PREPARING TOMORROWS AGRICULTURE LEADERS...

As part of the University of Minnesota Extension Center for Youth Development, 4-H has made improving science literacy a priority, and is working to develop the next generation of agriculture scientists. A study of youth development by Tufts University shows that young people who participate in 4-H excel in school and science, and are more likely to pursue a career in science, engineering or computer technology than their peers. 4-H's hands-on interactive programs expose youth to cutting-edge technology in agriculture that produces abundant, healthy and economical food. The 4-H Science of Agriculture Challenge asks teams of youth to work with agriculture experts explore and develop science-based solutions to agriculture-related issues they have identified in their communities.

To aid in the development of future Science of Agriculture Response Challenge teams, roundtable discussions were held in each region. Representatives from agriculture business and industry came together to help identify agricultural topics and mentors that relate to their agricultural enterprises. Please utilize the lists below when promoting the 2015-2016 Science of Agriculture Challenge with 4-H youth in your county and/or region.

North East Region

<table>
<thead>
<tr>
<th>Jim Takala, Takala Dairy Farms</th>
<th>218-744-1162</th>
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<tbody>
<tr>
<td>Determining the profitability of various types of dairy facilities (i.e. free stall, confinement, pasture).</td>
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<td>Grazing cattle in the dairy industry; increase or decrease in the final profit margin?</td>
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<td>What motivates people to remain in the agriculture industry?</td>
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<td>The impact of agricultural government regulations.</td>
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<td>The agricultural awareness of politicians.</td>
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<td>Wood ash as a fertilizer source and the potential by-products.</td>
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<td>Alternative Sources of fertilizer.</td>
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<tr>
<th>Jay Porter, General Manager Mille Lacs Energy</th>
<th>218-927-8224 <a href="mailto:jporter@mlecmn.com">jporter@mlecmn.com</a></th>
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<tr>
<td>111D Power Regulations (EPA carbon emissions regulations).</td>
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<td>What is the sustainability of solar panels?</td>
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<td>Agricultural waste to energy; utilizing agriculture waste in power plants.</td>
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<td>Recycling used agricultural materials (i.e. plastics, steel, etc).</td>
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<td>The carbon footprint of solar panels.</td>
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<td>Robbie Radaich</td>
<td>Itasca County 4-H Program Coordinator</td>
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<td>Noreen Thomas</td>
<td>Organic Farmer</td>
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<td>Jerry Christenson &amp; Greg Richards</td>
<td>American Crystal Sugar</td>
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<tr>
<td>Angela Kazmierczak</td>
<td>Scientist</td>
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<td>Nan Larson</td>
<td>Director of Innovative Networks</td>
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<td>Duane Maatz</td>
<td>Executive Director</td>
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<tr>
<td>Bob Majkrzak</td>
<td>President &amp; CEO</td>
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Central Region

Ruth Meirick,
Foundation Director
Minnesota Farm Bureau
Ruth.meirick@fbmn.org
Clean water.
Agricultural erosion.
Agricultural runoff.
Composting farm animals.
Animal quarantine practices.
Animal health travel requirements.
The relationship between agriculture and the forestry industry.
Agricultural odor issues.
Habitats for animals and wildlife.
Legal litigation in agriculture.
Alternative uses for animal waste.

Mary Kay Delvo,
Director of Membership and Development
AgriGrowth
mkdelvo@agrigrowth.org
Agricultural finance and banking.
The science of people: agricultural social sciences.
The public perception of agriculture.
Advertisements effect on consumer prices.
Food process model development: input/output process.
Government regulations: water requirements.

Al Withers,
Program Director
Minnesota Agriculture in the Classroom
651-201-6688
Alan.withers@state.mn.us
Career opportunity awareness in agriculture.
Global food caring capacity.
Best food varieties to feed the world.
Shortage capacity of agriculture water.
Who should pay for water and how much is it worth.
Water use priorities.
What is sustainability?
New food develop and marketing.
Buffer strips: size, materials, and public policy.
Soil profiles across Minnesota.
Urban agriculture: perceptions and misconceptions.
The perception of organic agriculture.
Renewable energy.

Glen Schmidt,
Education Director
Minnesota Farmers Union
651-288-4066
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Public perception of raw milk.
The social and economic impact of agriculture.
Local agricultural food markets.
CSAs: Community supported agriculture.
The importance and impact of school gardens.
### Southeast Region

**Bruce Wenner,**  
Business Manager  
*Davis Family Dairies*  
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Looking at where milk comes from and milk quality. When milk comes from the cow it is in its purest form. When we look at quality, we need to keep the milk as pure as possible from the cow to the tank, truck, plant, and consumer.

