social Sciences (BE)

1009T **Courtney M Anderson**
Grade 10 - Effects of Playing a Sport or Instrument on Self Esteem

1010T **Kayla M Beckel**
Grade 10 - The Effectiveness of Post-exercise Cool-down Methods

1011T **Emily M Berg**
Grade 10 - A Comparison Of Moral Development Stages In Third Graders Versus Tenth Graders

1012T **Emily M Bollinger**
Grade 10 - The effect "choice blindness" has on everyday decision making

1013T **Alicia Bruce**
Grade 10 - The Effects of Television on Language Development

1014T **Lauren M Campbell**
Grade 10 - Testing the Discrepancies in the Choice Blindness Phenomenon Caused by Age and Gender

1015T **Erika B Cao**
Grade 10 - The Difference of Spatial Reasoning, Memory, and Direction-Following-Skills Depending on Gender

1016T **Brianna J Fesenmaier**
Grade 10 - The Effect of Concussions on an Individual's Mood

1017T **Laney R Heier**
Grade 10 - The Effects of Technology on Teen Schoolwork

1018T **Noelle M Hinrichs**
Grade 10 - The Categorical Perception of Voice Onset Time in Regional Accents of the United States

1019T **Kayla A Johnson**
Grade 10 - The Correlation of Highlighting and Cognition

1020T **Maris O Krekelberg**
Grade 10 - A Study of the Distractions of Technology

1021W **Abhishek Nayar, Stephen Kim**
Grade 12,12 - **Team** - Birth of a Revolution (Part II)
Project At Electricity Wall

1022T **Carly R Olson**
Grade 10 - How do different ages determine facial expressions

1023T **Noah J Pahl**
Grade 10 - Effects of Conformity on Isolated Participants

1024W **Bhargavi Papisetty**
Grade 12 - Predictive Analytics for Agricultural Commodity Pricing in India using the ARIMA Model
Project At Electricity Wall

1025T **Khaleyah S Rogers**
Grade 10 - Effects of Music on Memory

1026W **Rohan Sinha**
Grade 11 - Mining Healthcare Data for Behavioral Factors Affecting Cost of Chronic Care
Project At Electricity Wall

1027S **Grant Sommerhauser, Hunter Sommerhauser**
Grade 9,10 - **Team** - HG Bait Co Durability Test

1028T **Avery L Thoresen**
Grade 10 - The Effects of Conformity on Adolescents

1029T **Emma C Toomire**
Grade 10 - Facial Symmetry's Effect on How "Attractive" Someone is Perceived

1030T **Johanna G Weber**
Grade 10 - The Effects of Color on the Fatigue Rate of Cone Cells in the Retina

1031T **Aja Wesson**
Grade 12 - Double Standards in High Stakes Testing

1032T **Sarah Young-Church**
Grade 10 - Does Age Affect the Ability to Read Emotions?

Biochemistry (BI)

1033T **Aron J Hawkinson**
Grade 10 - The Effects of Cooking on pH Levels

1034W **Chinmaey K Kelkar**
Grade 10 - Urea Concentration Detection

1035T **Larissa M Knudsen**
Grade 9 - Coliform Bacteria in White Earth's Water

1036W **Priyanka R Narayan**
Grade 12 - Understanding the Mechanism Behind Nanoparticle Enhanced Oral Absorption of Chemotherapeutic Drugs
Project At Electricity Wall

1037T **Jeyani Narayan**
Grade 11 - Difference in Risk of Contracting Esophageal Cancer Between African American and Caucasian Smokers

1038S **Belinda Vang**
Grade 11 - DNA in Fruit: Rotted or Fresh

Cellular and Molecular Biology (CB)

1039T **Minxuan Gu, Jered W Everson**
Grade 12,11 - **Team** - Misorientation of the nuclear-centrosomal axis during cell polarization is an underlying factor in the pathogenesis of the primary dystonias

1040W **Trevor J Larsen, Nath Samaratunga**
Grade 12,12 - **Team** - Using histology to investigate stem cells as a treatment for bronchiolitis obliterans

1041T **Janani V Narayan**
Grade 11 - The Relationship Between Insulin-Induced Hypoglycemia and Inflammation in the Hippocampus

Chemistry (CH)

1042T **Aisha R Cacique**
Grade 11 - The Four Sacred Medicines and Carcinogens

1043S **Erica P Craddock**
Grade 11 - Oranges, or Something Better? : A Study Comparing Ascorbic Acid Concentrations in Different Citrus Fruits

1044T **Maren E Decker**
Grade 10 - Does the tree species and moisture content in firewood affect the longevity of the fire it will create?

1045S **Elizabeth M Demitroff**
Grade 9 - Electrolytes

1046W **Claire M Drysdale**
Grade 12 - Combining Chemistry and Artistry: Synthesis and Identification of Artistic Patinas Using Raman Spectroscopy

1047T **Nathanial S Dutcher**
Grade 10 - The Effect of Electropositivity on the Oxidation Process of Iron

1048S **Hanan C Farah**
Grade 11 - The Effects of Hydrolysis on Solution PH

1049T **Ibtisam M Ibrahim, Yasmin A Gabdille, Maryam J Abdi**
Grade 10,10,10 - **Team** - Potions and Lotions

1050W **Carolyn K Jons**
Grade 10 - Improved Efficiency of Steam Generation Using Carbon Nanoparticles

1051T **Grace H Koppen**
Grade 9 - Viscosity of Oils

1052W **Jacob W Levy, Sofie M Kim**
Grade 11,11 - **Team** - Greener, more efficient synthesis of medicinally applicable 1,2,3-triazole derivatives

