UC
CE

General

Engineering
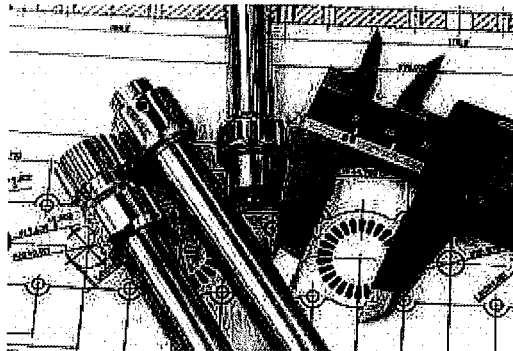
This We Believe:

- The boy and girl are more important than the projects.

- The member should be their own best product.

- No award is worth sacrificing the reputation of a member or leader.

- Competition is a natural human trait and should be recognized as such. It should be given no more emphasis than other fundamentals.

- Learning how to do the project is more important than the project itself.

- Many things are caught rather than taught.

- A blue ribbon member with a red ribbon project is more desirable than a red ribbon member with a blue ribbon project.

- To learn by doing is fundamental in any sound educational program.

- Generally speaking, there is more than one good way of doing most things.

- Every member needs to be noticed, to feel important, to win, and to be praised.

- Our job is to teach members *how* to think, not what to think.
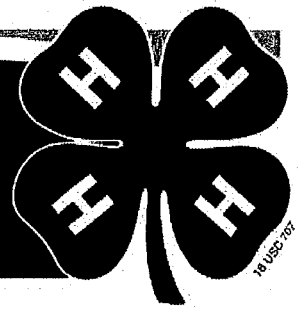
4-H ENGINEERING PROJECT

Engineering is a systematic and iterative approach to addressing human needs and wants, by designing, building, and testing tools, processes, and systems. Through engineering projects, youth learn about the iterative engineering design process, attributes of design, impacts of systems, and effects of technology on the environment.

- Identify and define a problem, its constraints, and goals/criteria a solution must meet
- Develop possible solutions; test and optimize the design solution
- Engage in engineering practices: defining problems, using models, carrying out investigations, analyzing/interpreting data, using math, designing solutions, engaging in argument from evidence, communicating information.

Starting Out *Beginner*	Learning More *Intermediate*	Exploring Depth *Advanced*
○ Experience the engineering design process ○ Record designs and testing in an engineering notebook ○ Learn about the types and safety considerations of tools and equipment. ○ Learn about form and function and the role of materials in engineering design ○ Evaluate design solutions against relevant criteria	○ Learn about engineering fields and careers. ○ Make connections between human issues and how engineering can help provide solutions ○ Start to think about systems thinking and how individual parts of a system work together ○ Learn about the selection, development, and use of tools	○ Identify real life issues and their constraints and design a tool to help solve the issue ○ Explore engineering in context of disciplines: agriculture, energy, medical, and others ○ Explore the interactions of technology (created using engineering) and their effects on the world ○ Dig deeper into ethics, equity, and responsibility of engineers

The activities above are ideas to inspire further project development. This is not a complete list.

4-H THRIVE
Help Youth:

Light Their Spark
A spark is something youth are passionate about; it really fires them up and gives them joy and energy. Help youth find what it is that excites them.

Flex Their Brain
The brain grows stronger when we try new things and master new skills. Encourage youth effort and persistence to help them reach higher levels of success.

Reach Their Goals
Help youth use the GPS system to achieve their goals.

Goal Selection: Choose one meaningful, realistic and demanding goal.
Pursue Strategies: Create a step-by-step plan to make daily choices that support your goal.
Shift Gears: Change strategies if you're having difficulties reaching your goal. Seek help from others. What are youth going to do when things get in their way?

Reflect
Ask project members how they can use their passion for this project to be more confident, competent and caring. Discuss ways they can use their skills to make a contribution in the community, improve their character or establish connections.
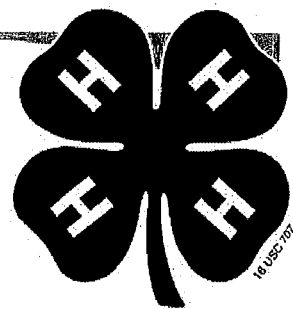
Light Your Spark *Flex Your Brain* *Reach Your Goals* *Light Your Spark* *Flex Your Brain* *Reach Your Goals*

Expand Your Experiences!

Science, Engineering, and Technology

- Go on a field trip of an engineering company or organization
- Build your own measurement tool in order to conduct a scientific investigation
- Research and discuss with other members the relationship between science and engineering—how are they different? How are they similar?

