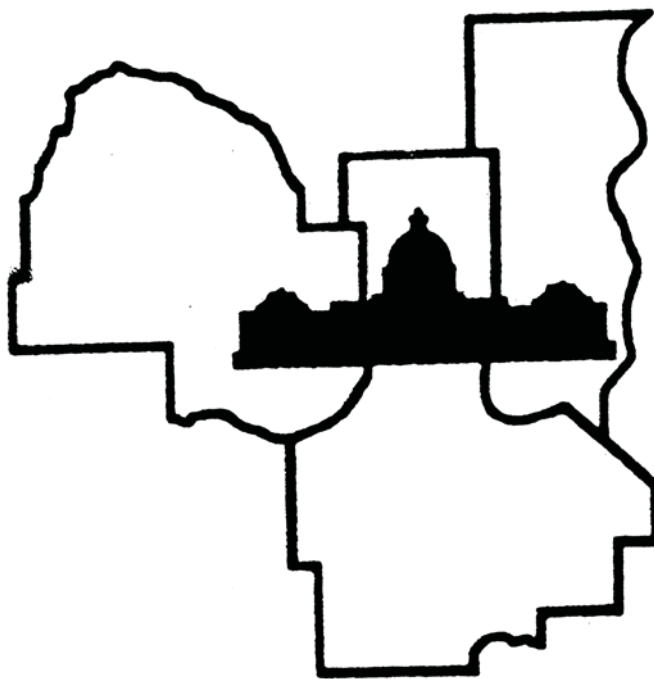


WELCOME TO THE

**73rd Annual Twin Cities Regional Science Fair
19th Annual St. Paul Science Fair
17th Annual Western Suburbs Science Fair**



2011

Science Fairs



February 25-26, 2011



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

We're scientists ^{engineers}
inventors marketers
& business people of every kind.



We're 3M volunteers.

Tutoring, mentoring, serving, advising, building, delivering and most of all inspiring. The good works of thousands of 3M employee and retiree volunteers improve lives in our communities.

Innovative and indispensable at work and in the community.

3M Community Giving

**WELCOME TO THE 73rd ANNUAL TWIN CITIES REGIONAL SCIENCE FAIR,
THE 19th ANNUAL ST. PAUL SCIENCE FAIR,
THE 17th ANNUAL WESTERN SUBURBS SCIENCE FAIR.**

Our Host this year is the University of Minnesota.

YOUR SCIENCE FAIR BUTTON is your identification as a participant in this Science Fair.

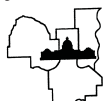
WEAR IT AT ALL TIMES - when you are at the Fair, both Friday and Saturday.

DO NOT WEAR HEELS WHILE IN THE BUILDING - FLAT SOLES ONLY!

PLEASE PICK UP YOUR PROJECT FORMS AND KEEP them FOR A YEAR.

(They may be needed for next year's project, too.)

Make copies of your forms if you are selected to compete further.



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. If there is a Scientific Review Committee (SRC) violation sheet in your folder, it means that there is a problem with your paperwork. Report to the SRC table as soon as you have set up your project. You will not be allowed to compete unless you have been cleared for competition by the Scientific Review Committee.
3. After your project is completely set up, please drop off the Safety & Display card in the **IN BOX at Safety & Display** (next to SRC). Go back to your project exhibit and wait for a Safety & Display volunteer to check your exhibit so you can be cleared for competition. You must pass both SRC and Safety & Display inspections to be able to compete for awards.
4. Read through this booklet for information about judging times and other rules.
5. Wear your TCRSF button in a clearly visible place at all times.

TCRSF requires that **ALL TEAM** members of team projects must be present at judging on Friday night (unless cleared by the fair director and the SRC chair) and that all ISEF winners must be at the Saturday Awards Ceremony. 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. 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.**

SCHEDULE

Friday, February 25, 2011:

<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 Safety&Display 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	Field House – No heeled Shoes

Saturday, February 26, 2011

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 & judging forms	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.

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
-----------------------------	---	---------------------------------------

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.

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
-------------------------	---	---------------------------------------

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.
-----------------------------------	--	--

Minnesota State Science & Engineering Fair (grades 7-12 projects, grades 7-8 papers)
March 20-22, 2011, **Sheraton Bloomington Hotel**

JSHS: Junior Science & Humanities Symposium (grades 9-12 research papers)
March 19-20, 2011, **Sheraton Bloomington Hotel**

**I-SWEEEP: International Sustainable World EnergyEngineering Environment Project
Olympiad** (grades 9-12 projects), Houston, Texas, May 4–9, 2011

ISEF: Intel International Science & Engineering Fair (grades 9-12 projects)
Los Angeles, California, May 8–13, 2011 (Twin Cities flies out May 7th)

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) & S&D (Safety & Display) before judging begins to be able to compete.
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.	6:15p.m.
Grade 7	4:00p.m.	7:00p.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.

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 7-8 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.

Science doesn't start in a laboratory

A child's imagination is ignited by curiosity and powered by all the wonders of the world.

At Medtronic, we devote ourselves to finding new and better ways to alleviate pain, restore health and extend the lives of people around the world. And we know that any innovation starts with imagination. That's why we support organizations and activities that will inspire the next generation of scientific innovators.



Bill Hawkins
Chairman and Chief Executive Officer

www.medtronic.com/community



UC2008015B x EN

Grade 6

Animal Sciences (AS)

- 6001T **Emma L Baxter**
Chinchilla Nutrition
- 6002W **Bengt Fredrickson, Olivia Groth, Andrew Hienz Team** - Cockroach Choir
- 6003W **Alexander Johnson**
Are Dogs Colorblind?
- 6004T **Mamie Thrall**
Which Natural Pesticide is Safest for Honeybees?

Behavioral and Social Sciences (BE)

- 6005S **Maggie M Conners**
To Bee, or Not To Bee?
- 6006W **Stephanie Roberts**
Does the Color of the Paper Affect the Score of a Math Test?
- 6007W **Maggie R Sullivan**
Do Video Games Affect Memory In Children?

Biochemistry (BI)

- 6008S **Molly E. Johnson**
The Effect of Temperature on Yeast Production

Chemistry (CH)

- 6009T **Laren Chang**
What Milk Makes the Best Cheese
- 6010S **Sophie i Gallandat**
which type of ligh bulb works best to make yogurt?
- 6011W **Carson Knoer**
Do Different Cooking Methods Affect The Amount Of Vitamin C In Vegetables
- 6012S **Grace A Schwab**
Let Them Eat Cake
- 6013T **Anna E Strub**
Water Wars
- 6014W **Freya B Zank**
Popular Sodas to Avoid with Chronic/Acute Stomach Problems

Earth and Planetary Science (EA)

- 6015W **Maddie J Duffy**
Speed Demon
- 6016T **Colin D Olson**
Architecture vs Earthquakes

Energy and Transportation (ET)

- 6017W **Abby Bollensen**
Color and Temperature
- 6018S **Matthew E. Davis**
Got Support?
- 6019S **Isaac Etan Morales**
At what speed does a 2003 chevy monty carlo get the better gas mileage
- 6020S **Ezekial DR Pauls**
Parabolic Solar Energy
Project At Electricity Wall

Engineering: Electrical and Mechanical (EE)

- 6021T **Simon J Burgess**
Spare a watt, Save a lot
- 6022W **Anna Harris**
Sound of Music
- 6023T **Rachel Petruconis**
Ready, Set, Freeze!

Engineering: Materials and Bioengineering (EN)

- 6024W **Joel Ehlen**
Which Packing Material Is Most Protective?
- 6025S **Eric W Kuta**
The breaking point in some fishing knot.
- 6026S **Grace E Tisell**
What are the burn rates of different pajama fabrics

Environmental Sciences (EV)

- 6027T **Ethan A Davenport**
North vs South: pH water Testing
- 6028W **Morgan T Hovanec**
A Good Sock Cotton vs. Wool
- 6029W **Andrew Hoy**
What Angle of Light Striking a Solar Cell is the most Efficient?
- 6030T **Zoe M Huot-Link**
Banana Breakdown
- 6031W **Kate Janda**
The Effect of Temperature on Fingerprints
- 6032T **Isaac D Robinson**
Shower vs. Bath
- 6033T **Arianna H Winslow**
The Effect of the Gulf Oil Spill on Plant Life
- 6034S **Mackenzie F Zenk**
Go With The Flow

Mathematical Sciences (MA)

6035T **Austin M Murr**
Top Flight

Medicine and Health Sciences (ME)

6036W **Jane Kolar**
Does Exercise Affect Vital Lung Capacity?

6037S **Shannon M Ostenby**
I Didn't See That Coming!

6038S **Minna Stillwell Jardine**
What is the most effective combination of toothpaste and toothbrush?

6039T **Sergei Al Subramanian**
Canine Struvite Bladder Stones

6040W **Brooke E Wertwijn**
Do Sunglasses Really Protect Your Eyes From UV Light?

6041W **Jack Will**
The Biomechanics of Lifting Measuring Low Back Stress with a Mechanical Model

Microbiology (MI)

6042W **Emma Davies**
It's A Mouthful

6043T **Noah Rooze**
Bacteria Vs Plants

Physics and Astronomy (PH)

6044T **Charles C Baker**
The Elements of Speed

6045T **Jacob T Edwards**
Does changing a baseball bat's core material affect the distance of a hit ball?

6046W **Alex J Hartwick**
Hot Cups

6047W **James A Klaesges**
Airplanes

6048W **Michael J Munson**
Color Light Penetration

6049S **June E Ofstedal**
Why Does Salt Water Have A Higher Level Of Bouyancy Than Fresh Water

6050T **Ben Olson**
Arrow Tip Penetration

6051T **Kathryn J Richner**
How Strong is an Eggshell?

6052W **Cole J Solomon**
Does Color Effect Tempuature

6053W **Amelia R Walker**
Gravity and Newton's Second Law of Motion

6054T **Henry Warwick**
Friction Speedway

6055S **Brian R Whelan**
How Safe Are Hockey Helmets?

Plant Sciences (PS)

6056T **Jonathan O Rustad, Linnea R Rustad Team** - Which Christmas Tree Loses Its Needles Fastest

6057S **Claire Sponheim**
Do Different Liquids Affect the Growth of Peas and Beans

6058W **Peter C Thompson**
Does Light Color Affect Plant Growth?

Grade 7

Animal Sciences (AS)

7001T **Mairead D. Brooks**
Do Animals Show Color Preference?

7002S **Alexander H Forstrom**
Does changing a Red Harvester ant's diet affect its life span?

7003T **Zoe L Gale**
Wet, Dry or Damp? Do Sow Bugs Have a Preference

7004T **Laurel M Neufeld**
flytube: Male Fruit Flies and Their Preferences

Behavioral and Social Sciences (BE)

7005S **Katy I Baker**
The effect of ages of individuals on influence when shown biased information

7006S **Marius D Brown**
Sugar and the Brain

7007T **Hannah E Coleman**
What Age Group Can Best Identify Body Language?

