

OHIO 4-H MASTER PROJECTS



4-H 512M

Robotics Master

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The Robotics Master project is for members who want to continue with robotics after completing existing Ohio 4-H robotics projects or who want to explore robotics with a platform other than LEGOS®. Members of any age may complete this project, but should have previous robotics experience (comparable to what is required for other advanced-level 4-H projects), and be able to plan and complete the project on their own with minimal supervision or assistance.

NAME _____

AGE (as of January 1 of the current year): _____

COUNTY: _____

CLUB NAME: _____

ADVISOR: _____

Project Guidelines

1. Plan, design, build, program, and evaluate at least one robotics project. What you make should be different from what you can make within the guidelines of other 4-H robotics projects, or require specialized or professional-level skills to complete (beyond what would be expected in other robotics projects).
2. Take part in at least two learning experiences, as outlined and planned in section 2.
3. Take part in at least two leadership/citizenship activities, as outlined and planned in section 3.
4. Explore career opportunities in which you might apply or use what you learn by completing this project, as outlined in section 4.
5. Keep records of what you do, when you do it, how much you spend, and what you learn as you complete the project.
6. If possible, have someone take pictures of you working on your project at different stages as you progress from the beginning through completion, and attach copies of the photos in section 6 or in a separate project scrapbook.
7. Take part in a judging activity to evaluate the results of your project with someone else. The judging activity could be a simple discussion with your 4-H advisor about what you did particularly well with your project, and what you might like to do better next time, or it could be a more complex activity such as participating in your county's 4-H robotics judging to see how the results of your work compare with those of other members enrolled in the Robotics Master project.

Section 1: Planning What to Do and Doing What You Plan

To complete this project, you should plan, design, build, program, and evaluate at least one robotics project. Whatever you make should be different from what you can make within the guidelines of other 4-H robotics projects, or should require specialized or professional-level skills to complete (beyond what would be expected in other 4-H robotics projects). Here are a few examples of the many things you can do for your Robotics Master project:

- Plan, design, build, and program a robot to participate in a competitive robotics event such as the National Robotics Challenge or First LEGO League using your LEGO NXT kit. Document your work through pictures, video, or both. After the competition, reflect on the outcome of your work.
- Tour a manufacturing facility that uses robots in production. After seeing how robots are used there, plan, design, build, and program a robot that is a functional model of the system you witnessed. As you develop and evaluate your model, document your work through pictures and/or video.
- View videos of actual robots used in production at www.robots.com. After seeing these robots, plan, design, build, and program a robot that is a functional model of the system you witnessed. As you develop and evaluate your model, document your work through pictures, video, or both.
- Plan, design, build, and program a robot that performs a “dance” to a popular song. The dance should include actions that move pieces of the robot and that move the robot itself. (The robot should not just stay in one place). As you develop and evaluate your model, document your work through pictures, video, or both.
- Explore the application of robotics in a technology-intensive field such as space exploration, medicine, defense, etc. Conduct research, and plan, design, build, and program a

robot that simulates the application. As you develop and evaluate your model, document your work through pictures, video, or both.

- Visit the Carnegie Mellon Robotics Academy website called Computer Science Student Network (CS2N) at www.cs2n.org. Click on the “Activities” tab and develop your programming skills in a new area by following the online tutorials. Opportunities for learning may change, but as of fall 2012, areas for study included storytelling and animation, robot virtual worlds, robots in motion, game design, multi-robot communications, and web design. Implement what you have learned with your own computer or robot. Document your skill development or course work through a journal, pictures, video, or all three.
- Learn ROBOTC, a robotics programming language based on the C programming

language. The Carnegie Mellon Robotics Academy website called Computer Science Student Network (CS2N) offers ROBOTC as preparation for those participating in the FIRST® Tech Challenge (FTC). Use ROBOTC to program a real or virtual robot. Document your skill development or course work through a journal, pictures, video, or all three.

- Plan and design a robotics challenge for use with your LEGO NXT or other robot. (A FLL competition challenge is a good example.) Provide directions for the challenge, and design and build a portable board for use in completing the challenge. Program your robot to complete the challenge and evaluate your success. Document your work through pictures, video, or both.

These are just “starting place” ideas. The whole notion of a master project is to decide what you want to do. Just make sure what you plan is different from what you could do in other robotics projects, and do what best suits you and your family’s needs and interests. This project may be completed or repeated over several years, as long as new skills are developed each year, and as long as additional sources and activities are used. Be sure to enroll in 4-H and register your project with your Extension office each year.