1053T **Nickii Lyons**
Grade 11 - Healing dead beauty

1054T **Michelle Mao**
Grade 10 - Can hot water freeze faster than cold water? A search for the Mpemba effect

1055T **Andrew J Niederluecke**
Grade 10 - Antacid's and their Effectiveness on Neutralizing Stomach Acid

1056S **Rosemary O Olatunbosun**
Grade 12 - Recycling Amberlyst-15 Beads

1057W **Merrick Pierson Smela**
Grade 11 - Study of the Kinetics and Mechanism of the Production of Isopropyl Xanthic Anhydride

1058W **Claire M Simpson**
Grade 12 - Synthesis of cyclo-L-tryptophan-L-proline in anticancer drimentine C

1059T **Terrell Sook**
Grade 12 - Genetically Modified Peas

1060S **Ying Vang**
Grade 9 - pH Level of Ramsey County Lakes

1061S **Brian W Yang**
Grade 12 - Heterocyclics

Computer Science (CS)

1062T **Pedro Angulo-Umana**
Grade 11 - Structural Analysis of Iterated Digit Sequences and Applications in Telecommunicative Theory

1063W **Luis J Guzman, Julia Joern**
Grade 12,12 - **Team** - The trick to a twenty-dollar utility bill: Engineering a solar hydronics residential heating and cooling system

1064T **Ian P Harris**
Grade 10 - A Study of the Effects of Acceptable Bit Rate Compression in Digital Audio Music Files to the Human Ear

1065W **Apurv H Shekhar**
Grade 12 - A Scalable Pressure Equalization Approach to Contiguous Capacity-Constrained Network Voronoi Diagrams for Disaster and Emergency Response (Year Two)
Project At Electricity Wall

1066W **Sanjana Srivastava**
Grade 12 - A Machine Learning Based Approach to Diagnosing Executive Functioning Disorders and Providing Treatment Guidance
Project At Electricity Wall

Energy and Transportation (ET)

- 1067W **Jackson D Egert**
Grade 12 - Passive Reclamation of Unexploited Energy
Project At Electricity Wall
- 1068T **Julia K Gibbs**
Grade 9 - Facing it Head-on
- 1069W **Matthew R McMillan, Peter J Metzger**
Grade 12,12 - **Team** - Balancing power and safety in lithium-ion batteries by designing a protocol to study protective surface films
- 1070T **Craig M Sanislo**
Grade 9 - Stretching a Tank
- 1071T **Max Ylitalo**
Grade 10 - Garbage Reduction to Energy Production: Converting waste paper to cellulosic ethanol
Project At Electricity Wall

Engineering: Electrical and Mechanical (EE)

- 1072T **Khalid Ali, Abdullahi Abdi**
Grade 9,9 - **Team** - Aerodynamics
- 1073W **Darartu M Gamada, Rustam Kosherbay**
Grade 10,11 - **Team** - Fabricating a Miniature Langmuir Trough to Facilitate Climate Change Studies
- 1074T **Charlotte R Gude**
Grade 10 - The Effects of a Modified Pill Bottle on How Easy it is to Open
- 1075S **Connor E Helseth, Matthew J Mordorski**
Grade 12,12 - **Team** - Consumer Livestream Analysis
- 1076T **Nathan T Jerik**
Grade 10 - Can Static electricity be used to charge a cellular phone
- 1077T **Demetrius McAllister**
Grade 11 - Building a Light Seeking Device
- 1078W **Evelyn G McChesney, Zachary L Donahue**
Grade 10,12 - **Team** - Engineering a Hybrid Robotic Prototype: An Innovative use of Gravitational and Solar Energy
- 1079S **Miles J Miller**
Grade 9 - Effects of Age on Solar Panels
- 1080T **Christian P Peterson, Karl W Schmaltz**
Grade 12,12 - **Team** - Bedini SG Motor
Project At Electricity Wall
- 1081S **Kristofer T Robison**
Grade 10 - Transistors make radios

- 1082W **Jason Sylvestre**
Grade 12 - VoltX 2.0, A Rescue Robot That Can Locate and Extract Victims
- 1083W **Kevin Zheng**
Grade 12 - Creating a Cavity-Dumped Helium Neon Laser
- 1084T **Zishuai Zou, Zesun Yang**
Grade 12,12 - **Team** - Study of Car Door Safety and the Prevention of Further Risk

Engineering: Materials and Bioengineering (EN)

- 1085W **Radek Chlebicki**
Grade 11 - Bringing Science into the Realm of Dishwashing Sponges
Project At Electricity Wall
- 1086W **Nikhil Deshpande**
Grade 10 - Data Collection for Aggregate Analysis
Project At Electricity Wall

Environmental Management (EM)

- 1087W **Easton J McChesney, Wolfgang Ofstedal**
Grade 11,11 - **Team** - Protecting Streams, Lakes, and Rivers: Engineering a Breakthrough Filter to Remove Phosphates From Stormwater Runoff

Environmental Sciences (EV)

- 1088T **Katie L Carlson, Kate M Carithers**
Grade 12,12 - **Team** - The Environmental Effects of Iron Fertilization on Marine Life
- 1089T **Jacob T Edwards**
Grade 9 - Glass Cleaner's Effect on Earthworms
- 1090W **Arun Kethar, Harini Kethar**
Grade 10,9 - **Team** - Mushroom Enzyme Enhancement to Boost Biofuel Production
- 1091T **Natalie S Kincs**
Grade 10 - Wind Turbine Efficiency
- 1092T **Jonna S Kolmer**
Grade 10 - Frac Sand Mining Industry's Effect on Rural Communities
- 1093W **Yun J Lee**
Grade 10 - The comparison of electricity levels related to the anode surface area of Microbial Fuel Cell using a benthic mud sample
- 1094S **Imogene J Silver**
Grade 9 - Daphnia death by triclosan pollution
- 1095T **Jason Ung**
Grade 10 - The Effects of New and Used Oil on Biodiesel