7008W **Morgan Dachis, Jessie Boon Team** - Sing your range

7009W **Abigail L Fuchs**
What is the Correlation of car type and the drivers' willingness to obey a stop sig

- 7010W **Conor S Klaers**
Exer-Studying
- 7011S **Ethan Levin**
How does ethnicity and gender affect stress level in 4th and 5th graders?
- 7012S **Maxine I Lightfoot**
The affect of age on perception of time
- 7013W **Allie Petersen**
All in Good Taste
- 7014T **Beebee R Qureshi**
Examining Stroop Effect
- 7015S **Ellie T Thorsgaard**
Eating Modeling
- 7016W **Travis Alexander Woltmann**
Plant Power
- Cellular and Molecular Biology (CB)*
- 7017W **Arush Jain**
Effect of voltage on DNA separation
- 7018S **Sunanda Rajput**
How does different solution affect osmosis?
- Chemistry (CH)*
- 7019S **Lexi P Bottern**
What Popcorn is Best for Your Home?
- 7020T **Ryan R. Crotty**
Stain, Stain Go Away
- 7021T **Maria K Johnston**
What type of salt makes certain objects float in the least concentration?
- 7022T **Tristen D Lorsung**
Mini Fire Extinguisher
- 7023W **Sarah M McGoldrick**
Growing Crystals
- 7024S **Nelson W Moroukian**
The Fore of Food
- 7025S **Philip C Moulton**
How does soda affect the erosion of paper clips?
- 7026T **Ruthie E Nordquist**
What to Feed a Fire
- 7027W **Brendan J Quinlan**
What Variety of Apple has the Greatest Vitamin C Content?
- 7028T **Tyler S Radtke**
Which Orange Juice Has the Most Vitamin C?
- 7029W **Sam R Rocheford**
What's in your cooking oil?
- 7030T **Kyle J Schaust**
What Type Of Water Do Salt Crystals Grow Faster In?
- 7031T **Siddharth Sridher**
Can hot water freeze faster than cold water?
- 7032W **Bradley G Van Tatenhove**
Rock Candy
- 7033W **Devin T. Weiman**
Density
- 7034W **Alana T Wells**
What's Your Dissolvin Point?
- Computer Science (CS)*
- 7035T **Kirby Goodell**
Computer Input Device Efficiency
- Earth and Planetary Science (EA)*
- 7036S **Alayna R Carrier**
Which Wood Burns Longer
- 7037T **Emily V. Dahlstrom**
What Colors Absorb the Most Heat
- 7038W **John Hiller**
Earthquake Liquefaction
- 7039S **Alexandra L Penn**
Process of Wood Decay
- 7040T **Nicholas J Weimann**
Water Erosion
- Energy and Transportation (ET)*
- 7041W **Anna L DeVries**
Wind Wonders
- 7042W **Zarek D Drozda, Jack T McCabe Team** - Gone With the Wind
Project At Electricity Wall
- 7043W **Caleb N Hay**
What Insulates Best and Why?
- 7044T **Michael W Hughes**
Heating Metals
Project At Electricity Wall
- 7045S **Evan P Hulick**
How the type of renewable energy affects how much electricity it makes
- 7046T **Isabel A Huot-Link**
Windmills: How does the amount of sails affect the velocity?

7047W **Carolyn K Jons**
The Effect of Soap Bubble Size on the Insulative Abilities of Foams

7048T **Daniel Kussow**
Harnessing the Wind
Project At Electricity Wall

7049W **Kobe I Peters Ehrlich**
Solar Power

Engineering: Electrical and Mechanical (EE)

7050T **Tyler P Darrow**
Skyscraper Shapes and Wind Forces

7051W **Emma C Faust**
Does Battery Storage Temperature Affect Performance?

7052W **Caleb H Kroese**
Shockingly Fruity

7053W **Geordie S Roscoe, Fernando A Arias**
Team - Motor Strength

Engineering: Materials and Bioengineering (EN)

7054S **Isak L Bowron**
What Bridge Structure Holds the Most Weight?

7055T **Karsten R Francis**
What Materials have the Ability to Levitate Magnets

7056T **Louis W Glewwe**
Sand/ Cement Ratio: Does it Affect a Brick's Strength?

7057W **Matthew R Kruse**
What Type of Thermal Insulation is most Effective

7058T **Mary Anna Preble**
The Strength of Sewing Thread

7059W **Camryn D Rettig**
A Streak Free Shine

7060W **Sarah Verdoorn**
Stick It

7061S **Carly C Zimmerman**
Bike Helmets: Stop, Drop, and Reuse?

Environmental Management (EM)

7062T **Shanelle M. Abeywardene**
Which item will clean oil out of water the most effectively from the ocean and marshes?

7063T **Katherine B. Hughes Ms**
The Effect of Oils on Elodea

7064W **Roman D Kouznetsov, Jack T Oster**
Team - Investigation of Effectiveness of Household Materials as Oil Absorbents and Dispersants

7065T **Marcos Luna**
Heat Conservation

7066S **Matthew J Richie**
Does the distance of visibility depend on the type of camouflage?

Environmental Sciences (EV)

7067T **Michael A. Ardichvili**
Worms, soil or plain?: What's the fastest way to compost?

7068S **Grace M Clark**
Sedimental Journey: River Current and its Effects on Water Clarity
Project At Electricity Wall

7069S **Keith B Eicher**
How does the acidity of a plants water affect its height?

7070T **Ridhima Mishra**
pH Power: A Yummy Eco - Friendly Alternative to Batteries

7071T **Craig A Munson Jr, Collin T McKane**
Team - Sand VS Soil

7072T **Luke W Nelson**
Does Eco Friendly Deicer Leave a Visual Stain on Carpet?

7073W **Ellie Pryor**
The Effect of Oil Spills on Plants

7074W **Gregory R Sercombe**
The Rate of Degradation of SunChips Bags

7075S **Laura J Souther**
Rain Rain Go Away! Come Again a Cleaner Way!

7076W **JJ Wahlquist**
Acid Rain, the Silent Killer

Mathematical Sciences (MA)

7077S **William B Anderson**
Chaos Triangles: Are You More Random Than a Computer?
Project At Electricity Wall

Medicine and Health Sciences (ME)

7078T **Madison R Huna, Annabelle Hearne**
Team - Pitter Patter Goes My Heart: The Effect of Caffeine on Heart Rate in Daphnia magna

- 7079T **Emily J Keis**
Does Listening to Different Types of Music Affect your heart rate?
- 7080W **Maddie McConkey, Clare Lothenbach Team** - Crazy Carrots
- 7081T **Christina S Meyer**
How Does Daily Aerobic Exercise Affect Your Muscle Memory?
- 7082T **Aisha Tahir**
Does age affect heart rate recovery time?

Microbiology (MI)

- 7083W **Sean Daley**
Mold and Cheese: When and Where
- 7084W **Colin R Glass**
Water Purification Methods
- 7085W **Joseph Harvey**
Garlic and Bacteria
- 7086S **Avery Q Larsson**
How Does Packaging Affect Meat Spoilage?
- 7087T **Siena I Milbauer**
Is it Better to Eat Bread With or Without Preservatives?
- 7088T **Timothy A Riethmeier**
How To Disinfect Contaminated Water
- 7089W **Benjamin C Rusert**
Dangerous Game
- 7090T **Minna H Thrall**
Which Honey Has the Least Bacteria: Store-bought or Local?
- 7091S **Lisa I Torstenson**
Fast Food Burger Decomposition
- 7092T **Kayley R Winkelman, Abrielle Prunty Team** - Ugh! Whose Mouth Did That Come From?
- 7093T **Max Ylitalo**
The effects of storage time and storage conditions on bacteria levels in pasteurized milk

Physics and Astronomy (PH)

- 7094S **Vincent R. Altobell-Velasco**
The Invisible Light: The Effects of UV Radiation
- 7095T **Mikaela J Amundson**
Does the speed of light differ when measured through different amounts of sugar in gelatin?
Project At Electricity Wall
- 7096W **Alisha L Carter**
Which Pot Holder Insulates the Most?

- 7097W **Meagan C Chalfen**
Catapults - Does Mass Matter?
- 7098S **Meara H Cline**
Throwing Straight with Added Weight: A study of how Weight
- 7099S **Frances G. Fuller**
An Investigation of the effects of Newton's Laws in terms of the human body in motion
Project At Electricity Wall
- 7100W **Annelise Gaston-Carrere**
Temperature and Solubility
- 7101T **Lydia K. Grimes**
Will it Crack
- 7102W **Mark Gustafarro**
Big Air
- 7103W **Daniel Kiely**
Eddy Current Braking
- 7104W **Matia M Maciel**
Boat Shape vs. Speed
- 7105W **Ja'Bre O Moore**
Bouncing Ball Rebound Rating
- 7106T **Maitreya A Mujumdar, Jonathan Luk Team** - The Perfect Wing
- 7107W **Jack P Reddan**
Exploring Potential and Kinetic Energy
- 7108T **Matthew F Reser**
Does the Flex of a Hockey Stick Affect its Accuracy?
- 7109T **Noah A Rohleder, Kyle J Steiner Team** - Soccer Ball and Air Pressure
- 7110T **Jordan D Thompson**
Magnetometer
Project At Electricity Wall

Plant Sciences (PS)

- 7111T **Lesley L Aragon - Blanco**
Does Dr.Pepper Affect the Growth Of Grass?
- 7112W **Matthew W. Farstad**
What Type of Water Helps Plants Grow Best?
- 7113T **Maddie T Howes**
Does the depth a lettuce seed is planted affect how fast it'll sprout?
- 7114T **Nicole L Kleinschmidt**
Medicated Plants
- 7115W **Eleanor J Konz**
Does Water Temperature Affect Plant Growth

- 7116W **Jacob Koppendrayar**
Weed War: the impact of winter rye on weeds
- 7117T **Haley LaValle**
Stop the Rot
- 7118S **Clara J Lee**
The power of fruits and vegetables
- 7119S **Ann M Leimbach**
Do Plants React to Music?
- 7120W **Morrison A Robblee**
Growing Organic and Non-Organic Potatoes
- 7121W **Emma B Roth**
An Apple a Day - What Keeps the Browning Away?
- 7122W **Audrey M Sheehy**
Hydroponics vs. Ionized Hydroponics
- 7123W **Danae L. Sollie**
Hiding in a Leaf
- 7124S **Fiona J Steen**
How does the brand of bottled water affect the growth of plants?
- 7125T **Jack T Warmka**
Do different types of ice melt affect plant growth?

Grade 8

Animal Sciences (AS)

- 8001S **Lucas W Clapp**
How Light Effects Egg Production
- 8002T **Kasey J Kalthoff**
Clean Me!
- 8003S **Anton J Konieczny**
Effect of Heat on Crickets' Chirping Rates
- 8004T **Mary C Polak**
Does dog saliva kill bacteria?
- 8005W **Liam E Spencer**
Does Tank Size affect Fish Growth
- 8006W **Xandi C Swedberg**
Does the age of a cat affect its sense of smell

Behavioral and Social Sciences (BE)

- 8007S **Duncan E Anderson**
Sterotyping and its Diverse Effects
- 8008S **Gabriel James Blackburn**
lie to me
- 8009T **Emily J Blosberg**
Remember That?

