2014 Bratney Companies
4-H Robotics Challenge
@ the Iowa State Fair
August 10 and 11, 2014

Robotics Club Packet

Sponsored by:

[Bratney Companies logo]

[4-H logo]

[Iowa State University logo]
Event Overview

This event is an opportunity for youth who have been learning about Robotics to demonstrate your learning, celebrate your accomplishments, and interact with others who share an interest in robotics. The most important thing of all is to have fun. This event is put on entirely by volunteers, so show them your support and appreciation. Check your worries at the door and enjoy the day and everyone’s amazing achievements!

Event Location

The event will be held in the 4-H Exhibits Building on the Iowa State Fair grounds, Des Moines, IA 50317. Go to http://www.extension.iastate.edu/4h/statefair/ for maps of the Fair grounds and 4-H Building. Click here for directions.

Club members who participate in the Robotics Challenge and up to two club leaders/coaches will receive admission tickets to the 2014 Iowa State Fair for their respective challenge day (Aug. 10th for senior division, Aug. 11th for juniors division). Tickets will be issued to clubs based on the completion of the Bratney Companies 4-H Robotics Challenge Participation Confirmation Form.

Family members and spectators are responsible for their own admission.

Event Schedule

(Preliminary – subject to change)

7:30-8:00  Robotics clubs check-in: Receive club t-shirts; Set-up club pit area; Check out equipment
8:00-8:15  Challenge Release: Explain format; Review rules; Explain Challenges
8:15-10:45 Work on challenges
10:45-12:40 Challenge Events
12:40-1:00 Awards Ceremony
1:00-1:30 Teardown: Clean up stage and pit areas; Neatly arrange equipment and return it

Eligibility

1. Club registration is taken on a first-come-first-serve basis through June 30, 2014. The first eight clubs to register for each division will be invited to participate. All other clubs will be placed on a waiting list.
2. All clubs who are invited to participate must complete the Participation Confirmation Form by July 2, 2014.
3. All club members participating in the junior division must have completed 5th–8th grades in the 2013–2014 school year. All club members participating in the senior division must have completed 8th–12th grades in the 2013–2014 school year.
4. At least one member of each robotics club must be a 4-H member.
5. Clubs must have no fewer than 3, and no more than 10 members participating.
6. Club members need to be proficient with the LEGO Mindstorms® NXT robotics platform before the event begins.

Event Content

The Robotics Challenges

The Bratney Companies 4-H Robotics Challenge will be a real time challenge. This means clubs and their leaders will not know in advance of the event day what the challenges are. After check-in and set-up, the clubs will gather together for the Challenge Release. Everyone will receive the details of the tasks their robots must accomplish at the same time. Time has been allotted for questions and clarification. After the challenge release, each club returns to their pit area to design, build, and program robots that can complete the tasks outlined in the challenges. At the end of the work time, clubs demonstrate their engineering skills in the Challenge Events. The Challenge Events will take place on the main stage in the 4-H Exhibits Building. Fair visitors are encouraged to watch the event, and live video of the event will be projected onto the big screen.

The challenge

There will be two robotics challenges. Club members will have to decide how to divide their time to accomplish each challenge.

The LEGO Mindstorms® NXT Challenge uses the LEGO Mindstorms® NXT brick. It does NOT use the FLL or FTC playing field or any of its missions. The Challenge requires a club to design and build a robot that can accomplish a specific set of tasks. Points will be awarded based on how much of the challenge the robot accomplishes. During the Challenge Release each club will receive a sheet detailing the tasks and providing a point breakdown. The 4-H program will check-out one LEGO Mindstorms® NXT robotics kit including all necessary pieces to each club. You may NOT bring your own robot or use any of your own LEGO® pieces. However, you must bring your own computers (limit 2/club) with the NXT software (or alternative compatible software) loaded on it. We recommend that all clubs spend time working with sensors before the event. The tasks are easier to accomplish with sensors, and bonus points are awarded for using sensors. However, it is possible to accomplish the junior division challenges without using sensors. Senior division challenges, on the other hand, will require the use of sensors.

The divisions

There will be two age-based divisions; a junior division for younger youth and a senior division for older youth. The junior and senior events will take place on different days.

Junior Division: All club members must have enrolled in 5th – 8th grades in the 2013-2014 school year.

Senior Division: All club members must have enrolled in 8th – 12th grades in the 2013-2014 school year.