1096W **Leighton Zhao**
Grade 11 - Experimental Determination of the Wall Loss Rate of Fractal Agglomerate Aerosols
Project At Electricity Wall

Medicine and Health Sciences (ME)

1097W **Sweta Bhoopatiraju**
Grade 11 - Betaine for Patients with ALL Intolerant to Maintenance Chemotherapy

1098T **Kyra N Doyle**
Grade 10 - The Relation Of Gender And Height To Tidal Volume

1099T **Nathaniel R Farmer**
Grade 9 - A STEM Study of Magnetically Disturbed Blood Flow

1100T **Sonrisa Gaulden, Danielle Pineiro**
Grade 11,11 - **Team** - Interference of Nail Polish on Pulse Oximetry

1101W **Arush Jain**
Grade 10 - A Novel Cardio Vascular Stent Design Utilizing Multiple Materials
Project At Electricity Wall

1102T **Emma L Marko**
Grade 10 - The Effects of Sounds on Blood Pressure

1103T **Amrita Mohanty**
Grade 11 - Schwann cell differentiation from stem cells of Neurofibromatosis patients and normal controls
Project At Electricity Wall

1104S **Geeta Rajamani**
Grade 9 - The Use of Well-Timed Low Intensity Activity for Type 2 Diabetics

1105T **Noah D Robb**
Grade 10 - The Correlation between Fingerprints of Related and Unrelated People

1106S **Juliet E Rohde, Maria V Meza-Ortiz**
Grade 10,11 - **Team** - You Eat Like A Pig

1107T **Christopher M Santilli, Ryan J Kibler**
Grade 12,12 - **Team** - Morphine's Effect on Macrophage's Ability to Perform Phagocytosis

1108T **Megan G Solberg**
Grade 10 - Dandelion Root vs Antibiotics on *Serratia marcescens* and *Escherichia coli*

1109T **Ashley J St. Aubin**
Grade 10 - Extension of Knee Ligaments

1110W **Elliott C Weiler**
Grade 12 - Correlations Between Genetic Markers and the Gum Disease Periodontitis

Microbiology (MI)

1111T **Maedin F Abegaz**
Grade 10 - The Effects of UV Radiation, Vindicator +, and Hydrogen Peroxide on *Escherichia coli*, *Bacillus subtilis*, and *Serratia marcescens*: Phase I and Phase II

1112T **Allie L. Anderson**
Grade 10 - Effects of Baking on Fresh Fruit's Bacterium Surface Content

1113T **Brody Bien**
Grade 10 - The Effects of "Home Sterilizers" on *Escherichia coli*.

1114T **Emily N Carlson**
Grade 10 - Effects of organic agriculture of bacterial content of raw beef

1115T **Ella J Cavanor**
Grade 10 - The Effectiveness of Clorox Wipes vs. Generic Brand on the Bacteria of Doorknobs

1116S **Meserete Hatte, Eftu Abasham**
Grade 11,11 - **Team** - Ethiopian Spices and the Intestinal Bacterial *E. coli*

1117S **Serena Jing**
Grade 9 - The Silver Bullet: using silver nanoparticles to reduce bacteria in the kitchen

1118T **April T Kim**
Grade 10 - Effects of Oil and Saltwater on Bacteria Growth

1119S **Rebecca J Kirby**
Grade 10 - Regular Hand Soap vs. Anti-Bacterial

1120T **Kristin M Robinson**
Grade 10 - Bacterial Contamination in School Departments

1121S **Olson Thao, Jeremy Kong**
Grade 11,11 - **Team** - Slime Mold and Temperature

1122S **Pa Yia Vang**
Grade 11 - Bacteria and Milk

1123W **Patricia Zhao, Madison K Ernst**
Grade 12,12 - **Team** - Targeting toxic waste in soil and aquatic environments: Investigating chemotactic response of *Pseudomonas putida* F1

Physics and Astronomy (PH)

1124T **Quinten T Anderson**
Grade 10 - Effects Of Glide Wax on Skis and Snowboards Using Hydrocarbon and Fluorocarbon Waxes

1125S **Zack R Bellovich**
Grade 9 - What's the bounce of a football?

- 1126T **Lauren C Bench**
Grade 10 - A Comparison of the Performance of
Baseball and Softball Bats
- 1127T **Kaley M Brault**
Grade 10 - A Correlation of Accuracy with a
Change of Gender Lacrosse Sticks
- 1128S **Tyme T. Enright**
Grade 11 - Determining Water Pollution through
Refractive Indices
- 1129T **Ajullu O Jobi**
Grade 10 - Lacrosse: The Difference of Gender
Sticks
- 1130S **Ken Thao**
Grade 9 - What's the fastest way to cool a soda?
- Plant Sciences (PS)*
- 1131T **Aditi Das**
Grade 12 - Developing Transgenic Sugar Beet by
Agrobacterium-mediated Gene Transfer
Project At Electricity Wall
- 1132T **Deborah O. Dipo-Ajayi**
Grade 10 - Does Tissue Preparation Affect the
Processing and Examination?
- 1133S **Htee Hgay, Lay Lae Htoo**
Grade 11,11 - **Team** - Pitcher Plants and Light
- 1134T **Jesse Jubera**
Grade 10 - Allelopathic Influence of Invasive and
Native Grasses on *Taraxacum officinale*
- 1135S **Nicolina Mao**
Grade 12 - Sickly Spuds
- 1136T **Heather J Stone**
Grade 12 - Globally Utilizing Perennial
Intermediate Wheatgrass
- 1137T **Joseph Vallin, Sunghee Lee**
Grade 12,12 - **Team** - Ethylene vs.Oxygen:
Optimizing the Fastest Fruit Ripening Environment
- 1138W **Elisa B Villafana**
Grade 12 - Save the honeybees: Stop using
neonicotinoids: Effects of the pesticide
thiamethoxam on vigor, growth and development of
soybean (*Glycine max*) crops
- 1139S **Pong Tay K Vue**
Grade 9 - Colors of Light and Plants