- 8010S **Tate L Bosler**
A helpful tool, or just something cool: reading comprehension on the iPad
- 8011W **Haley M Busyn**
Do Cars Obey Stop Signs More During Rush Hour or Off-Peak Time?
- 8012W **Rebecca A Carpenter**
Optical Illusions
- 8013W **Anna M Carr**
Multitasking
- 8014T **Theresa M Chapdelaine**
Are You Lying to Me? What is the most effect way to tell?
- 8015T **Lizzy A Cullen, Abigail L Knipp Team** - What are the effects of font and color on memory?
- 8016W **Jack L Exline**
Can You Be Trusted?
- 8017S **Anna K Fryxell**
Mirror Tracing and Math
- 8018T **Grace Gauthier**
The Trouble With Talking
- 8019S **Stella D Hewett**
Does Chewing Gum Affect Math Test Scores?
- 8020T **Ellie S Honerman**
The Stroop Effect
- 8021S **Paul Ihlenfeldt**
Disfluency In Education: How Font Affects Memory
- 8022T **Maggie L Krawczyk**
The effect of the age of the test subject on the number of people who can hear the mosquito ringtone.
- 8023S **Jenna Krivit**
How Does Lying Affect Behavior?
- 8024T **Jack R Madson, Steffan Z Larcoran Team** - Does Age or Gender Effect Reaction Times?
- 8025S **Raya M Quttaineh**
Right Vs. Left Handed People's Ability In Mirror Writing
- 8026S **Shannon Silberhorn**
Is the Book or the Movie Better?
- 8027T **Zach Smith, Malik Bowen, Isaiah Bigger Team** - The Effects of Shooting Position on the Trajectory of a Basketball
Project At Electicity Wall

- 8028W **Camille I Smith**
Does Sensory Deprivation Affect Retention of Content?
- 8029S **Abby M Vidmar**
Multitasking Minds: Not As Effective As We Think
- 8030T **Katelyn Weiland, Claire Magno, Rayna Meadows**
Team - The Effects of Energy Drinks on Video Gaming

Biochemistry (BI)

- 8031T **Lujain A Al-khawi**
Vitamin C Concentration in Bell Peppers
- 8032S **Maddie Caruso**
Save My Fruit!
- 8033S **Pahna Lee**
Which Beverage Relieves Spiciness the Best?
- 8034S **Lila C Scher**
The Great Food Debate: Organic vs. Conventional

Cellular and Molecular Biology (CB)

- 8035T **Kimberly M Delveaux**
Bacteria Good or Bad?
- 8036S **Alyona M Link**
Reaction Of Water On Paper
- 8037W **Zoe A Vickerman**
got DNA

Chemistry (CH)

- 8038W **Nathan M Carroll**
The Energy Outputs of Biofuels and Fossil Fuel
- 8039T **Maja H Caye , Morgan A Cottew**
Team - What type of liquid rusts steel the fastest?
- 8040S **Cristina A Corrie**
The Effectiveness of Homemade Vitamin C Indicator Solution on Determining the Relative Amounts of Vitamin C in Various Drinks.
- 8041T **Savannah R Cunnien**
Hand Sanitizer
- 8042T **Matthew J Danley**
The Effect of Compressed Air and Compressed Nitrogen on a Vehicle's Gas Mileage
- 8043T **Ty Gale**
How Will It Burn?
- 8044T **Kerry E Hagedorn**
How Permanent Are Permanent Markers

- 8045S **Zachery M Inskeep**
What Is the Best Temperature For Growing The Largest Crystals
- 8046S **Ellen H Purdy**
Chromatography of Marker Inks
- 8047W **Sofie F Scott**
How Acids Affect Cupcake Characteristics
- 8048T **Sydney I Steinmaus**
Detergent

- 8049T **Anna Elise Stolte**
Sneaky Shampoo

Earth and Planetary Science (EA)

- 8050W **Charlotte C Cowdery, Claudia Cerda-Escobar**
Team - Water Quality in Minneapolis Lakes
- 8051S **Amber Lee Walker Amber Walker**
Does the amount of water affect the growth of a stalactite?
Project At Electricity Wall

Energy and Transportation (ET)

- 8052T **Marco C Braaten, Will S Byers-Olson**
Team - Wood Burning
- 8053T **Wencel T Kust**
Gearng
- 8054W **Theresa M Narog**
Wind Turbine Efficiency
- 8055T **Brian Rooker**
Magnetic Levitation
- 8056W **Chase R Ward**
Algae Biofuel
- 8057S **Jon Watters**
The effect of the shape of blade on a wind turbine on the amount of energy output.
- 8058S **Hannah K Weissman**
How the Number of Fan Blades and the Shape of the Fan Blade Affect the Energy Produced.
- 8059S **Branick D Weix**
What is the best angle for a belly fairing on a semi-truck to reduce drag?

Engineering: Electrical and Mechanical (EE)

- 8060T **Carly J Koemptgen**
The effect of shutter speed on photo clarity
- 8061T **Nathaniel I Landin**
Light 2 Electricity
Project At Electricity Wall

- 8062T **Emily J Miotke**
Heat or Light; Which Affects the Enhancement of a Solar Panel?
- 8063W **Nick A Mitchell**
Stop the Box!
- 8064S **Maria K Neuzil**
To Catch a Thief: The Effectiveness of Different Lengths of Wire for a Small, Battery-Operated Burglar Alarm
- 8065S **Benjamin Pauls**
Propellers
Project At Electricity Wall
- 8066T **Jacinta M Rademacher**
Texting : What Cell Phone Company sends text messages the fastest?
- 8067S **William A Rose**
How does the length of the Trebuchet arm affect the throwing distance?

Engineering: Materials and Bioengineering (EN)

- 8068W **Rico L Bullock**
Super Glove
- 8069S **Jimmy M Hallermann**
The Effects of Structural Supports on Bridge strength
- 8070T **John W Leinberger**
The Effects of Nose Cone Shape on the Altitude of a Model Rocket
- 8071W **Tianna N Roberts**
Which building design is the most wind resistant?
- 8072W **Kyle J Walz**
Material Matters
Project At Electricity Wall
- 8073T **Madeline L Warner**
World on a String: How Climate Affects Intonation
- 8074S **Micaela J Yarosh**
The Sound of Music

Environmental Sciences (EV)

- 8075S **Sarah M Bordsen Bailey**
Go Green and Compost!
- 8076S **Simon E Brown**
How do Earthworms affect Plants?
- 8077T **Isabella M Christensen**
How Does Compost Create Heat
- 8078T **Olivia A Enquist**
"Money in the Bank" A Study For Energy vs. Water Conservation

- 8079T **George W Gallagher**
Salt Eliminator of Ice
- 8080T **Jenna J Grundtner**
CO2 and Plant Growth
- 8081W **Sophie M LaMere**
Paper Strength
- 8082S **Matthew R Michalski Jr**
The Effect of Biomanipulation in Stormwater Ponds
- 8083T **John R Oberst**
After The Disaster
- 8084W **Delaney L Peterson**
Recycling is Cool and Hot
- 8085W **Monica E. Plante**
Water Quality
- 8086T **Emily Roznowski**
Lead N' Lakes: Which Areas Around Lake Superior Contain Lead?

- 8087T **Colin D Salchow**
Insulation testing
- 8088W **William H Thompson**
Does Oil Affect Aquatic Plant Functions?
- 8089W **Rachel S. Woell**
Acid Rain
- 8090S **Katie I Wollmering**
The Effect Of Still Design On The Collection Of Purified Drinking Water

Medicine and Health Sciences (ME)

- 8091T **Jupiter U.G. Adams-Phipps**
Enhancing CSF
- 8092T **Cole Brueschoff**
Are all Carbs Created Equal
- 8093W **Afton M Hanger**
Dissolving Eggs
- 8094W **Rebecca J Heer**
It's Good for Your Heart
- 8095W **Greta A Henry**
Type 1 diabetes
- 8096T **Thomas J Henschell**
Artificial Sweeteners affect on teeth
- 8097T **Maureen T. Hughes Ms.**
The Effectiveness of SPF Levels
- 8098T **Libby K Jacobson, Eva F Manson Team** - How do our teeth react to common liquids?

8099W **Annabelle L. Jensen**
Which liquid is the best for dissolving ibuprofen in your stomach

8100W **Kelly E Kerin**
Does Power Balance Really Work?

8101S **Mikayla M Klein**
Dancing on the Brain

8102S **Sarah K Link**
The effect of the types of cooked burger patties on the amount of mold that will grow within three weeks.

8103S **Alice E Michell**
Do children mistake medicine for candy?

8104S **Lilianna Keane Pavlicek**
Does food affect your mood?

8105S **Riley J Quinlan**
How Does Caffeine Affect How You Shoot Free Throws?

8106T **Lucia K. Renikoff**
Taste and Smell Relationship

8107S **Jacob A Reynolds**
ACHOO (autosomal dominant compelling helio-ophthalmic outbursts of sneezing) syndrome: The Investigation of Sunlight, Halogen and LED Light Sources on Subjects and Their Effects on the Photic Sneezing Reflex

8108S **Morgan J Riddle Kimm**
Does Age Affect Retinal Glare Recovery?

8109T **Michael C Rydel**
Affect of Panikillers on a Daphnia

8110S **Samantha E Vitek**
Cookie Crazy

8111S **John S Wenger**
How Many Warm-up Pitches?
Project At Electricity Wall

8112T **Greta S White, Abby Cromie**
Team - What Are The Harmful Chemicals In Hair Products? Is There A Correlation To pH?

8113S **Samantha Yang**
Can Small Children Tell The Difference Between Candy and Medicine?

Microbiology (MI)

8114W **Anna H Cote**
The Five Second Rule?

8115S **Jayne E Gephart**
Do Different Types of Bags Used to Store Bread Affect the Rate at Which Mold Grows

8116S **Richie M Gulner**
Talking Dirty

8117T **Sarah A Layon**
Where Are Bacteria More Prone to Grow Within the School?

Physics and Astronomy (PH)

8118W **Keanndra M Auld**
Hutch Heat

8119W **Ellen M Bakke**
How Does Solar Panel Angle Affect Electricity Production?
Project At Electricity Wall

8120W **Molly M Davies**
The Sound of Speed

8121S **Stephan J Hankerson**
Do Comercials have a louder volume than regular tv

8122W **Carolyn A Klaesges**
Parachute

8123T **Michael Ochs**
Shear Power

8124S **Tessa A Portuese**
Tennis Balls vs. Temperature

8125T **Laura C Sunday**
Game, Set, Match: Does String Tension Affect Accuracy?

8126W **Ashley N Stephens**
Microwave Wattage vs. Food & Liquid Temperature

8127T **Kristyn A Waldhauser**
Composite Vs. Aluminum Softball Bats: Which Bat Gives the Ball the Greatest Distance?

8128S **Tou Xiong**
How does type of ball affect storage of potential energy?

Plant Sciences (PS)

8129S **Kalvin Lane**
How Does Different Strengths Of Acids Affect The Growth Of Zinnia Seeds?

8130W **Sam P McIlwain**
Does Radiation Affect Seed Germination and Plant Growth?

8131T **Colin J Moriarty**
The Effects Of Different Chemical Compounds On Seed Germination

8132S **Claire E Newbury**
The Effect of 4 Different Preservatives on Fresh
Roses

8133W **Kelly J Reger**
The Soil of the Future: Hydroponics, Aeroponics,
or Soil?

High School

Animal Sciences (AS)

1001W **Iman Y Pakzad**
Grade 9 - The Effect of Water Velocity on Nearest
Neighbor Distance in *Aphyocharax Anisitsi*

1002W **Zachary M Reidell**
Grade 9 - Do Altered Light and Dark Cycles Affect
the Circadian Rhythm and Metamorphosis of
Danaus Plexippus?

1003T **Maddy M Wedan**
Grade 10 - Dominant and Recessive Traits in Mice

Behavioral and Social Sciences (BE)

1004T **Nadirah Abdus-Salam**
Grade 12 - Extracurricular Activities and School
Success

1005T **Maranda L Blackwell**
Grade 10 - The Effectiveness of Graphic
Organizers

1006W **Samarth A Damania**
Grade 11 - Computer Analysis of Player and Team
Performance in Professional Halo 3

1007T **Danny D Dang**
Grade 10 - "Remini-Scents" The Effects of Odor on
Recollection Ability

1008T **Anna Elling**
Grade 10 - Does Experiencing Physical Warmth
Affect Our Feelings About Others?

1009T **Abigail K Farmer**
Grade 9 - Do Males or Females Embrace Delayed
Gratification More?

1010T **Laura Garbe**
Grade 10 - Is There a Correlation Between Physical
and Mental Brain Hemisphere Preference?