Healthy Living

- Learn about the safety of a tool or equipment and present to the other project members
- Identify a health-related need in your home or community and then design, build, and test a device that can help meet that need
- Learn about the engineering behind a piece of medical equipment

Citizenship

- Select one tool and trace its lineage. When was that tool first introduced? Who created it and for what purpose? What affect has adoption of that tool had on society?
- Identify a community need and then plan and implement a service learning project to address that need using the experience you've gained in this project

Leadership

- Serve as a Junior or Teen Leader for the Engineering project
- Lead an engineering activity at a 4-H club meeting for younger members
- Serve as the lead for a service learning project related to engineering, form a group of fellow members, and submit a request for funding

Resources

- National 4-H Engineering & Technology
www.4-h.org/youth-development-programs/4-h-science-programs/engineering-technology/
- International Technology and Engineering Educators Association (ITEEA)
http://www.iteaconnect.org/
- 4-H Clover Safe Notes
safety.ucanr.org/4-H_Resources/
- Design Squad (PB)
http://pbskids.org/designsquad
- Maker Education Initiative
http://www.makered.org/
- eGFI: Dream Up the Future
http://www.egfi-k12.org/
- Engineer Girl
http://www.engineergirl.org/
- Autodesk Education
http://www.autodesk.com/education/student-software
- National Center for Women and Information Technology
https://www.ncwit.org/
- Techbridge: Inspire a girl to change the world
http://www.techbridgegirls.org/

The UC 4-H Youth Development Program does not endorse, warrant, or otherwise take responsibility for the contents of unofficial sites.

| Connections & Events	Curriculum	4-H Record Book
Presentation Days – Share what you've learned with others through a robotics related presentation. Field Days – At these events, 4-H members may participate in a variety of contests related to their project area. Contact your county 4-H office to determine additional opportunities available, such as a field day.	○ 4-H Robotics: Engineering for Today and Tomorrow www.4-h.org/robotics/ ○ TechXcite: Discover Engineering techxcite.pratt.duke.edu/ ○ 4-H The Power of the Wind www.4-h.org/educational/wind/ ○ Design It! www.terc.edu/resources/designit ○ Exploratorium, the Tinkering Studio projects tinkering.exploratorium.edu/	4-H Record Books give members an opportunity to record events and reflect on their experiences. For each project, members document their personal experiences, learning, and development. 4-H Record Books also teach members record management skills and encourage them to set goals and develop a plan to meet those goals. To access the 4-H Record Book online, visit www.ca4h.org/Resources.
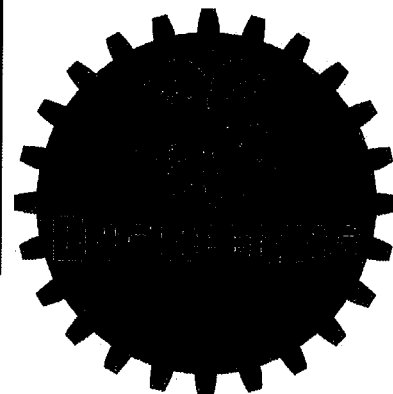
University of California Agriculture and Natural Resources

I'm a 4-H Project Leader: Now What Do I Do?

How do I know who is in my project?

- Your club organizational leader will provide you with the names, addresses and phone numbers of the members enrolled in the project for which you are the leader.
- If you are working on the county level, contact the UCCE for the list of project members.
- The organizational leader may indicate to you if any of the youth have special needs. At your first project meeting, note any other youth that may have special needs.
- You may wish to consult with the parent or your 4-H Youth Development Agent as to how to work with a special needs child.

How often should I hold project meetings?

It is recommended you hold 4-6 meetings that each last 1½ to 2 hours in length. Some projects require more meetings or a longer meeting time to accomplish your goals. Some projects, such as leathercraft, may lend themselves to individual project work as members progress on their projects. In this case, you should hold several introductory meetings for all members and then set up a schedule of time for them to sign up for individual help.

When do I start?

Get started as soon as possible! Members' interest in a project is most keen when they are signing up for a project and when they get their project books.

How do I cover the cost of project meetings?

- There is a wide variety of means for covering the cost of project meetings. Some methods used include:
- Each member pays for their share of the expenses or provides a portion of the supplies.
- The club agrees to cover expenses using funds from their treasury. Approval in advance is needed for this.
- Members and leaders can solicit donations/supplies from area businesses.
- Sometimes funds from sources outside your club may be available to cover your project meeting costs.

How do I establish a project meeting schedule?

First, determine when you are available to work with project members. Then determine an initial project meeting date by consulting with your project members.