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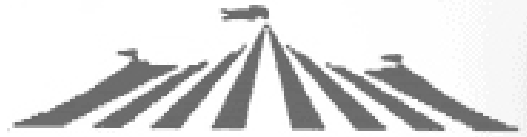
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Adams, Parker A 6089T
 Allen, Savannah 6036T
 Anderson, Maggie J 6033W
 Baird, Sean R 6039W
 Barrett, Tara 6004S
 Benson, Zachary B 6022T
 Betts, Stephen 6061W
 Bier, Elias 6079S
 Bjermeland, Solveig O 6090S
 Brass, Gavin 6046W
 Carpenter, Emily 6062W
 Carter, Brendan 6075W
 Castaneda, Christina Rache 6058T
 Chea, Ryan S. 6063W
 Chijioke, Chiamaka 6064S
 Cosey-Richmond, Jawein D 6049W
 Crutchfield, Carmen 6016S
 Deng, Trista 6086W
 Dosch, Aidan 6080S
 Duncan, Jeries J 6081S
 Estrada, David 6050T
 Farber, Kate 6017S
 Farmer, Hannah E 6040T
 Flores, Daniel 6050T
 Gailloux, Amelia Ann 6001W
 Garcia, Francisco 6050T
 Gataud, Pricess 6074W
 Geherin, Anna 6023W
 Giertsen, Brady 6005W
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 Grimm, Kobe E 6037W
 Gupta, Aaryan 6065T
 Habegger, Keegan Jared 6034T
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 Hamilton, Janelle 6066S
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 Hays, Delson H 6020W
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 Laird, Molly K 6092S
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 Miller- Shiell, Isabel C 6025W
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 Nolen, Colee A. 6086W
 O'Connell, John D 6042W
 Olson, Griffin J 6068T
 Pickett, Ty'shon T 6069W
 Quinlan, Meghan 6077W
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 Radoc, Ana 6010S
 Rangel, Jonathan 6053S
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 Welna, Lauren 6078S
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Adams, Kristiana J. 7006W
 Alfonzo, Natalia 7105W

Altman, Quincy D 7047S
 Arnett, Flint N 7001S
 Baker, James G 7058S
 Bares, Valerie C. 7100S
 Barron, Jacqueline 7007S
 Beckman, Ruby J 7025S
 Belitz-Shomion, James 7127S
 Biermaier, Allison M 7026T
 Bistram, Matthew J 7069T
 Blessing, Cemina 7027S
 Bloemendal, Alex C 7106T
 Blohm, Noah J 7048S
 Bogie, Ben T 7042S
 Botten, Chloe C 7002W
 Bowlin, Ryan T 7107T
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 Burns, Garrett T. 7109T
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 DePape, Emma R 7130W
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 Fellrath, Melissa M 7111T
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Johnson, Conor L	7072S	Petruconis, Cecilia	7034T	Deng, Cassidy	8059W
Joseph, Ashay K	7079W	Phan, Andrew V	7065T	Dick, Katherine L	8053T
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Kuiah, Prince N.	7014W	Alejandra		Flanagan, Josie E	8011W
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 Zou, Zishuai 1084T




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2014 Research Papers

Name	Grade	Title
Stephen Betts	6	Now is the Time! A Study to Improve Diagnosis and Evaluation of Mild Traumatic Brain Injuries (Concussions) for Children 5-12 years old
Elias Bier	6	Parachute Shapes and Sizes
Solveig O Bjermeland	6	What is the best way to preserve a banana?
Katie Calger	6	Can a guinea pig remember a maze?
Katherine Costanzo	6	The Five Second Rule
Isabella Farah	6	Which Cleaning Agent Is The Best Disinfectant Against Bacteria On A Plastic Surface?
Manashree Padiyath	6	Bread Dough DOE: Saving bread from extinction!
Max J Vogel	6	Warm Fluff - Which Loose-Fill Insulation Insulates the Best?
Katie Wein	6	Sweet Dreams: The effect of dreams on productivity of the left brain
Valerie C. Bares	7	How do winter temperatures affect the growth and life cycle of the tar spot fungus
James Lukas Haugen	7	Waters Dramatic Effects on Beach Erosion
Avni Jain	7	Allergen Alert! An Innovation to assist people with finding the correct food
Annie J Kuchenmeister	7	Lutefisk
Brittney Kuntz	7	The Effect of Chloride on a Water Supply
Jackson W Lee	7	Propeller Pitch Explored
Sophia G Marcus	7	Worm Casting Ratios: Their Effect on Purple Petra Growth
Molly K McCollow	7	Does Running in Water Affect Heart Rate?
Kate F Meadows	7	"Strike Out" Window Strikes
Caitlin M O'Donnell	7	Does a Lemon or a Potato Produce more Voltage?
Jack Ogle	7	Elastin: it gives us our bounce
Elise M Pearson	7	Do Females or Males Stop the Most at Crosswalks
Gihara M Perera	7	Does Texting and Driving Affect A Person's Driving Skills
Isak J Stillwell-Jardine	7	Does the Flavor of Mint Affect the Amount of Mouth Bacteria?
Micah J Sybesma	7	Varying Amounts of Exposure to Magnetic Fields Corrupting Storage Device Data
Ashoka J Zylstra	7	Using Water in a Bottle to Model the Vortex of a Tornado
Caroline G Bowen	8	The Effects of a Genetically Modified Vs. an Organic Papaya Diet on the Longevity and Fertility of Fruit Flies
Katherine L Dick	8	Rumble & Roll
Audrey V Gorman	8	Minimizing Nitrate Leaching from Fertilizer
Alice S. Lightfoot	8	How do Free Will Beliefs Affect Attitudes Toward High School Success?
Olivia J Liteky	8	Favorite Lightbulb Technology
Jacob F Marsan	8	Winter Birds' Choice of Suet Fat
Emma M Meyer	8	Testing Effectiveness of Insulation
Kylie M Nevells	8	Psoriasis: DermaPal UVB Narrow Band Comb