1011T **Savannah Lim**
Grade 10 - The Influences of Packaging Color on
Teenage Female Consumers' Preferences of Bottled
Bath Products

1012W **Rishi Sinha**
Grade 11 - On the Correlations of Differences in
Social Behavior between Genders on Social
Networking Sites and in Real Life Studies
Project At Electricity Wall

1013T **Brianna A. Westbrook**
Grade 10 - Gender Occupational Stereotypes of 5th
Grade Children

1014S **Josh J Whitesell**
Grade 9 - Music Memory

1015T **Amber R Willenburg**
Grade 10 - Effects of Music on Memory

1016T **Alynie K Xiong**
Grade 10 - Is Beauty Really in the Eye of the
Beholder: A Scientific Study on the General
Population's Shared Perception of Beauty and
Attractiveness

1017S **Loelue Yang**
Grade 9 - Music Memory

1018T **Tyler R Young-Church**
Grade 10 - Music's Effects

Cellular and Molecular Biology (CB)

1019W **Ishmam A Ahmed**
Grade 11 - Regulation of Sonic hedgehog
expression and activity during differentiation of
human pluripotent stem cells
Project At Electricity Wall

1020W **Evan Chen**
Grade 11 - Functional Analysis of CD24 in Satellite
Cells
Project At Electricity Wall

1021W **Naveen Jain**
Grade 11 - Mechanism of Tumor Suppression by
CHD5
Project At Electricity Wall

1022W **Mahati Pidaparti**
Grade 11 - Isolation & Purification of Clusterin

Chemistry (CH)

1023W **Tom Erdmann IV**
Grade 12 - Synthesis and Purification of Novel
Indene Derivatives for use in Organic Solar Cells

1024W **Josh P Gallop**
Grade 9 - Time's effect on Vitamin C levels and pH
balance in Orange Juice

1025W **Kaelynn Heiberg**
Grade 9 - The Science of Glide Wax

1026T **Jaelyn R Hinz**
Grade 10 - Homemade Photography

1027S **Sabrina Miller**
Grade 9 - Which One Dissolves Me

Computer Science (CS)

- 1028W **Emily R Cherkassky**
Grade 10 - Machine Learning for Evidence-Based
Medical Diagnosis

Earth and Planetary Science (EA)

- 1029W **Ganesh Raman**
Grade 12 - Hydrothermal Vent Communities: An
investigation into the fundamental cause for
extremophile diversity
Project At Electricity Wall

Energy and Transportation (ET)

- 1030T **Nadine M Burkhead**
Grade 10 - Effect of division of surface area on
watts produced by solar cells
- 1031S **Cole M Dunlap, Jeffrey Bissoy-Mattis**
Grade 9 - **Team** - Solar Power
- 1032W **Jackson Egert**
Grade 9 - There's "Something" in My Waste Water
- 1033T **Carissa E Klonecz, Alex J Claseman**
Grade 11,11 - **Team** - Agricultural Biomass:
Revamping the World's Energy Sources One Crop
at a Time
- 1034W **Gavin G Ovsak**
Grade 12 - The Creation and Testing of a Fully
Submersible Geared Water Turbine for Alternative
Energy Production
Project At Electricity Wall
- 1035T **Andy Ylitalo**
Grade 10 - Power Up! Dual Rotor Wind Turbine
Design

Engineering: Electrical and Mechanical (EE)

- 1036T **Martin Anderson**
Grade 12 - Specific Impulse of Traditional Black
Powder Rocket Engines in the Pyrotechnics
Industry: Engineering an Improved Static Test
Apparatus / Utilizing it to Analyze Performance
and Quality of Traditional Versus Modern
Manufacturing Methods
Project At Electricity Wall
- 1037W **John M Culliton Jr.**
Grade 12 - Engineering Engine Maps to Determine
Peak Efficiency of a Hydraulic Hybrid Off-Road
Utility Vehicle
- 1038W **Hari Ganti**
Grade 12 - Flying in the Future: Phase Two of
Optimizing an Airfoil for Inviscid Airflow
Project At Electricity Wall
- 1039W **Tristan S. Kusner**
Grade 9 - The effects of filament voltage and
antenna length on radio performance

- 1040W **Abhishek Nayar**
Grade 9 - Scan.Save
Project At Electricity Wall

Engineering: Materials and Bioengineering (EN)

- 1041W **Seungjin Chung**
Grade 9 - Recyclable Insulators
- 1042W **Matthew C Hackner**
Grade 12 - Improving efficiency of organic solar
cells through fluorescence quenching of poly-3-
hexylthiophene
- 1043W **Elaina E Hamann**
Grade 12 - Solar Energy
Project At Electricity Wall
- 1044W **Duligur Ibeling**
Grade 11 - Shape-memory Liquid-crystalline
Polymers with Cholesterol Mesogen
- 1045T **Monica Latapi**
Grade 11 - Slippery When Wet? An Analysis of
Coefficient of Friction Under Varied Loading
Conditions
- 1046W **Addison L Weiler**
Grade 12 - Improving Efficiency of Organic Solar
Cells Using Lead Phthalocyanine
- 1047T **Jonathan S Yiv**
Grade 10 - Types of Soil Most Suitable for
Structural Stability

Environmental Management (EM)

- 1048T **Juana M Espinoza, Michelle J LaGarde**
Grade 11,11 - **Team** - Wetland Health Evaluation:
Replacing Bottle Traps With Hester Dendy Traps,
Year Two

Environmental Sciences (EV)

- 1049T **Brandon Banh**
Grade 10 - The Effects of a Solar Cell's Angle
Compared to the Amount of Electricity Generated
- 1050W **Tim Bergeland**
Grade 9 - The Effect of Vermicompost Diet on
Casting pH and NPK
- 1051T **Arnoldo Bruce**
Grade 10 - NaCl Tolerance of Three Minnesota
Leech Species
- 1052S **Latham G Carr**
Grade 9 - Wind to Energy
- 1053W **David B Fuad**
Grade 12 - Preventing microalgae
(Chlamydomonas reinhardtii) build-up in
photobioreactors for biofuel production efficiency

- 1054T **Isak P Hawkinson**
Grade 10 - Quality of Water and Snow concerning Phosphate, Dissolved Oxygen, and Hardness
- 1055T **Cheyenne Mason-Brousseau**
Grade 10 - Twin Cities Meltwater: Cyanide
- 1056T **Olivia J Newman**
Grade 10 - Effects of Sulfuric Acid Solution on Red Wrangler Worms in Different Soils
- 1057W **Lisa K Persson**
Grade 10 - Home energy efficiency improvement with targeted venting
- 1058T **Omead Sanei**
Grade 10 - What Soil Amendment is the Most Effective at Helping Plants Grow Tall?
- 1059W **Miranda N Smith**
Grade 9 - The Neutralization of Acid Rain
- Mathematical Sciences (MA)*
- 1060T **Alexis C Bayless**
Grade 10 - The formulation of an algorithm to decipher a Rubik's Cube via three explicit sequences
- 1061W **Paimon Y Pakzad**
Grade 11 - Characterization Of Benign Nevi And Malignant Melanoma Using Signature Curves
- Medicine and Health Sciences (ME)*
- 1062T **Redeat F Abegaz**
Grade 10 - Effects of Benzoyl Peroxide and Salicylic Acid on Escherichia Coli
- 1063W **Emily C Alper, Eleanor M Haeg**
Grade 12 - **Team** - Targeting Genes in Salmonella Kentucky Associated With Food-Born Illnesses
- 1064T **Thatcher Banh, Sierra M Adrian**
Grade 11,11 - **Team** - Modulation of Phagocytosis by Morphine and Hypoxia
- 1065T **Anushua Bhattacharya**
Grade 11 - Silver Nanoparticles Affect Cell Messenger Delivery
- 1066W **Naomi P Borowsky**
Grade 9 - Iron Chef: The Effects of Cooking Methods on the Amount of Iron in Foods
- 1067W **James M Chen**
Grade 11 - Non-invasive Imaging of Oxygen Metabolism in Diseased Brain
- 1068T **Micah J Hill**
Grade 11 - Spicy Foods: Senses, Year Two
- 1069T **Heather M Huna**
Grade 9 - Spice it Up! The Effects of Turmeric on Planarian Regeneration
Project At Electricity Wall
- 1070W **Caleb Kumar**
Grade 10 - Designing a Java Program to Diagnose Bladder Cancer
- 1071T **Roumany Phan**
Grade 10 - Effect Of Co-enzyme10 (Q10) On Platyhelminthes—Planarians' Regenerating
- 1072W **Michael L Portu**
Grade 12 - Loading Forces Experienced by Heart during High School Athletic Impacts
- 1073T **Christina A Sahli**
Grade 10 - The Effect of Gender and Senescence on Preference Toward Models That Insinuate Benevolence or Abhorrence
- 1074W **Paarul Sinha, Jillian Wothe**
Grade 10,10 - **Team** - The Effects of the Mitochondria in Myocardial Ischemia
Project At Electricity Wall
- 1076W **Bo Sun**
Grade 12 - Establishment of long-term cultures of new cardiomyocytes for use as an in vitro model for heart regeneration
Project At Electricity Wall
- 1075W **Lesley Sun**
Grade 11 - Does a high-fat diet induce obesity?
Project At Electricity Wall
- 1077W **Lawrence Wang**
Grade 12 - The Role of Bile Acids in Cryopreservation Injury of Kidney
- Microbiology (MI)*
- 1078T **Jacob S Christina**
Grade 10 - Effects of Repeated Heating of All Numbers of the Plastic Coding System on Saccharomyces cerevisiae Count
- 1079W **Sid Gopinath, Sachin Rao**
Grade 10 - **Team** - Determining the Relative Effectiveness of Water Purification Techniques Used in Developing Nations
- 1080T **Iman Issa**
Grade 10 - Does The Skin Work Like A Barrier Against Pathogens?
- 1081T **Alexis C Kraft**
Grade 10 - Effects of Ultraviolet Light on Bacteria in Water
- 1082W **Rebecca M Southern, Cara K Kowalchyk**
Grade 12,12 - **Team** - Investigating the use of Pseudomonas putida Fu1 to clean up toxic furan agricultural byproducts

1083S **Shayla J Thacker**
Grade 11 - Pyramid Power

1084T **Antonio Trinh**
Grade 10 - An Analysis of Bacteria, PH, and Chlorine in the Schools Water Supplies

Physics and Astronomy (PH)

1085S **Walter A Aguilar**
Grade 9 - How Fast Can You Flow?

1086T **Gabriela O. Braga**
Grade 12 - Buoyancy In Single Bubbles and Foams
Project At Electricity Wall

1087W **Jacob Derechin**
Grade 12 - Does Adding Streamers To A Wing Increase The Lift Force?

1088W **Ryland Dorshow**
Grade 9 - Elasticity of Rubber bands with Temperature

1089S **Alysia R Flores**
Grade 12 - Engineering a Working Mode of The Casimir Effect
Project At Electricity Wall

1090T **Jacob M Karr**
Grade 10 - Filaments: They changed the world

1091S **Kong Lee**
Grade 12 - Laser Telephony

1092W **Jonathan Z Liu**
Grade 12 - Design and Analysis of a Tunable Superlens
Project At Electricity Wall

1093W **Alexander Spencer**
Grade 11 - An Exploration of Magnetism in Thin Film Strained LaCoO₃
Project At Electricity Wall

1094S **Austin M Yang**
Grade 9 - Phonebook Friction

Plant Sciences (PS)

1095T **Aditi Das**
Grade 9 - Understanding Crown Gall Tumor Disease on Plants Through the VirB3 Protein

1096T **Thomas E Husen**
Grade 10 - Correlation Between Fertilizers and Grass Growth

1097W **Aris E Prince, Roshny S Vijayakar**
Grade 11 - **Team** - Has nuclear radiation fallout in Japan and Chernobyl altered plant response to UV-B radiation? A study of Arabidopsis thaliana response to UV-B

1098T **Abigail A Schulberg**
Grade 10 - The Effects of Isopropyl Alcohol on Pea Plants

1099W **Amy M Wen**
Grade 12 - Effect of Compost Amendments on Sandy Soil for Sustainability: Vegetative Health and Water-Holding Capacity
Project At Electricity Wall

1100W **Ann Ziegler**
Grade 9 - The Germination of Different Seed Types



Office Max congratulates the students on competing in the Twin Cities Regional Science Fairs

<http://www.officemaxsolutions.com/education/>

Office Max - The Quarry Store 0723

1610 New Brighton Blvd, Minneapolis, MN 55413
(612) 781-0154

Office Max - The Fountains Store 1460

11160 Fountains Drive, Maple Grove, MN 55369
(763) 315-1140



Water & Process Solutions

Dow Water & Process Solutions congratulates your achievements in competing at the Twin Cities Regional Science Fair.

We thank Dow Water & Process Solutions for their sponsorship of this event!