Before deciding for sure what you want to do or make for your project, complete the following:

- Discuss your ideas with family, friends, and your 4-H advisor.
- Talk with someone who has done something similar to what you are planning, and ask for tips and advice.
- Check out books about your topic at the library before you begin.
- Visit websites that provide more information about what you plan to do.
- Check your county’s project guidelines (if any) for additional requirements, especially if you choose to participate in county project judging or prepare an exhibit for the fair.

My Robotics Master Project Plan

Use this table to outline your goals (what you want to do in your project), the specific steps you need to take to accomplish those goals, and when you plan to do them.

Goals	Objectives	Dates

Section 2: Project Learning Experiences

Learning experiences are organized programs or events in which you learn with other people about things related to your project, beyond what you would by yourself. Choose **at least two** learning experiences from the list below (or create your own). Write them in the table below. Record your progress by asking your project helper to initial next to the date when each one is completed. You may add to or change these activities at any time.

- Attend a clinic, workshop, demonstration, or speech on a topic related to your project.
- Attend a county, area, statewide, or national 4-H officers and advisors conference and participate in sessions related to teen leadership.
- Take part in a 4-H camp counselor training and discuss with your project helper the leadership skills needed to be a counselor.
- Take part in a tour of your county courthouse and administrative offices to meet your elected officials and visit with them about their work.
- Prepare your own demonstration, illustrated talk, or exhibit.
- Participate in county judging or in the open Ohio State Fair Robotics Challenge event. (For more information, go to www.ohio4h.org/robotics.)

Learning Experiences (include location)	Date Completed	Project Helper Initials

Section 3: Leadership/Citizenship Activities

Leadership/citizenship activities provide opportunities for 4-H teens to live the 4-H pledge—by using their heads, hearts, hands, and health to think clearly, promote loyalty, provide service, and live better to improve their clubs, communities, country, and world. Choose **at least two** leadership/citizenship activities from the list below (or create your own). Write them in the table below. Record your progress by asking your project helper to initial next to the date when each one is completed. You may add to or change these activities at any time.

- Encourage a friend or a younger person to join 4-H and take a robotics project, or help younger members plan and complete a robotics project.
- Do an interview practice session for younger members to help them prepare for judging.
- Attend a local township trustees meeting or county commissioners meeting, and tell them about yourself and your club’s service projects.
- Assist in setting up for and cleaning up after a club, county, or other 4-H event, especially those related to robotics.
- Prepare an illustrated talk, speech, or skit related to your project, and present it to your 4-H club or at the county or area 4-H speaking contest.
- Create an online video that demonstrates a unique feature from one of your robot designs. Share it with robotics program leaders.

Leadership/Citizenship Activities	Date and Locations of Activities I Completed

Section 4: Explore Career Opportunities

One benefit of completing 4-H projects is that they give you a chance to think about and explore potential career opportunities. Many former 4-H teens use the skills and abilities developed in 4-H robotics projects in their careers. Some have successful careers directly related to robotics, such as maintenance technician, controls engineer, manufacturing engineer, mechanical engineer, electrical engineer, software engineer, and even physician. Even if you do not pursue a career in a robotics field, you will use your 4-H robotics experience throughout life.

Since the process you are working through requires selecting a task and developing a solution, the skills you

gain during the project transfer to nearly any career. Every employer is looking for associates who are self-starters and for individuals who can work through a given problem from start to finish.

Talk with a parent, project helper, or friend and brainstorm a list in the table below of at least three careers in which you could apply what you learn through this project. In the middle column, list the name of someone you know who could tell you more about that career. Select *one* of the people listed to interview them about their field and how to succeed in it. Summarize what you learned in the space below.

Related Career/Job Title	Person you could visit with who knows about the career	Date you visited ONE of these people about the career

What I Learned:

Section 6: Project Photos

Use this page to attach photos of you working on your project at different stages. Add additional pages if needed, or keep your photos and project records in a separate project scrapbook.

Section 7: Evaluating Your Results

Take part in a judging activity to evaluate the results of your project with someone else. The judging activity could be a simple discussion with your local 4-H advisor about what you did particularly well with your project and what you might like to do better next time, or a more complex activity such as participating in your county's 4-H robotics judging to see how the results of your work compare with those of other members enrolled in the Robotics Master project. To prepare for judging, evaluate what you did for your project using by answering these questions:

1. Describe what you did for this project.

2. What led to this decision?

3. What did you do especially well in your project? What are the best parts of your project?

4. If you could improve anything about your project, what would it be? What will you do differently next time you attempt to make something like what you made in your project?

Date Judging Activity Completed: _____

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