2014 Research Papers (continued)

Name	Grade	Title
Annie K O'Connell	8	Fience: Where Fashion and Science Meet
Bennett Poganski	8	Substance that Breaches the Gap Between Liquid and Solid
Meghan M Pryor	8	The Effectiveness of Natural Sunblock
Gabriel N Reynolds	8	Does Color Affect Consumers' Preference?
Emilia F Topp-Johnson	8	Behind the Kernels, A Study of 5 Fungal Endophytes and their use in Biocontrol Against the Common Maize Pathogen Ustilago maydis
Nathaniel R Farmer	9	A STEM Study of Magnetically Disturbed Blood Flow
Alex M Schatz	9	The Eating Behavior of Crustaceans in the Superfamily Paguroidea
Maedin F Abegaz	10	The Effects of UV Radiation, Vindicator +, and Hydrogen Peroxide on Escherichia coli, Bacillus subtilis, and Serratia marcescens: Phase I and Phase II
Ryan W Alexander	10	The effect of different brands of mouthwash on the growth of Bacillus Subtilis
Shay Alwine	10	Does Sugar Water Affect Plant Water
Allie L. Anderson	10	Effects of Baking on Fresh Fruit's Bacterium Surface Content
Quinten T Anderson	10	Effects of Glide Wax on Skis and Snowboards Using Hydrocarbon and Fluorocarbon Waxes
Courtney M Anderson	10	Effects of Playing a Sport or Instrument on Self Esteem
Jill M Ayers	10	Animal Behavior Study
John Baradaran	10	Computer Programs and their Start Up Time
Kayla M Beckel	10	The Effectiveness of Post-exercise Cool-down Methods
Gretchen L Bellefeuille	10	Chlorine Levels in Tap Water around Minnesota
Lauren C Bench	10	A Comparison of the Performance of Baseball and Softball Bats
Emily M Berg	10	A Comparison Of Moral Development Stages In Third Graders Versus Tenth Graders
Jack A Bevolo	10	Effects Magnets on Data Transfer Through Ethernet Cable
Brody Bien	10	The Effects of "Home Sterilizers" on Escherichia coli.
Kyra L Boaz	10	Which household agent is most affective against bacteria?
Emily M Bollinger	10	The effect "choice blindness" has on everyday decision making
Kaley M Brault	10	A Correlation of Accuracy with a Change of Gender Lacrosse Sticks
Peter D Brinkmann	10	The effect of physical activity on reaction time
Lauren M Campbell	10	Testing the Discrepancies in the Choice Blindness Phenomenon Caused by Age and Gender
Erika B Cao	10	The Difference of Spatial Reasoning, Memory, and Direction-Following-Skills Depending on Gender
Emily N Carlson	10	Effects of organic agriculture of bacterial content of raw beef
Eunice C Carrasco	10	Soil Grown Plants vs. Hydroponic Plants
Ella J Cavanor	10	The Effectiveness of Clorox Wipes vs. Generic Brand on the Bacteria of Doorknobs
Anna A Cayer	10	Effects of Caffeine on Blood Pressure
Sidney D Christopherson	10	Just Breathe
Braydon C Dagenais	10	The Correlation Between Temperature and Crime Rate
Maren E Decker	10	Does the tree species and moisture content in firewood affect the longevity of the fire it will create?