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

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



**AWARD
SPECIALIST**
31 YEARS IN BUSINESS

900 3rd Street Suite C
St. Paul Park, MN 55071

TROPHIES - PLAQUES - MEDALS
PLASTIC SIGNS & BADGES

----CALL DONNA----

(651) 459-6237

fax (651) 458-9252

edstrophies@comcast.net

Good luck to all participants



MIDWAY PARTY RENTAL, INC.

2110 Gilbert St. Paul, MN 55104

Fax: 651-647-1353

Phone: 651-644-0005

1-800-759-RENT

Custom catering,
event planning and
memorable spaces
for every occasion.

612-253-0025
ahanson@mintahoe.com

Mintáhoe



HOSPITALITY GROUP

Grade 6

Baker, Charles C 6044T
 Baxter, Emma L 6001T
 Bollensen, Abby 6017W
 Burgess, Simon J 6021T
 Chang, Laren 6009T
 Conners, Maggie M 6005S
 Davenport, Ethan A 6027T
 Davies, Emma 6042W
 Davis, Matthew E. 6018S
 Duffy, Maddie J 6015W
 Edwards, Jacob T 6045T
 Ehlen, Joel 6024W
 Fredrickson, Bengt 6002W
 Gallandat, Sophie i 6010S
 Groth, Olivia 6002W
 Harris, Anna 6022W
 Hartwick, Alex J 6046W
 Hienz, Andrew 6002W
 Hovanec, Morgan T 6028W
 Hoy, Andrew 6029W
 Huot-Link, Zoe M 6030T
 Janda, Kate 6031W
 Johnson, Alexander 6003W
 Johnson, Molly E. 6008S
 Klaesges, James A 6047W
 Knoer, Carson 6011W
 Kolar, Jane 6036W
 Kuta, Eric W 6025S
 Morales, Isaac Etan 6019S
 Munson, Michael J 6048W
 Murr, Austin M 6035T
 Ofstedal, June E 6049S
 Olson, Colin D 6016T
 Olson, Ben 6050T
 Ostenby, Shannon M 6037S
 Pauls, Ezekial DR 6020S
 Petruconis, Rachel 6023T
 Richner, Kathryn J 6051T
 Roberts, Stephanie 6006W
 Robinson, Isaac D 6032T
 Rooze, Noah 6043T
 Rustad, Jonathan O 6056T
 Rustad, Linnea R 6056T
 Schwab, Grace A 6012S
 Solomon, Cole J 6052W
 Sponheim, Claire 6057S
 Stillwell Jardine, Minna 6038S
 Strub, Anna E 6013T
 Subramanian, Sergei Al 6039T
 Sullivan, Maggie R 6007W
 Thompson, Peter C 6058W
 Thrall, Mamie 6004T

Tisell, Grace E 6026S
 Walker, Amelia R 6053W
 Warwick, Henry 6054T
 Wertwijn, Brooke E 6040W
 Whelan, Brian R 6055S
 Will, Jack 6041W
 Winslow, Arianna H 6033T
 Zank, Freya B 6014W
 Zenk, Mackenzie F 6034S

Grade 7

Abeywardene, Shanelle M. 7062T
 Altobell-Velasco, Vincent R. 7094S
 Amundson, Mikaela J 7095T
 Anderson, William B 7077S
 Aragon - Blanco, Lesley L 7111T
 Ardichvili, Michael A. 7067T
 Arias, Fernando A 7053W
 Baker, Katy I 7005S
 Boon, Jessie 7008W
 Bottern, Lexi P 7019S
 Bowron, Isak L 7054S
 Brooks, Mairead D. 7001T
 Brown, Marius D 7006S
 Carrier, Alayna R 7036S
 Carter, Alisha L 7096W
 Chalfen, Meagan C 7097W
 Clark, Grace M 7068S
 Cline, Meara H 7098S
 Coleman, Hannah E 7007T
 Crotty, Ryan R. 7020T
 Dachis, Morgan 7008W
 Dahlstrom, Emily V. 7037T
 Daley, Sean 7083W
 Darrow, Tyler P 7050T
 DeVries, Anna L 7041W
 Drozda, Zarek D 7042W
 Eicher, Keith B 7069S
 Farstad, Matthew W. 7112W
 Faust, Emma C 7051W
 Forstrom, Alexander H 7002S
 Francis, Karsten R 7055T
 Fuchs, Abigail L 7009W
 Fuller, Frances G. 7099S
 Gale, Zoe L 7003T
 Gaston-Carrere, Annelyse 7100W
 Glass, Colin R 7084W
 Glewwe, Louis W 7056T
 Goodell, Kirby 7035T
 Grimes, Lydia K. 7101T
 Gustaferro, Mark 7102W
 Harvey, Joseph 7085W
 Hay, Caleb N 7043W

Hearne, Annabelle 7078T
 Hiller, John 7038W
 Howes, Maddie T 7113T
 Hughes Ms, Katherine B. 7063T
 Hughes, Michael W 7044T
 Hulick, Evan P 7045S
 Huna, Madison R 7078T
 Huot-Link, Isabel A 7046T
 Jain, Arush 7017W
 Johnston, Maria K 7021T
 Jons, Carolyn K 7047W
 Keis, Emily J 7079T
 Kiely, Daniel 7103W
 Klaers, Conor S 7010W
 Kleinschmidt, Nicole L 7114T
 Konz, Eleanor J 7115W
 Koppendrayner, Jacob 7116W
 Kouznetsov, Roman D 7064W
 Kroese, Caleb H 7052W
 Kruse, Matthew R 7057W
 Kussow, Daniel 7048T
 Larsson, Avery Q 7086S
 LaValle, Haley 7117T
 Lee, Clara J 7118S
 Leimbach, Ann M 7119S
 Levin, Ethan 7011S
 Lightfoot, Maxine I 7012S
 Lorsung, Tristen D 7022T
 Lothenbach, Clare 7080W
 Luk, Jonathan 7106T
 Luna, Marcos 7065T
 Maciel, Matia M 7104W
 McCabe, Jack T 7042W
 McConkey, Maddie 7080W
 McGoldrick, Sarah M 7023W
 McKane, Collin T 7071T
 Meyer, Christina S 7081T
 Milbauer, Siena I 7087T
 Mishra, Ridhima 7070T
 Moore, Ja'Bre O 7105W
 Moroukian, Nelson W 7024S
 Moulton, Philip C 7025S
 Mujumdar, Maitreya A 7106T
 Munson Jr, Craig A 7071T
 Nelson, Luke W 7072T
 Neufeld, Laurel M 7004T
 Nordquist, Ruthie E 7026T
 Oster, Jack T 7064W
 Penn, Alexandra L 7039S
 Peters Ehrlich, Kobe I 7049W
 Petersen, Allie 7013W
 Preble, Mary Anna 7058T
 Prunty, Abrielle 7092T
 Pryor, Ellie 7073W
 Quinlan, Brendan J 7027W

Qureshi, Beebee R	7014T	Bruesehoff, Cole	8092T	Kust, Wencel T	8053T
Radtke, Tyler S	7028T	Bullock, Rico L	8068W	LaMere, Sophie M	8081W
Rajput, Sunanda	7018S	Busyn, Haley M	8011W	Landin, Nathaniel I	8061T
Reddan, Jack P	7107W	Byers-Olson, Will S	8052T	Lane, Calvin	8129S
Reser, Matthew F	7108T	Carpenter, Rebecca A	8012W	Larcoran, Steffan Z	8024T
Rettig , Camryn D	7059W	Carr, Anna M	8013W	Layon, Sarah A	8117T
Richie, Matthew J	7066S	Carroll, Nathan M	8038W	Lee, Pahna	8033S
Riethmeier, Timothy A	7088T	Caruso, Maddie	8032S	Leinberger, John W	8070T
Robblee, Morrison A	7120W	Caye , Maja H	8039T	Link, Alyona M	8036S
Rocheford, Sam R	7029W	Cerda-Escobar, Claudia	8050W	Link, Sarah K	8102S
Rohleder, Noah A	7109T	Chapdelaine, Theresa M	8014T	Madson, Jack R	8024T
Roscoe, Geordie S	7053W	Christensen, Isabella M	8077T	Magno, Claire	8030T
Roth, Emma B	7121W	Clapp, Lucas W	8001S	Manson, Eva F	8098T
Rusert, Benjamin C	7089W	Corrie, Cristina A	8040S	McIlwain, Sam P	8130W
Schaust, Kyle J	7030T	Cote, Anna H	8114W	Meadows, Rayna	8030T
Sercombe, Gregory R	7074W	Cottew, Morgan A	8039T	Michalski Jr, Matthew R	8082S
Sheehy, Audrey M	7122W	Cowdery, Charlotte C	8050W	Michell, Alice E	8103S
Sollie, Danae L.	7123W	Cromie, Abby	8112T	Miotke, Emily J	8062T
Souther, Laura J	7075S	Cullen, Lizzy A	8015T	Mitchell, Nick A	8063W
Sridher, Siddharth	7031T	Cunniën, Savannah R	8041T	Moriarty, Colin J	8131T
Steen, Fiona J	7124S	Danley, Matthew J	8042T	Narog, Theresa M	8054W
Steiner, Kyle J	7109T	Davies, Molly M	8120W	Neuzil, Maria K	8064S
Tahir, Aisha	7082T	Delveaux, Kimberly M	8035T	Newbury, Claire E	8132S
Thompson, Jordan D	7110T	Enquist, Olivia A	8078T	Oberst, John R	8083T
Thorsgaard, Ellie T	7015S	Exline, Jack L	8016W	Ochs, Michael	8123T
Thrall, Minna H	7090T	Fryxell, Anna K	8017S	Pauls, Benjamin	8065S
Torstenson, Lisa I	7091S	Gale, Ty	8043T	Pavlicek, Lilianna Keane	8104S
Van Tatenhove, Bradley G	7032W	Gallagher, George W	8079T	Peterson, Delaney L	8084W
Verdoorn, Sarah	7060W	Gauthier, Grace	8018T	Plante, Monica E.	8085W
Wahlquist, JJ	7076W	Gephart, Jayne E	8115S	Polak, Mary C	8004T
Warmka, Jack T	7125T	Grundtner, Jenna J	8080T	Portuese, Tessa A	8124S
Weiman, Devin T.	7033W	Gulner, Richie M	8116S	Purdy, Ellen H	8046S
Weimann, Nicholas J	7040T	Hagedorn, Kerry E	8044T	Quinlan, Riley J	8105S
Wells, Alana T	7034W	Hallermann, Jimmy M	8069S	Quttaineh, Raya M	8025S
Winkelman, Kayley R	7092T	Hanger, Afton M	8093W	Rademacher, Jacinta M	8066T
Woltmann, Travis Alexander	7016W	Hankerson, Stephan J	8121S	Reger, Kelly J	8133W
Ylitalo, Max	7093T	Heer, Rebecca J	8094W	Renikoff, Lucia K.	8106T
Zimmerman, Carly C	7061S	Henry, Greta A	8095W	Reynolds, Jacob A	8107S
		Henschell, Thomas J	8096T	Riddle Kimm, Morgan J	8108S
		Hewett, Stella D	8019S	Roberts, Tianna N	8071W
		Honerman, Ellie S	8020T	Rooker, Brian	8055T
		Hughes Ms., Maureen T.	8097T	Rose, William A	8067S
		Ihlenfeldt, Paul	8021S	Roznowski, Emily	8086T
		Inskeep, Zachery M	8045S	Rydel, Michael C	8109T
		Jacobson, Libby K	8098T	Salchow, Colin D	8087T
		Jensen, Annabelle L.	8099W	Scher, Lila C	8034S
		Kalthoff, Kasey J	8002T	Scott, Sofie F	8047W
		Kerin, Kelly E	8100W	Silberhorn, Shannon	8026S
		Klaesges, Carolyn A	8122W	Smith, Camille I	8028W
		Klein, Mikayla M	8101S	Smith, Zach	8027T
		Knipp, Abigail L	8015T	Sunday, Laura C	8125T
		Koemptgen, Carly J	8060T	Spencer, Liam E	8005W
		Konieczny, Anton J	8003S	Steinmaus, Sydney I	8048T
		Krawczyk, Maggie L	8022T	Stephens, Ashley N	8126W
		Krivit, Jenna	8023S	Stolte, Anna Elise	8049T