- **Feed efficiencies** – better ways to feed cows. Timing – ability to clean up (eat) feed between cow groups (optimal time/amounts of feed).
- **Processing** – corn silage – looking at timing of cut, length of cut, kernel formation, harvesting, packing, fermentation, etc.
- **Management side** – hard to find feed managers, site managers, manager managers.
- How do you select employees? Carousel workers, feeding cows, upkeep of equipment, vets and vet assistants, maintenance workers, specialized workers – i.e., diesel mechanics.
- **Increasing efficiency on dairy farms.**

**Mark Wrucke,**  
Ph.D.  
Field Operations Manager  
*Bayer Crop Science*  
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Unmanned aerial scout (UAS) trying to get an exemption from FAA to try on their property

- Look at stand counts from photos from UAS. What do you do with the info? What do you see? Takes us to the digital farming route
- BT hybrids have issues with stalks not breaking down. Certain strains of bacillus help with the breakdown. May increase phosphorus intake. Can this be measured?

**Lisa Young,**  
Staff Writer  
*Agrinews*  
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- Microclimates and how they affect farms.
- Soil health and water retention.
- Agricultural literacy.

**Pam Voelkel,**  
Events Director  
*MN Pork Producers Assoc.*  
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- Connect with youth initiative and get young people back on the farm.
- Biosecurity – PEDv and PERS.
- Feed efficiencies and by-products.

**Meghan Doyle,**  
Communications Manager  
*MN Corn Growers Assoc.*  
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- New uses for corn: fuel and by-products.
- Agriculture transportation infrastructure.
- Agriculture literacy, outreach, and connecting to the public.
- Consumer research and public perception.
- Food labeling.

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**Other topics identified in the Southeast Region:**

- Unmanned aerial scouts – look at the data and see what the kids could do for producers, co-ops, etc.
- Crop rotations on farms.
- Look at grazing systems – which are more efficient?
- Small local producers into a hub of “home-grown”.
- Economics of robotic milkers. Are they worth the cost?
- Telling the farm story through social media in effort to increase ag consumption.
- Biosecurity best practices.
- Exploration of farm practices.
- Antibiotics/hormones – best practices. What words resonate with consumers; what words do not resonate?
- GMO vs organic vs natural.
- What is “local” (FDA defines 350 miles).
- Meat quality – what is expected? Back to heritage breed’s.
- Housing systems.
- Conservation – improve air, buffer strips, grass water ways, tillage, and tiling.
- Expanded new uses of different types of feeds, fuels, human foods.
- Yields – soil types, fertilizers, pesticides.
- Food labeling – food nutrition.

Southwest

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Princso
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Topics identified in the Southwest Region:

- Limited number of veterinarians specializing in poultry
- The energy economics of grain drying with gas vs electricity. What percentages of farmers use electricity for drying grain? What is the time of use?
- Youth Energy Summit --- Look at what happens (how much energy used) if you leave a 60 watt bulb on all day?
- Irrigators --- drainage water use? Can the water be moved to use in irrigation?
- Water – nitrates/phosphates in water.
- Yield monitors in combines – what effect does tiling have on yield?
- Water table management – quantify if you tile 40’ tile in a section of field, you increase productivity by X.
- Planting chips with seed to monitor water levels in soil to turn irrigators on/off.
- Cool Science – tell kids the possibilities.
- Grow different era varieties of corn and add in GMOs to see what the difference is.
- Demonstrate different types of drainage and the economic inputs.
- Food/light/air/water/sanitation of barns. How it affects egg quality. Seasonal effect of these factors.
- Focus on waste. Make less.
- Sustainable soil loss.
- Economics of cover crops.
- Beef check-off. Research, education, promotion.
- Misperception on how beef fits into a healthy diet.
- Let kids take lead in start to finish project.
- Utilizing social media to market beef.
- Differential between educational and science based.
- Twitter - information coming-going so fast. Big marketing opportunity. People are getting better at tapping social media. Tools can be used to assess themes on social media. How do you keep the pulse on social media?
- Engaging with consumers with digital media.
- Create a project around promotion of ag issues with social media.
- Sheep – issues around immigration. Shepherds coming from the west. Bringing in sheep/goats for land management around airports, etc.
- Beef – amount of consumption of product and misperception of product. Grass fed vs commercial fed. Nutritional/marketing/costs. Somali high school goat project.
- Design a realistic game to do ag programming.
- What will give farmers most bang/buck.
- Precision farming.
- Fuel efficiencies.
- Mentoring in agriculture.
- Buffer strips.
- Water quality and runoff.
- Health management.
- Biosecurity – what works, what doesn’t?
- How do you get urban kids involved in agriculture?
- Animal activists – fact from fiction.
- Transparency with animal husbandry.
- Live bird market.
- Myths of advertising as it pertain to advertising – Chipotle (ie).
- Protein sources for swine and poultry:
  - Menhaden (plant eating fish)
  - Getting rid of carp – turn into amino acids for swine feed or bio mass and burn for electricity
- Looking at bioacoustics in swine and poultry to see stress levels. Goal to address animal welfare and make farmer more efficient.
- Work to increase animal health.