2014 Research Papers (continued)

Name	Grade	Title
Vincent P Dimmen	10	A Change in the Winds: Studying Bernoulli's Principle
Deborah O. Dipo-Ajayi	10	Does Tissue Preparation Affect the Processing and Examination?
Christine Do	10	How age correlates with fear
Charli K Donchetz	10	The Effect of Music on Blood Pressure
Shannon Dothe-Olmedo	10	The effect of Earth's tilt on the four seasons
Kyra N Doyle	10	The Relation Of Gender And Height To Tidal Volume
Madeline C Duethman	10	Effects of Chewing Gum on Test Performance
Nathaniel S Dutcher	10	The Effect of Electropositivity on the Oxidation Process of Iron
Kaija Eckholm	10	Turn Up The Heat
Kaylee M Emo	10	Does drinking coffee affect your ability to focus?
Danielle Fairchild	10	The Correlation between Air and the Process of Corrosion in Various Metals
Brianna J Fesenmaier	10	The Effect of Concussions on an Individual's Mood
Gabe L Fink	10	Perceptual Dialects in the Caucasian Population of Minnesota
Rachel S Floersch	10	Cell Phone Conversations' Effects on Reaction Time
Ree Ford	10	Which Study Technique Works Best?
Darartu M Gamada, Rustam Kosherbay	10	Fabricating a Miniature Langmuir Trough to Facilitate Climate Change Studies
Alex J Grant	10	Comparing Burn Times Of Selected Fabrics
Isaiah R Gray	10	Comparison of Musical Complexity from Different Time Periods
Charlotte R Gude	10	The Effects of a Modified Pill Bottle on How Easy it is to Open
Emily A Haberlack	10	The Correlation Between Highlighting and Memory Comprehension
Ian P Harris	10	A Study of the Effects of Acceptable Bit Rate Compression in Digital Audio Music Files to the Human Ear
Aron J Hawkinson	10	The Effects of Cooking on pH Levels
Laney R Heier	10	The Effects of Technology on Teen Schoolwork
Adam L Hensley	10	The decomposition rate of organic materials
Lucas W. Heyne	10	The Effect of Musical Mode on the Listener's Emotional Reaction to a Piece of Music
Noelle M Hinrichs	10	The Categorical Perception of Voice Onset Time in Regional Accents of the United States
Paul V HoangLong	10	Effects of High Ethanol Levels in <i>Saccharomyces cerevisiae</i> Cell Growth and Reproduction
Ben R Hubbard	10	Employing the Power of a Magnet in a Motor
Arush Jain	10	A Novel Cardio Vascular Stent Design Utilizing Multiple Materials
Nathan T Jerik	10	Can Static electricity be used to charge a cellular phone
Ajullu O Jobi	10	Lacrosse: The Difference of Gender Sticks
Kayla A Johnson	10	The Correlation of Highlighting and Cognition
Carolyn K Jons	10	Improved Efficiency of Steam Generation Using Carbon Nanoparticles
Cory J Kallstrom	10	Music on the Mind
Natalie A Kauls	10	Food Preference of Mealworms
Chinmaey K Kelkar	10	Urea Concentration Detection

2014 Research Papers (continued)

Name	Grade	Title
Arun Kethar, Harini Kethar	10	Mushroom Enzyme Enhancement to Boost Biofuel Production
April T Kim	10	Effects of Oil and Saltwater on Bacteria Growth
Natalie S Kincs	10	Wind Turbine Efficiency
Cole J Knutson	10	Manipulated Matrix Memorization
Mary F Knutson	10	The Analysis of the Correlations between the Live Culture Count in a Variety of Dairy Yogurt Brands
Jonna S Kolmer	10	Frac Sand Mining Industry's Effect on Rural Communities
Maris O Krekelberg	10	A Study of the Distractions of Technology
Kinsey S Kump	10	How Mediums of Different Densities Affect Sound Transmission and the Amplitude of Sound
Phillip M Kuplic	10	The Effects of Temperature on the Strength of a Magnet
Angela K Le	10	The Effects of Lung Capacities Correlated with Asthma and Exercise
Yun J Lee	10	The comparison of electricity levels related to the anode surface area of Microbial Fuel Cell using a benthic mud sample
Joseph Leipold	10	The Effects of Soil Compaction on Plant Stem Growth
Denver J Ludvigson	10	Sound: A Test Of Quality of Soundproofing Materials.
Carrie Mannila	10	Study of Brain Development
Aurora M Mara	10	The Unconstrained Truth About Constrained Layer Damping
Emma L Marko	10	The Effects of Sounds on Blood Pressure
Maggie A Martin	10	The Correlation of Human Personality Traits and Social Media Use
Benjamin J Mason	10	Musical Interference: A Study on Memory
Evelyn G McChesney, Zachary L Donahue	10	Engineering a Hybrid Robotic Prototype: An Innovative use of Gravitational and Solar Energy
Hannah Joy S McNeal	10	Verbal Tics
Alexander G Meehan	10	The Different Types of Wax for Skis
Anna Metzger	10	The Effects of Various Purification Methods on Contaminated Water
Reed D Miller	10	Does Weightlifting Affect Post Day Performance?
Madeline R Mulcahy	10	Differences Between Male and Female Problem Solving Involving Morals and the Change Over Time
Olivia M Nelson	10	You Just Turn That Up? Which is Louder, Television Programming or Commercials?
Brianna Neumann	10	The Effect of Microwave Oven Radiation Exposure on the Growth of Organisms
Dat T Nguyen	10	Effects of Viscosity and Temperature on Surface Tension
Jake R Niederluecke	10	The Process of Sound Dampening Against Metal
Andrew J Niederluecke	10	Antacid's and their Effectiveness on Neutralizing Stomach Acid
Carly R Olson	10	How do different ages determine facial expressions
Damon R Olson	10	The Correlations of a Baseball's Spin Direction and Flight Path
Benn Olson	10	Memory of The Mind
Adam T Ottoson	10	Hovercrafts: Surface vs. Performance
Noah J Pahl	10	Effects of Conformity on Isolated Participants