Grade 8

Adams-Phipps, Jupiter U.G.	8091T				
Al-khawi, Lujain A	8031T				
Anderson, Duncan E	8007S				
Auld, Keandra M	8118W				
Bakke, Ellen M	8119W				
Bigger, Isaiah	8027T				
Blackburn, Gabriel James	8008S				
Blosberg, Emily J	8009T				
Bordsen Bailey, Sarah M	8075S				
Bosler, Tate L	8010S				
Bowen, Malik	8027T				
Braaten, Marco C	8052T				
Brown, Simon E	8076S				

Swedberg, Xandi C	8006W	Dorshow, Ryland	1088W	Sinha, Paarul	1074W
Thompson, William H	8088W	Dunlap, Cole M	1031S	Sinha, Rishi	1012W
Vickerman, Zoe A	8037W	Egert, Jackson	1032W	Smith, Miranda N	1059W
Vidmar, Abby M	8029S	Elling, Anna	1008T	Southern, Rebecca M	1082W
Vitek, Samantha E	8110S	Erdmann IV, Tom	1023W	Spencer, Alexander	1093W
Waldhauser, Kristyn A	8127T	Espinoza, Juana M	1048T	Sun, Lesley	1075W
Walker Amber Walker, Amber Lee	8051S	Farmer, Abigail K	1009T	Sun, Bo	1076W
Walz, Kyle J	8072W	Flores, Alysia R	1089S	Thacker, Shayla J	1083S
Ward, Chase R	8056W	Fuad, David B	1053W	Trinh, Antonio	1084T
Warner, Madeline L	8073T	Gallop, Josh P	1024W	Vijayakar, Roshny S	1097W
Watters, Jon	8057S	Ganti, Hari	1038W	Wang, Lawrence	1077W
Weiland, Katelyn	8030T	Garbe, Laura	1010T	Wedan, Maddy M	1003T
Weissman, Hannah K	8058S	Gopinath, Sid	1079W	Weiler, Addison L	1046W
Weix, Branick D	8059S	Hackner, Matthew C	1042W	Wen, Amy M	1099W
Wenger, John S	8111S	Haeg, Eleanor M	1063W	Westbrooks, Brianna A.	1013T
White, Greta S	8112T	Hamann, Elaina E	1043W	Whitesell, Josh J	1014S
Woell, Rachel S.	8089W	Hawkinson, Isak P	1054T	Willenburg, Amber R	1015T
Wollmering, Katie I	8090S	Heiberg, Kaelynn	1025W	Wothe, Jillian	1074W
Xiong, Tou	8128S	Hill, Micah J	1068T	Xiong, Alynie K	1016T
Yang, Samantha	8113S	Hinz, Jaclyn R	1026T	Yang, Austin M	1094S
Yarosh, Micaela J	8074S	Huna, Heather M	1069T	Yang, Loelue	1017S

High School

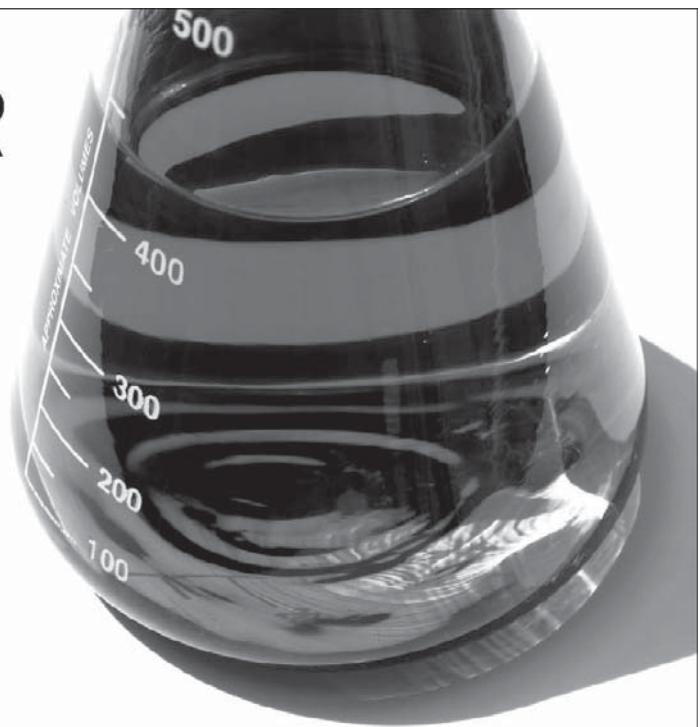
Abdus-Salam, Nadirah	1004T	Ibeling, Duligur	1044W	Ylitalo, Andy	1035T
Abegaz, Redeat F	1062T	Issa, Iman	1080T	Young-Church, Tyler R	1018T
Adrian, Sierra M	1064T	Jain, Naveen	1021W	Ziegler, Ann	1100W
Aguilar, Walter A	1085S	Karr, Jacob M	1090T		
Ahmed, Ishmam A	1019W	Kloncz, Carissa E	1033T		
Alper, Emily C	1063W	Kowalchuk, Cara K	1082W		
Anderson, Martin	1036T	Kraft, Alexis C	1081T		
Banh, Thatcher	1064T	Kumar, Caleb	1070W		
Banh, Brandon	1049T	Kusner, Tristan S.	1039W		
Bayless, Alexis C	1060T	LaGarde, Michelle J	1048T		
Bergeland, Tim	1050W	Latapi, Monica	1045T		
Bhattacharya, Anushua	1065T	Lee, Kong	1091S		
Bissoy-Mattis, Jeffrey	1031S	Lim, Savannah	1011T		
Blackwell, Maranda L	1005T	Liu, Jonathan Z	1092W		
Borowsky, Naomi P	1066W	Mason-Brousseau, Cheyenne	1055T		
Braga, Gabriela O.	1086T	Miller, Sabrina	1027S		
Bruce, Arnaldo	1051T	Nayar, Abhishek	1040W		
Burkhead, Nadine M	1030T	Newman, Olivia J	1056T		
Carr, Latham G	1052S	Ovsak, Gavin G	1034W		
Chen, James M	1067W	Pakzad, Iman Y	1001W		
Chen, Evan	1020W	Pakzad, Paimon Y	1061W		
Cherkassky, Emily R	1028W	Persson, Lisa K	1057W		
Christina, Jacob S	1078T	Phan, Roumany	1071T		
Chung, Seungjin	1041W	Pidaparti, Mahati	1022W		
Claseman, Alex J	1033T	Portu, Michael L	1072W		
Culliton Jr., John M	1037W	Prince, Aris E	1097W		
Damania, Samarth A	1006W	Raman, Ganesh	1029W		
Dang, Danny D	1007T	Rao, Sachin	1079W		
Das, Aditi	1095T	Reidell, Zachary M	1002W		
Derechin, Jacob	1087W	Sahli, Christina A	1073T		
		Sanei, Omead	1058T		
		Schulberg, Abigail A	1098T		

THE LEADER IN CLEAN

At Ecolab, we use cutting-edge science and technology to continually develop innovative breakthroughs for our customers - earning our reputation as the leader in clean.

To learn more about our innovative solutions, call Ecolab at 1.800.2.ECOLAB or visit us at www.ecolab.com.

ECOLAB®



© 2007 Ecolab Inc. All rights reserved.

USS Nokomis Twin Cities
Star Trek Fan Club
<http://www.ussnokomis.org/>

Volunteering to make a difference.


SLATTERY SALES GROUP, INC.
VALUE DIFFERENTIATION STRATEGIES
AND EXECUTION THAT ENHANCE RESULTS
info@slatterysales.com
PH 952.832.5436 FX 952.832.5438
4940 VIKING DRIVE, SUITE 101, MINNEAPOLIS, MN 55435
WWW.SLATTERYSALES.COM

ATK

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.

TWIN CITIES REGIONAL SCIENCE FAIR "ISEF" ALUMNI

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

1973	Timara Kulzer Underbakke Harding High School, St. Paul	1989	Todd Capistrant Minnesota Zoo School
1974	Craig Johnson Harding High School, St. Paul	1990	Cynthia Schaumburger Harding High School, St. Paul
1975	Dennis Scanlon Harding High School, St. Paul	1990	Ryan Egeland Wayzata High School, Wayzata
1976	Mark Foertsch Grace High School, Fridley	1991	Ryan Egeland Wayzata High School, Wayzata
1976	Linda Ann MacDonald Mounds View High School, Arden Hills	1991	Jonathon Kubik Sibley High School, West St. Paul
1977	Steve Rabatin Benilde-St. Margaret, St. Louis Park	1992	Heidi Konkler Wayzata High School, Wayzata
1977	Charles Clevenger Westonka High School, Mound	1992	Ryan Egeland Wayzata High School, Wayzata
1978	Mitchell Voehl	1993	Ryan Egeland Wayzata High School, Wayzata
1978	Charles Clevenger Westonka High School, Mound	1993	Andrew Grande St. Thomas Academy, Mendota Heights
1979	Jeffrey Rabatin Benilde-St. Margaret, St. Louis Park	1993	Kelly Lohman Harding High School, St. Paul
1979	Joseph Rabatin Benilde-St. Margaret, St. Louis Park	1993	Jens Strand St. Paul Academy, St. Paul
1980	Jeffrey Rabatin Benilde-St. Margaret, St. Louis Park	1994	John Hassett Burnsville High School, Burnsville
1980	Joseph Rabatin Benilde-St. Margaret, St. Louis Park	1994	Ana Navarro Minnetonka High School, Minnetonka
1981	Jeffrey Rabatin Benilde-St. Margaret, St. Louis Park	1994	Victoria Miller St. Agnes High School, St. Paul
1981	Joseph Rabatin Benilde-St. Margaret, St. Louis Park	1994	Julia Goetzke Harding High School, St. Paul
1982	Micheal Rabatin Benilde-St. Margaret, St. Louis Park	1995	John Hassett Burnsville High School, Burnsville
1982	Brian Hallberg Harding High School, St. Paul	1995	Adam Tatarynowicz Burnsville High School, Burnsville
1983	Thinh Hoang Tran Westonka High School, Mound	1995	Victoria R. Miller St. Agnes High School, St. Paul
1983	UNKNOWN	1995	Marcus Rollins St. Paul Open School, St. Paul
1984	Susan Kain Edina High School, Edina	1995	Anna Navarro Minnetonka High School, Minnetonka
1984	Steve Herrman Mahtomedi High School, Mahtomedi	1995	Samuel Rush Minnetonka High School, Minnetonka
1985	Brenda Zenk Sibley High School, West St. Paul	1996	Laurie Louis Parker Roseville High School, Roseville
1985	Steve Herrman Mahtomedi High School, Mahtomedi	1996	David Loy Bowe Burnsville Senior High School, Burnsville
1986	Brenda Zenk Sibley High School, West St. Paul	1996	Michael Scott Lohman Expo III High School, St. Paul
1986	Steve Herrman Mahtomedi High School, Mahtomedi	1996	Victoria Reynolds Miller St. Agnes High School, St. Paul
1987	Brenda Zenk Sibley High School, West St. Paul	1996	Anna Navarro Minnetonka High School, Minnetonka
1987	Ann Bailey Mahtomedi High School, Mahtomedi	1996	Michelle Lee Monnens Minnetonka High School, Minnetonka
1988	Sara Greenslit Mounds View High School, Arden Hills	1996	James Justin Wilson Minnetonka High School, Minnetonka-Team
1988	Ann Marie Gentes Westonka High School, Mound	1996	Michael Gary Grotenhuis Minnetonka High School, Minnetonka-Team
1989	Ann Marie Gentes Westonka High School, Mound		