What to Bring

1. Paperwork—Fill out and bring Medical Release Forms for each youth and adult, the Club Roster, and the Equipment Check-out Agreement. Use the Club Checklist to make sure you didn’t forget anything. All these documents are available on the Iowa 4-H Robotics Challenge webpage.
2. Computer(s) with LEGO Mindstorms® NXT (or compatible) software loaded on it—limit 2 computers per club.

3. A power strip and extension cable—maybe several.

4. A club display—to decorate your pit area and showcase the great things you’re doing and learning in 4-H. This display can take any form club members choose. It could be a tri-fold display with pictures and text, but it need not be. Other possibilities that come to mind include ribbons and pictures of achievements to display on pit walls and tables, a slide show with captions, a video, materials produced for the FLL research project (if your club participated in FLL), or any other creative ideas you come up with.

5. Robot garages—It will happen . . . someone will drop their robot and watch the parts explode in a million directions. It’s not pretty. BRING TWO PLASTIC CONTAINERS LARGE ENOUGH TO CARRY YOUR ROBOTS DURING THE EVENT. If it drops, you have a better chance of collecting all of the parts and reassembling your robot.

6. Snacks—5 hours is a long time to go without food! The 4-H building has Campbell’s Concessions where you can purchase food, but you might want to bring snacks as well. When planning food, keep in mind that the event doesn’t end until 1:30 PM (by the time you clean up and check out).

7. Knowledge of how to build and program using the LEGO Mindstorms® NXT platform—you will not have time to learn at the event, but we will have technical advisors available who can help club members think through how to trouble shoot problems. (Sensor use is not necessary for the junior division challenge, but clubs who work on sensor skills before the event will have a distinct advantage. Using sensors increases options for accomplishing the challenge and earns bonus points. Senior clubs must be able to use sensors in order to accomplish the Challenge tasks.)

8. Your teamwork and engineering skills—this is your chance to show them off, be innovative, creative, collaborative, and demonstrate your ingenuity.

9. A great 4-H attitude!—This is a fun chance to stretch your skills, see what other 4-Hers are doing, and show off all the hard work you’ve put into the past year. Come ready to have fun and learn!

**What NOT to Bring**

1. Your own LEGO Mindstorms® NXT robot kit—we will provide these.

2. Extra parts for the Junk Drawer Challenge—we will provide all permitted supplies.

**Odds and ends**

**Participation Confirming**—Registration is taken on a first-come-first-serve basis. Shortly after registration closes every club who registered will be notified of acceptance. Each club that is invited to participate is required to complete the Participation Confirmation Form. This form MUST be completed by July 22nd.

**Attendance**—On the Participation Confirmation Form your club will indicate the number of leaders and club members who will attend. We understand that things happen, and someone who planned to attend may not be able to. If this situation arises, please email Jay Staker at jstaker@iastate.edu so we have an accurate count for tickets and T-shirts. If your club has already received its tickets, you must return any unused tickets to: Vicki Speake at the State 4-H office.
**Tickets and T-Shirts**—As part of the Participation Confirmation Form clubs will indicate the number of tickets and sizes of T-shirts required. Tickets will be sent to club leaders before the event. Each club will be assigned a t-shirt color and members will receive t-shirts to wear during the event. You can pick these up when you check-in on the day of the Event. Only individuals who actually participate in the event will receive t-shirts.

**Supplies Check-out**—Clubs will be required to check out two sets of supplies upon arriving at the Event: one LEGO Mindstorms® NXT robot kit, and one tool kit. After the Event clubs will be required to disassemble their LEGO robots, put every piece back in the proper compartment, and return them to the equipment check-out volunteers. Volunteers will verify that equipment is sorted properly. If not, the club will be instructed to take the kit back and finish sorting it. **CLUBS MAY NOT LEAVE THE BUILDING UNTIL A VOLUNTEER HAS SIGNED OFF ON THEIR EQUIPMENT CHECK OUT AGREEMENT.** Please plan sufficient time at the end of the event to clean up and return equipment before leaving.

**Resources**—Before the Event: if you have any questions or concerns contact Jay Staker at jstaker@iastate.edu or Vicki Speake at speake@iastate.edu. At the Event: we will have technical advisors to offer limited assistance with computer, programming, or component problems. Volunteers will also be available to answer questions about and clarify the challenges. We want you to have fun, learn something, and discover the amazing things you can do. We will do everything possible to make this a fun and educational while keeping the playing field level. So, if you have a question, ask!