2014 Research Papers (continued)

Name	Grade	Title
Conner G Pendill	10	Effects of Humic Acid on Plant Growth
Joseph Phung	10	What's in a face?
Sam W Pope	10	The Effect of Hand Sanitizer on Preventing the Growth of <i>Bacillus subtilis</i>
Jennifer I Reitan	10	Effects of Musical Education on Visual Memory
Noah D Robb	10	The Correlation between Fingerprints of Related and Unrelated People
Kristin M Robinson	10	Bacterial Contamination in School Departments
Khaleyah S Rogers	10	Effects of Music on Memory
Zachary D Rushford	10	The Effect That Sight Has On a Person's Taste
Fahad M Salad	10	Video Games and Pain Tolerance
Matthew J Sash	10	Initial Disintegration Rates of Different Brand Name Tylenol Products
Amanda M Schmid	10	Electrolytes and Sports Drinks: Are Their Advertisements Truthful?
Emily A Schmid	10	The Correlation Between Ripening Time and Vitamin C Amounts in <i>Capsicum Annuum</i>
Sydney A Schulberg	10	Color Distractions
Jared J Sheridan	10	Effect of organic vs. non-organic soil on growth of different plant species
Megan G Solberg	10	Dandelion Root vs Antibiotics on <i>Serratia marcescens</i> and <i>Escherichia coli</i>
Ashley J St. Aubin	10	Extension of Knee Ligaments
Sawyer R Stoos	10	The Changing Colors Of Leaves
Colin J Strey	10	Going, Going, Gone, Does Corking A Bat Really Affect the Distance the Ball Travels?
Tia M Thompson	10	The Power of Peppermint
Avery L Thoresen	10	The Effects of Conformity on Adolescents
Emma C Toomire	10	Facial Symmetry's Effect on How "Attractive" Someone is Percieved
Jason Ung	10	The Effects of New and Used Oil on Biodiesel
Cole Utter	10	Bursting Bubbles
Sarah K Waterman	10	A Taxonomic Survey of the Microorganisms Present In Credit River, Prior Lake, and Sunset Pond
Johanna G Weber	10	The Effects of Color on the Fatigue Rate of Cone Cells in the Retina
Aimee E Whitaker	10	The Effect of Gender Roles on Adolescents
Matthew K Wiebe	10	Correlation Between Memory and Ages
Benjamin M Wishart	10	The Effects of Antiseptics and Disinfectants on Household Bacteria
Max Ylitalo	10	Garbage Reduction to Energy Production: Converting waste paper to cellulosic ethanol
Sarah Young-Church	10	Does Age Affect the Ability to Read Emotions?
Pedro Angulo-Umana	11	Structural Analysis of Iterated Digit Sequences and Applications in Telecommunicative Theory

2014 Research Papers (continued)

Name	Grade	Title
Sweta Bhoopatiraju	11	Betaine for Patients with ALL Intolerant to Maintenance Chemotherapy
Radek Chlebicki	11	Pressure Versus Percent Compression Relationship of Polyurethane and Cellulose Dishwashing Sponges: Implications for Sponge Users
Jacob W Levy, Sofie M Kim	11	Novel synthesis of medicinally applicable 1,2,3-triazole derivatives
Easton J McChesney, Wolfgang Ofstedal	11	Protecting Streams, Lakes, and Rivers: Engineering a Breakthrough Filter to Remove Phosphates From Stormwater Runoff
Amrita Mohanty	11	Schwann cell differentiation from stem cells of Neurofibromatosis patients and normal controls
Merrick Pierson Smela	11	Study of the Kinetics and Mechanism of the Production of Isopropyl Xanthic Anhydride
Solomon J Polansky	11	What's the Best Way to Wash Your Fencing Lamé?
Leighton Zhao	11	Experimental Determination of the Wall Loss Rate of Fractal Agglomerate Aerosols
Katie L Carlson, Kate M Carithers	12,12	The Environmental Effects of Iron Fertilization on Marine Life
Aditi Das	12	Role of Cell Poles in Agrobacterium-mediated Genetic Transformation of Plants
Claire M Drysdale	12	Combining Chemistry and Artistry: Synthesis and Identification of Artistic Patinas Using Raman Spectroscopy
Cole M Dunlap	12	Reflection vs. Absorbance
Minxuan Gu, Jered W Everson	12,11	Misorientation of the nuclear-centrosomal axis during cell polarization is an underlying factor in the pathogenesis of the primary dystonias
Luis J Guzman, Julia Joern	12	The trick to a twenty-dollar utility bill: Engineering a solar hydronics residential heating and cooling system
Connor E Helseth, Matthew J Mordorski	12	Consumer Livestream Analysis
Trevor J Larsen, Nath Samaratunga	12	Using histology to investigate stem cells as a treatment for bronchiolitis obliterans
Nicolina Mao	12	Virus Detection in Elite Potato Plant Samples
Matthew R McMillan, Peter J Metzger	12,12	Balancing power and safety in lithium-ion batteries by designing a protocol to study protective surface films
Priyanka R Narayan	12	Differences in Behavioral, Psychological, and Social Factors Associated with Positive Mental Health in Adolescents
Rosemary O Olatunbosun	12	Considering the Green Economy of Recycling Amberlyst Beads.
Bhargavi Papisetty	12	Predictive Analytics for Agricultural Commodity Pricing in India using the ARIMA Model
Christopher M Santilli, Ryan J Kibler	12	Morphine's Effect on Macrophage's Ability to Perform Phagocytosis
Apurv H Shekhar	12	A Pressure-Equalization Approach to Contiguous Capacity-Constrained Network Voronoi Diagrams for Disaster and Emergency Response
Claire M Simpson	12	Synthesis of cyclo-L-tryptophan-L-proline in anticancer drimentine C
Sanjana Srivastava	12	A Machine Learning Based Approach to Diagnosing Executive Functioning Disorders and Providing Treatment Guidance