TWIN CITIES REGIONAL SCIENCE FAIR “ISEF” ALUMNI

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

1997	Nguyen Trung Burnsville Senior High School, Burnsville	2000	Emily Letourneau Central High School, St. Paul-Team
1997	Samuel Rush Minnetonka High School, Minnetonka	2000	Anna Bishop Como Park, St. Paul-Team
1997	Anna Navarro Minnetonka High School, Minnetonka	2001	Megan Bailey Breck School, Minneapolis
1997	Victoria Reynolds Miller St. Agnes High School, St. Paul	2001	Kathryn Gieselman Burnsville High School, Burnsville
1997	Michael Scott Lohman Expo III High School, St. Paul	2001	A. Ben Suri Harding High School, St. Paul
1997	Travis Smith Burnsville Senior High School, Burnsville	2001	Li Mei Wayzata High School, Wayzata
1997	James Justin Wilson Minnetonka High School, Minnetonka-Team	2001	Laura Egerdal Burnsville High School, Burnsville
1997	Justin Rainey Minnetonka High School, Minnetonka-Team	2001	Anna Bishop Como High School, St. Paul-Team
1998	Dean Harvey Burnsville Senior High School-Team	2001	Emily Letourneau Central High School, St. Paul-Team
1998	Dan Harakh Burnsville Senior High School-Team	2002	Jacob Fitzpatrick Burnsville High School, Burnsville
1998	Bryce Gillespie Breck School, Minneapolis	2002	Kaonhou Her Johnson High School, St. Paul-Team
1998	Preeya Kshetry Breck School, Minneapolis	2002	PaCha Yang Johnson High School, St. Paul-Team
1998	Phally Seak Burnsville Senior High School	2002	Stephen Morris Breck School, Minneapolis
1998	Raj Pai Burnsville Senior High School	2002	Arun Saini Burnsville High School, Burnsville
1998	Michael Scott Lohman Expo III High School, St. Paul	2002	A. Noel Suri Harding High School, St. Paul
1998	A. Ben Suri Harding High School, St. Paul	2003	Jessica Swartz ISD 287
1999	Michael Scott Lohman Expo III High School, St. Paul	2003	Ning Zhou ISD 287
1999	Alison Boutin Burnsville High School, Burnsville	2003	PaCha Yang Johnson High School, St. Paul
1999	Jennica Slattery Minnehaha Academy, Minneapolis	2003	A. Noel Suri Harding High School, St. Paul
1999	Chrissy Jones Minnetonka High School, Minnetonka-Team	2003	Brendan Doms Breck School, Minneapolis
1999	Elizabeth Larkin Breck School, Minneapolis	2003	Javier Cabrera-Perez Breck School, Minneapolis
1999	Melissa Borken Minnetonka High School, Minnetonka	2004	Adam Yock Breck School, Minneapolis
1999	Alli Kellogg Minnetonka High School, Minnetonka-Team	2004	William Mitchell Breck School, Minneapolis
2000	Mark Galatowitsch Highland High School, St. Paul	2004	Noel Suri Harding High School, St. Paul
2000	Jennica Slattery Minnehaha Academy, Minneapolis	2004	Adam Hahn Robbinsdale Armstrong HS, Robbinsdale
2000	Chrissy Jones Minnetonka High School, Minnetonka	2004	Akash Kumar Wayzata High School, Wayzata
2000	Michael Chansky Burnsville High School, Burnsville	2004	Laura Heeter Breck School, Minneapolis - Team
2000	A. Ben Suri Harding High School, St. Paul	2004	Kristina Naranjo-Rivera Breck School, Minneapolis – Team

TWIN CITIES REGIONAL SCIENCE FAIR “ISEF” ALUMNI

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

2005	Kyrstin Underbakke Maranatha Christian Academy, Brooklyn Park	2008	Iola Edwards Johnson High School, St. Paul
2005	Janet Li Wayzata High School, Plymouth	2008	Stephen Trusheim Breck School, Minneapolis - Team
2005	Heidi Chun St. Paul Academy, St. Paul	2008	Daniel Mohktari Breck School, Minneapolis – Team
2005	Zachary Howland Burnsville High School, Burnsville	2009	Prithwis Mukhopadhyay Woodbury High School, Woodbury
2005	Eric Halverson Como Park Senior High, St. Paul	2009	Tiffanie Stone AFSA High School, Vadnais Heights
2005	Kahli Her Johnson High School, St. Paul	2009	Michael Fuad Breck School, Minneapolis
2006	Jenna Johnson Burnsville High School, Burnsville	2009	Michael Fuad Breck School, Minneapolis
2006	Andrea Jensen Burnsville High School, Burnsville	2009	Stephen Trusheim Breck School, Minneapolis
2006	Daniel Zeng St. Paul Academy & Summit School	2009	Chee Xiong Como Park Senior High, St. Paul
2006	Matthew Weiss Breck School, Minneapolis	2009	Martin Camacho Central High School, St. Paul
2006	Katherine Schaeffer Breck School, Minneapolis	2009	Sahar Hakim-Hashemi Breck School, Minneapolis - Team
2007	Ummul Kathawalla Blake High School	2009	Sierra Danforth Breck School, Minneapolis - Team
2007	Daniel Zeng St. Paul Academy & Summit School	2009	Nicholas NaSal Burnsville High School, Burnsville - Team
2007	Kyra Underbakke Maranatha Christian Academy, Brooklyn Park	2009	Joseph Lane Burnsville High School, Burnsville – Team
2007	Brandon Lew Breck School, Minneapolis	2010	Prithwis Mukhopadhyay Woodbury High School, Woodbury
2007	John Earl Harding High School, St. Paul	2010	Tiffanie Stone AFSA High School, Vadnais Heights
2007	Lucas Gabrielson Harding High School, St. Paul	2010	Gavin Ovsak Eden Prairie Senior High School
2007	Jacob Stramer Harding High School, St. Paul	2010	Charles Morris Breck School, Minneapolis
2008	Prithwis Mukhopadhyay Lake Junior High, Woodbury	2010	Houa Xiong Johnson High School, St. Paul
2008	Michael Cherkassky Edina High School, Edina	2010	Martin Camacho Central High School, St. Paul
2008	Madeline Taft-Ferguson Breck School, Minneapolis	2010	Ava Mokhtari Breck School, Minneapolis - Team
2008	Kyra Underbakke Maranatha Christian Academy, Brooklyn Park	2010	Addison Weiler Breck School, Minneapolis - Team
2008	Aly Xiong Johnson High School, St. Paul	2010	Ashley Santilli Burnsville High School, Burnsville - Team
		2010	Emily Bostrom Burnsville High School, Burnsville – Team



2011 Research Papers

Name	Grade	Title
Emma Davies	6	Bacteria In The Mouth
Carson Knoer	6	Do Different Cooking Methods Affect The Amount Of Vitamin C In Vegetables
Jane Kolar	6	Does Exercise Affect Vital Lung Capacity?
Stephanie Roberts	6	Does the Color of the Paper Affect the Score of a Math Test?
Maggie R Sullivan	6	Do Video Games Affect Memory in Children?
Colleen E Wagner	6	Bacteria on Hockey Equipment
Brooke E Wertwijn	6	Do Sunglasses Really Protect Your Eyes From UV Light?
Jack Will	6	The Biomechanics of Lifting Measuring Low Back Stress with a Mechanical Model
Annelia E Anderson	7	Handwriting and how Stress Effects it
William B Anderson	7	Chaos Triangles: Are You More Random Than a Computer?
Mairead D. Brooks	7	Do Animals Show Color Preference?
Meagan C Chalfen	7	Catapults - Does Mass Matter?
Madeleine S Etienne	7	Multitasking: Can it be done?
Nicholas Jean-Paul Gionet	7	Focus on The Road Not Your Phone
Claire Gorman	7	The Impact of Water Temperature on Hand Washing Effectiveness
Brady F Happe	7	Tee Time: How Does Tee Height Affect Driving Distance
Madison R Huna, Annabelle Hearne	7	Pitter Patter Goes My Heart: The Effect of Caffeine on Heart Rate in Daphnia magna
Carolyn K Jons	7	The Effect of Soap Bubble Size on the Insulative Abilities of Foams
Daniel Kiely	7	Eddy Current Braking
Avery Q Larsson	7	How Does Packaging Affect Meat Spoilage?
Maxine I Lightfoot	7	the affect of age on perception of time
Erik N Lucas	7	Age vs Memory
Brendan J Quinlan	7	What Variety of Apple has the Greatest Vitamin C Content?
Sam R Rocheford	7	Saturated Fats in Cooking Oils
Gregory R Sercombe	7	The Rate of Degradation of SunChips Bags
Siddharth Sridher	7	Can hot water freeze faster than cold water?
Max Ylitalo	7	The effects of storage time and storage conditions on bacteria levels in pasteurized milk
Emily J Blosberg	8	Remember That?
Olivia A Enquist	8	Saving Money; A Study of Energy vs. Water Conservation
Jenna J Grundtner	8	Carbon Dioxide and the Greenhouse Effect
Greta A Henry	8	Type 1 diabetes
Pahna Lee	8	Which Beverage Relieves Spiciness the Best?
Delaney L Peterson	8	Recycling is cool and hot
Kelly J Reger	8	The Soil of the Future: Hydroponics, Aeroponics, or Soil?
Morgan J Riddle Kimm	8	The Eye
Camille I Smith	8	Sensory Deprivation and Learning: A Study of the Effects of Reduced Stimuli in the Classroom
Hannah K Weissman	8	How the Number of Fan Blades and Shape of the Fan Blade Affect the Energy Produce
Micaela J Yarosh	8	The Sound of Music

Aditi Das	9	Understanding Crown Gall Tumor Disease on Plants Through the VirB3 Protein
Abigail K Farmer	9	Do Males or Females Embrace Delayed Gratification More?
Heather M Huna	9	Spice it Up! The Effects of Turmeric on Planarian Regeneration
Iman Y Pakzad	9	The Effect of Water Velocity on Nearest Neighbor Distance in <i>Aphyocharax Anisitsi</i>
Redeat F Abegaz	10	Effects of Benzoyl Peroxide and Salicylic Acid on <i>Escherichia Coli</i>
Brandon Banh	10	The Effects of a Solar Cell's Angle Compared to the Amount of Electricity Generated
Alexis C Bayless	10	The formulation of an algorithm to decipher a Rubik's Cube via three explicit sequences
Jesse T Beane	10	Relationship between the Number of Coils of Insulated Wire and the Magnetic Strength it Produces
Eric M Bench	10	Which Camera Lens Performs Best?
Josh Bernardy	10	The Efficiency of Different Propeller Designs
Maranda L Blackwell	10	The Effectiveness of Graphic Organizers
Alaina M Blair	10	Effects of Solar Energy on Contaminated Water
Nadine M Burkhead	10	Effect of division of surface area on watts produced by solar cells
Jacob S Christina	10	Effects of Repeated Heating of All Numbers of the Plastic Coding System on <i>Saccharomyces cerevisiae</i> Count
Sarah J. Codner	10	The Effects of Floral Preservatives on the Diameter of <i>Bellis perennis</i>
Danny D Dang	10	“Remini-Scents” The Effects of Odor on Recollection Ability
Sarah Davidson	10	Differences in Responses to Frustration by Gender
Jason Dorow	10	The Effect of Color on Heat Retention
Katie K Duethman	10	The Effects of Color on Mathematical Performance
Richard C Eknes	10	Effects of Size and Distance Apart on the Rate of Successive Destabilization of Dominoes
Anna Elling	10	Does Experiencing Physical Warmth Affect Our Feelings About Others?
Tessa E Ewing	10	The Effect of the Angle of Incoming Light on the Performance of Solar Cells
Laura Garbe	10	Is There a Correlation Between Physical and Mental Brain Hemisphere Preference?
Ben P Gillies	10	Comparing the Moisture Content of Five Different Varieties of Apples
Bradley R Gullikson	10	Correlation Between Long Term Memory Storage and Paper Color
Sierra L Halverson	10	The Affect of Chlorine on Hair
Shane A Harrison	10	A comparison of oral bacteria and different brands of toothpaste
Isak P Hawkinson	10	Quality of Water and Snow Concerning Phosphate, Dissolved Oxygen, and Hardness
Sarah M Hinz	10	The Musical Key's Effects on Mood
Jaclyn R Hinz	10	Homemade Photography
Isaac E Hubbard	10	The effects of air pressure on the punting distance of a ball
Thomas E Husen	10	Correlation between Fertilizers and Grass Growth
Andrew J Jensen	10	Soil Toil
Alison M Jeziorski	10	Effects of Heat on Hurricanes
Sydney M Johnson	10	Effects of Income Class on Water Usage
Jacob M Karr	10	Filaments: They changed the world
Erika Kaske	10	Effects of Tempo on Heart Rate