Publicize the date using one of the following means:

- County and/or club newsletter
- Club meeting or leader association meetings
- Postcards or phone calls to project members

You may not be able to schedule an initial meeting that everyone can attend. Establish a time to meet with those unable to attend before you hold your second project meeting.

Where do I hold project meetings?

Typically project meetings are held at project leader homes, schools, or community buildings. For more information on facility adaptability and liability concerns contact your 4-H Youth Development Agent.

What safety precautions do we need to consider?

Consider the type of safety issues your particular project involves. Request and secure necessary safety items such as ear protection, eye protection and head protection.

How do I let others in my club or other clubs know I am a project leader?

Prior to enrollment ask for time on your club's meeting agenda to let families in your club know you're a project leader and to share some things the kids could do in the project if they enrolled in it. When the project materials are handed out, take the opportunity to inform or remind members that you are their project leader and set an initial meeting date with the group. If no one in your club is in your project, you may wish to offer your services to a neighboring club. Talk to your club organizational leader or county 4-H Youth Development agent about this opportunity.

How do I prepare for the first meeting?

You may want to establish a 4-H resource box where you keep your project materials and any additional resources you will be using. Take time to become familiar with your project literature and talk to others who were project leaders for this project to find out what activities the members enjoyed.

What should I do at the initial project meeting?

- At the initial project meeting, here are some ideas of what you might want to cover:
- Find out what the members want to learn and accomplish in the project. The project literature is an excellent source of ideas.
- Review the safety practices that members will need to follow.

- Do an introductory activity related to the project so the members get to know one another
- Have a small project the members can complete and take home
- Talk about how the project meeting supplies will be paid for. Experienced leaders have found it easiest to charge a small fee to cover the cost of the expenses.
- Assess when members are available for additional meetings. You may wish to ask the parents or members to bring along their calendars of family activities.
- Encourage parents to participate in project meetings, especially the initial meeting.

What does a typical project meeting look like after the initial orientation?

Use the experiential learning model (found in the introductory pages of your Helper's Guide) to plan your project meeting. The project helper's guide will provide suggestions for designing a project meeting. Here are some suggestions for each section of the model:

Do

- Plan an activity to focus the project members on what they'll be doing today. Work on the project for that meeting.

Reflect

- Review the process completed
- Discuss what worked and didn't work.
- Talk about how any problems that arose were solved.
- Assist members in documenting their project work for inclusion in their record books/portfolios.

Apply

- Ask the project member the following questions:
- What else have you seen that is similar to this?
- How can you apply what you learned today to other situations?

What resources are available to help me?

- 4-H Project Literature – You will receive project literature through your 4-H club or the UW-Extension office. Typically there is a helper's guide and member literature for three to four levels.
- Other People in my Club & County – There are a number of people in your county who would be willing to share project ideas and tips with you.

These include:

- Project leaders in other clubs
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- Older youth who have been involved in the project

- Media Collection & Public Libraries – Additional resources can be obtained from the Cooperative Extension Media Collection. They have videos, skillathons, displays and resource packages available to support a variety of projects. There is a user fee per item you or your club will be responsible for. You can view their catalog at their website http://www.uwex.edu/ces/media/. Check with your local public library to find out what resources they may have or that you can obtain through inter-library loan.
- 4-H Website – Wisconsin 4-H is continually adding more information and activities to their website. Visit this site at www.uwex.edu/ces/4h/onlinepro/. You may wish to check out websites from other state 4-H programs also.
- Volunteer Leaders Conferences – Review each issue of your county's newsletter to learn about training sessions for project leaders offered by your county, district or at statewide events. Sessions focusing on new project literature are typically offered at the State 4-H Volunteer Leader Conference held every other year. Periodically statewide conferences focusing on specific project areas are offered in addition to sessions at the volunteer conferences. You can also exchange ideas with other leaders at statewide Field Day.
- Field Trips – Youth always enjoy the opportunity to see firsthand how things are done and how they work. Consider taking your project group on a field trip or tour of a local business or company to enhance their project experience. An example would be taking your dairy members to a cheese factory or your foods group to a local bakery.
- Local Experts – Bring in a local "expert" to share their ideas and experiences with your group. One example would be asking a Master Gardener to share information on choosing perennial or trimming shrubs at one of your project meetings.
- Magazines – Many leaders have found creative ideas to supplement those in the project literature in magazines they have or those at the public library.

How can I incorporate activities not included in the project guide?

We encourage you to use the ideas in the project literature as they have been successfully used with youth. If you have some additional activities you would like to incorporate, consider the following criteria:

- Of interest to kids
- Developmentally appropriate
- Incorporate the experiential learning model
- Youth and adults are involved in determining what will be done
- Enhances the development of member life and project skills
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What is the relationship between project work and the county fair?

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