2014 Research Papers (continued)

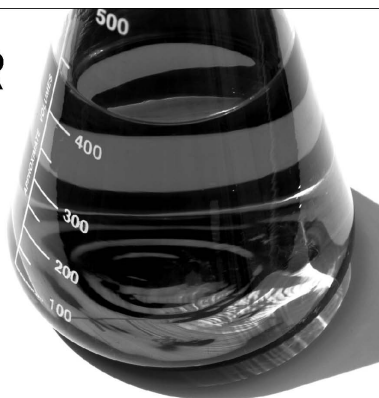
Name	Grade	Title
Heather J Stone	12	Globally Utilizing Perennial Intermediate Wheatgrass
Joseph Vallin, Sunghae Lee	12,12	Ethylene vs. Oxygen: Optimizing the Fastest Fruit Ripening Environment
Elisa B Villafana	12	Save the honeybees: Stop using neonicotinoids: Effects of the pesticide thiamethoxam on vigor, growth and development of soybean (Glycine max) crops
Elliott C Weiler	12	Correlations Between Genetic Markers and the Gum Disease Periodontitis
Brian W Yang	12	Heterocyclics
Patricia Zhao, Madison K Ernst	12	Targeting toxic waste in soil and aquatic environments: Investigating chemotactic response of Pseudomonas putida F1
Kevin Zheng	12	Creating a Cavity-Dumped Helium Neon Laser
Zishuai Zou, Zesun Yang	12	Study of Car Door Safety and the Prevention of Further Risk

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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	2012	Andrew Ylitalo Stillwater High School, Stillwater
2010	Tiffanie Stone AFSA High School, Vadnais Heights	2012	Keshav Mangalick Mounds View High School
2010	Martin Camacho Central Senior High School, St. Paul	2012	Margaret Green Burnsville High School, Burnsville - Team
2010	Houa Xiong Johnson High School, St. Paul	2012	Laura Landgraf Burnsville High School, Burnsville - Team
2010	Gavin Ovsak Eden Prairie Senior High School	2012	Caleb Kumar Breck School, Minneapolis
2010	Charles Morris Breck School, Minneapolis	2012	Taylor McCanna Breck School, Minneapolis
2010	Ava Mokhtari Breck School, Minneapolis - Team	2012	Alejandro Fenn Breck School, Minneapolis - Team
2010	Addison Weiler Breck School, Minneapolis - Team	2012	William Engel Breck School, Minneapolis - Team
2010	Ashley Santilli Burnsville High School, Burnsville - Team	2012	Thomas Vennemann Johnson High School, St. Paul
2010	Emily Bostrom Burnsville High School, Burnsville - Team	2013	Andrew Ylitalo Stillwater High School, Stillwater
2011	Alysia Flores Johnson High School, St. Paul	2013	Aditi Das Roseville Area High School, Roseville
2011	Andrew Ylitalo Stillwater High School, Stillwater	2013	Connor Duffy Mounds View High School, Arden Hills
2011	Martin Anderson Burnsville High School, Burnsville	2013	Graham Gabrielson Harding High School, St. Paul
2011	Redeat Abegaz Burnsville High School, Burnsville	2013	Mai Moua Harding High School, St. Paul
2011	Gavin Ovsak Eden Prairie Senior High School	2013	Carolyn Jons Eden Prairie Senior High School
2011	(Ernst) Tom Erdmann Breck School, Minneapolis	2013	Jessica Ryvlin Breck School, Minneapolis
		2013	Apurv Hirsh Shekhar Blake High School - Northrop campus

3M Community Giving



Open Minds
Spark Success

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

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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
Bright Future Award - Carolyn Jons
Broadcom MASTERS (Math, Applied Science,
Technology, and Engineering for Rising Stars)
Caffeinated Student Award – Kyra
Underbakke
Circle K Club
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
(2005)
ISEF Alumni Awards – Timara Underbakke
(1973)
I SWEEEP
Joel Wagner Caring Bridge Award
Junior Science & Humanities Symposium
Killeen Memorial Award
Minnesota Academy of Science Inquiry award
Medalists (6th grade)
Minnesota Agriculture in the Classroom
Minnesota Astronomical Society
Minnesota Chapter of American Fisheries
Society
Minnesota Space Frontier Society
Minnesota State Science & Engineering Fair

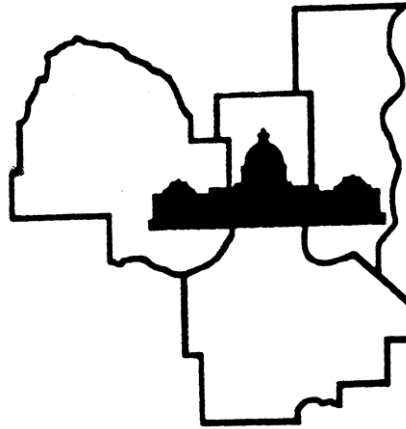
Mu Alpha Theta Mathematics
National Society of Professional Engineers
NOAA National Oceanic and Atmospheric
Administration
North Central Tri-state Junior Science &
Humanities Symposium Research Papers
Penny Lohman Memorial Award
Radio City
Research Paper trophies
Ricoh Sustainable Development Award
SAVE-Students Achieving Volunteer
Excellence
Schools trophies
Society for In Vitro Biology
Sponsor: 3M Foundation
Sponsor: 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 ROTC
US Army ROTC
US Department of Health and Human
Services
US Metric Association
US Navy/Marine ROTC
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

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.



2013-2014 Twin Cities Regional Science Fair Committee

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