**Role of the adult leader/coach**

This is the kids’ event! Thank you for all the hard work you do to make these amazing experiences and learning opportunities available to 4-Hers. Now is the time to watch with pride as they once again put it all together and show their stuff. You’re here to supervise and provide guidance and encouragement. Let’s watch them shine! If you, the adult leader, find the prospect of designing, building, or programming robots simply too enticing to resist, you will receive a warning from the technical advisors. If you still cannot resist the temptation to be overly involved in the process, you will be asked to leave the pit area and watch from the spectator stands while a technical advisor takes over your role of providing adult supervision. Such a request is non-negotiable, and failure to follow it will result in disqualification of your club. Removal of a club leader in no way disadvantages the kids who are supposed to be building their robots on their own anyway. Instead, it simply helps you, the adult, resist temptation.
Volunteers and Judges

Our volunteers and judges have generously donated their time to make this event exciting, educational, and fun for everyone involved. The rulings of judges and scorekeepers are final. If you have a concern during the event, please do not argue with judges. Bring your concerns to the Event Coordinator, Jay Staker.

Please discuss beforehand with your club and with parents that arguing with volunteers or judges is unacceptable behavior. This Event is about the achievement of the kids, teamwork, learning, and fun.

Safety

We expect everything will go smoothly and safely. No injuries, no accidents, nothing that a hug or a bandage can’t remedy. However, as a leader you have to be aware of your responsibilities for the care and safety of your club members, their belongings, those around you, and the facilities. It starts when you get behind the wheel and doesn’t end until the last club member is safely home.

There will be a lot of valuables sitting on tables around this event. The 4-H Building is a busy place with lots of visitors, and there will be many spectators watching the clubs work and cheering them on during the Challenge Events. Use common sense. Don’t leave valuables unattended. If something is expensive and a likely target of theft, leave it at home. Establish and encourage rules for your club before you arrive. Keep your club members and their belongings safe.

Scoring Overview

The challenge will have it’s own scoring sheet which clubs will receive when the challenge is released.

Upon check-in, each club will be designated a color and receive a schedule detailing when and on what Challenge Field the club’s robots will run.

Scorekeepers will record points during each round for each Event. The Events are scored separately and awards assigned separately.

There will be a champion of the LEGO Mindstorms® NXT Challenge champion. The 4-H Engineer Award goes to the club in each division with the greatest additive semifinal scores. Clubs will also receive recognition for engineering and 4-H excellence.
## Awards for each division
(Judges are not required to assign a recipient for every award)

<table>
<thead>
<tr>
<th>Award Name</th>
<th>Award Description</th>
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<tbody>
<tr>
<td>4-H Engineer Award</td>
<td>Top scoring club when scores from semifinal rounds are combined.</td>
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<tr>
<td>NXT Challenge Award</td>
<td>Top scoring club in LEGO Mindstorms® NXT Challenge Event championship.</td>
</tr>
<tr>
<td>Junk Drawer Challenge Award</td>
<td>Top scoring club in Junk Drawer Challenge Event championship.</td>
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<td>Golden Clover Volunteer</td>
<td>Club Leader who provided exemplary leadership by encouraging teamwork, providing appropriate but restrained guidance, allowing youth to engage in the engineering process, and being an example of 4-H values.</td>
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<tr>
<td>Clover Award</td>
<td>Club notable for exemplarity demonstration of 4-H values including teamwork, cooperation, generosity, responsibility, learning, working within space, time, and materials constraints, and showing respect for others.</td>
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<td>Innovative Programming Award</td>
<td>Club whose NXT Challenge program is notable for its innovativeness or elegance in producing desired robot behavior.</td>
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<tr>
<td>Innovative Programming Runner-up Award</td>
<td>Club whose NXT Challenge program is notable for its innovativeness or elegance in producing desired robot behavior.</td>
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<td>Mechanical Ingenuity Award</td>
<td>Club whose Junk Drawer Challenge robot is notable for its out-of-the-box design solutions.</td>
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<td>Creative Solution Award</td>
<td>Club whose NXT robot demonstrates a remarkably creative solution to an engineering dilemma encountered.</td>
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<td>Engineers not only have to solve technical problems, they also have to design solutions that are appealing to those who use their technologies. This award goes to the club whose robot is notable for its visual appeal.</td>
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## Contact Information

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<tr>
<td>Jay Staker</td>
<td>515-294-8417 <a href="mailto:jstaker@iastate.edu">jstaker@iastate.edu</a></td>
</tr>
<tr>
<td>Vicki Speake</td>
<td>515-294-5738 <a href="mailto:speake@iastate.edu">speake@iastate.edu</a></td>
</tr>
<tr>
<td>Good luck to your club!</td>
<td>Let us know if we've missed something or need to clarify!</td>
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