Christian S King	10	The Corrosive Effects of Various Brands of Soda on Metal Nails over Time
Alexis C Kraft	10	Effects of Ultraviolet Light on Bacteria in Water
Caleb Kumar	10	Designing a Java Program to Diagnose Bladder Cancer
Adam J Lee	10	The Effects of Genres of Music on Heart Rate
Nickolas V Lesser	10	Flammable Fabrics
Savannah Lim	10	The Influences of Packaging Color on Teenage Female Consumers' Preferences of Bottled Bath Products
James P. Matakovich	10	Correlation between Common Household Tapes and Their Respective Failure Times
Jessica M Nagel	10	The Effects of Color on Memory
Alex C Najafalipour	10	Performance Comparison of Two Baseball Bat Materials: Aluminum vs. Wood
Kjerstin I Narvesen	10	The Effect of Watering Grass with Tap Water, 30 Grams of Sugar per Liter of Water, and 70 Grams of Sugar per Liter of Water
Jon C Nelson	10	Are Lepidoptera Attracted to Heat or a Certain Color Light?
Olivia J Newman	10	Effects of Sulfuric Acid Solution on Red Wrigler Worms in Different Soils
Quyen T Nguyen	10	Effects of Time Pressure as a Stressor on Academic Accuracy
Alison N Nguyen	10	Time, Distance, and Duration of Model Planes made up of Paper-like Materials
Morgan L Olsen	10	Effectiveness of Antacids on Regulating pH levels
Josiah R Parotti-Walter	10	Effects of Test Anxiety on Test Scores
Roumany Phan	10	Effect Of Co-enzyme10 (Q10) On Platyhelminthes—Planarians' Regenerating
Rula R Rashid	10	The Effect of Scent on Blood Pressure
Kyle Reindl	10	The Feather of Archery
Britta L Riggs	10	Mouthwash Versus Bacteria; Does Mouthwash Really Kill Bacteria?
Megan Ruan	10	Study of algae biomass growth in concentrated wastewater aided by exogenous CO ₂
Christina A Sahli	10	The Effect of Gender and Senescence on Preference Toward Models That Insinuate Benevolence or Abhorrence
Mikhaila N Samz	10	The Relationship Between the Sense of Smell and Taste Buds
Omead Sanei	10	What Soil Amendment is the Most Effective at Helping Plants Grow Tall?
Abigail A Schulberg	10	The Effects of Isopropyl Alcohol on Pea Plants
Paarul Sinha, Jillian Wothe	10,10	The Effects of the Mitochondria in Myocardial Ischemia
Taylor D Smith	10	The Effect of High Efficiency Tide Detergents on Burpee Radish Plants
Jordan D Sperl	10	What Material Best Absorbs Car Oil
Erick E Strain	10	Determining a Linear Relationship Between Minimum Slope Height and Diameter of a Circular Loop
Nathaniel G Treimer	10	The Effects of Warping Words on the Stroop Effect
Antonio Trinh	10	An Analysis of Bacteria, PH, and Chlorine in the Schools Water Supplies
Maddy M Wedan	10	Dominant and Recessive Traits in Mice
Brianna A. Westbrook	10	Gender Occupational Stereotypes of Fifth Grade Children
Amber R Willenburg	10	Effects of Music on Memory

Emily M Wollmuth	10	The Effects of Mozart's Music on Mathematics Test Scores in Sixth Grade Students
Alynie K Xiong	10	Is Beauty Really in the Eye of the Beholder: A Scientific Study on the General Population's Shared Perception of Beauty and Attractiveness
Jonathan S Yiv	10	Types of Soil Most Suitable for Structural Stability
Dylan R Young	10	The Effectiveness of Different Types of Soap: Liquid vs. Foam
Tyler R Young-Church	10	Effects of Music on Spatial Reasoning in Homo sapiens
Ishmam A Ahmed	11	Regulation of Sonic hedgehog expression and activity during differentiation of human pluripotent stem cells
Thatcher Banh, Sierra M Adrian	11,11	Modulation of Phagocytosis by Morphine and Hypoxia
Anushua Bhattacharya	11	Silver Nanoparticles Affect Cell Messenger Delivery
Evan Chen	11	Functional Analysis of CD24 in Satellite Cells
James M Chen	11	Non-invasive Imaging of Oxygen Metabolism in Diseased Brain
Samarth A Damania	11	Computer Analysis of Player and Team Performance in Professional Halo 3
Naveen Jain	11	Mechanism of Tumor Suppression by CHD5
Carissa E Kloncz, Alex J Clasean	11,11	Agricultural Biomass: Revamping the World's Energy Sources One Crop at a Time
Paimon Y Pakzad	11	Characterization Of Benign Nevi And Malignant Melanoma Using Signature Curves
Aris E Prince, Roshny S Vijayakar	11	Has nuclear radiation fallout in Japan and the Chernobyl area altered plant response to UV-B radiation? A study of Arabidopsis thaliana response to UV-B
Lesley Sun	11	Does a high-fat diet induce obesity?
Jien Nee Tai	11	The Effect of Golf Ball Compression On Its Carry and Roll Distances: A case study of the Bridgestone Tour B330 Series
Zayn Tajamal	11	Electrolyte Comparison: Sports Drinks, Pop, and Water.
Martin Anderson	12	Specific Impulse of Traditional Black Powder Rocket Engines in the Pyrotechnics Industry: Engineering an Improved Static Test Apparatus / Utilizing it to Analyze Performance and Quality of Traditional Versus Modern Manufacturing Methods
Hannah Borowsky	12	Adolescent Smokers' Perceived Risk of Cigarette Use
Jacob Derechin	12	Does Adding Streamers To A Wing Increase The Lift Force?
David B Fuad	12	Preventing microalgae (Chlamydomonas reinhardtii) build-up in photobioreactors for biofuel production efficiency
Hari Ganti	12	Flying in the Future: Phase Two of Optimizing an Airfoil for Inviscid Airflow
Austin A Gromatzky	12	Using Force Analysis and Linearization to Determine the Coefficient of Drag of an Automobile
Jonathan Z Liu	12	Design and Analysis of a Tunable Superlens
Prithwis K Mukhopadhyay	12	Distinct Cellular Signaling Mechanism of Carrageenan-Induced Premalignant Transformation of Mammary Epithelial Cells
Gavin G Ovsak	12	The Creation and Testing of a Fully Submersible Geared Water Turbine for Alternative Energy Production
Michael L Portu	12	Loading Forces Experienced by Heart during High School Athletic Impacts
Rebecca M Southern, Cara K Kowalchyk	12,12	Investigating the use of Pseudomonas putida Fu1 to clean up toxic furan agricultural byproducts
Bo Sun	12	Establishment of long-term cultures of newt cardiomyocytes for use as an in vitro model for heart regeneration

Brett E Szalapski	12	Experimental Determination of the Point of Optimal Impact on a Baseball Bat
Lawrence Wang	12	The Role of Bile Acids in Cryopreservation Injury of Kidney



Office Max congratulates the students on competing in the Twin Cities Regional Science Fair

<http://www.officemaxsolutions.com/education/>

Office Max Impress Store 0723
The Quarry
1610 New Brighton Blvd
Minneapolis, MN 55413
Phone: 612-781-0154

Office Max Impress Store 1460
The Fountains
11160 Fountains Drive
Maple Grove, MN 55369
Phone: 763-315-1140

We're scientists ^{engineers}
inventors marketers
& business people of every kind.



We're 3M volunteers.

Tutoring, mentoring, serving, advising, building, delivering and most of all inspiring. The good works of thousands of 3M employee and retiree volunteers improve lives in our communities.

Innovative and indispensable at work and in the community.

3M Community Giving

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 Renewable Energy Award
Almost Perfect Teacher Award
American Psychological Association
American Council of Engineering
Companies
American Meteorological Society
American Psychology Association
ASM Materials Education International
Foundation
Association of Women Geoscientists
East Side Science Club Alumni
Glen & Jacob Domeier Memorial
Graduate Women in Science
I SWEEEP
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)
Joel Wagner Caring Bridge Award
Killeen Memorial Award
Minnesota Academy of Science Inquiry
award
Medallists (6th grade)
Minnesota Agriculture in the Classroom
Minnesota Astronomical Society
Minnesota Chapter of American Fisheries
Society
Minnesota Space Frontier Society
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

Radio City
Research Paper trophies
Ricoh Sustainable Development Award
SciGirls – Twin Cities Public Television
Schools trophies
Society for In Vitro Biology
Sponsor: 3M Foundation
Sponsor: Alliant Techsystems
Sponsor: Dow Chemical
Sponsor: Ecolab
Sponsor: General EC Rawlings
Sponsor: Medtronic
Sponsor: Midway Party Rental
Sponsor: Mintáhoe Hospitality Services
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
TCRSF Award for Excellence
Team Awards
University of Minnesota Institute of
Technology 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

Science doesn't start in a laboratory

A child's imagination is ignited by curiosity and powered by all the wonders of the world.

At Medtronic, we devote ourselves to finding new and better ways to alleviate pain, restore health and extend the lives of people around the world. And we know that any innovation starts with imagination. That's why we support organizations and activities that will inspire the next generation of scientific innovators.



Bill Hawkins
Chairman and Chief Executive Officer

www.medtronic.com/community



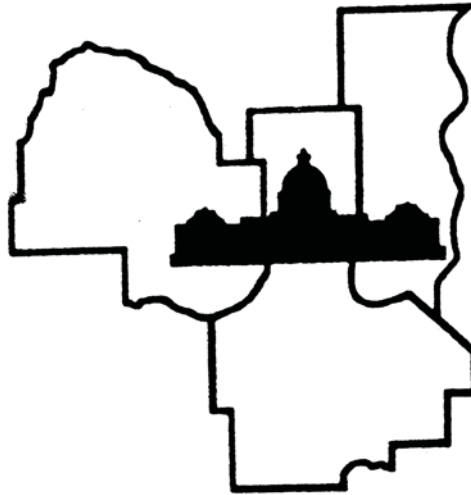
UC2008015B x EN

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.



2010-2011 Twin Cities Regional Science Fair Committee

Science Fair Co-Director: Penny Lohman
Science Fair Co-Director: Timara Underbakke
SRC Chair: Karin Ostrand
Treasurer: Dr. Gary Kwong
Research Paper Chair: Art & Judy Payne
Special Awards Chair: Nancy Day
Judging Coordinator: David & Timara Underbakke
Facilities: Michael Lohman, Sr.
Public Relations: Michael Lohman, Sr & Terry Slattery
Website & Databases: David Underbakke & Timara Underbakke
Data Processing: David Underbakke
Safety & Display: Mary Brown

Committee At Large:
Jess Day
Mary Brown
Sonja Dunlap
Lois Fruen
Phill Goldmann
Dr. Jennifer Hugstad-Vaa
Arthur C. Johnson
Judy Payne
Art Payne
Amy Stone
Kyrstin Underbakke
Kyra Underbakke

Scientific Review:
Karin Ostrand, Chair
Kyrstin Underbakke
Dr. Douglas Erbeck
Dr. Wendy Slattery
Penny Lohman
Timara Underbakke
Dr Jyothsna Rayadurg
Dr. Gary Kwong
Art Payne
Michael Lohman, Sr.
David Underbakke
Amy Stone
Tim Ford