

# 4-H Engineering Proficiency Program A Member's Guide

## OVERVIEW

The 4-H Engineering Proficiency program helps you learn what you need to know about your 4-H project.

There are many resources to help you learn more about your project:

- The University of California Davis has free resources available online by visiting: <http://anrcatalog.ucdavis.edu/4HYouthDevelopment/>. This site lists a variety of project materials and resources recommended for use in your project.
- The Solano County 4-H Resources and Lending Library at our county 4-H Office includes other books, videos, and reference materials that can be checked out by members and leaders.

There are five levels in the Project Proficiency Program. You may choose how many levels you wish to complete:

- ◆ Level I – “Explorer”, you begin to learn about many different aspects of your engineering project.
- ◆ Level II – “Producer”, you practice and refine the many skills involved in your project.
- ◆ Level III – “Consumer”, you become experienced in your project.
- ◆ Level IV – “Leader”, allows you to show your own leadership potential.
- ◆ Level V – “Researcher”, you carry out a demonstration or experiment on some aspect of engineering, and prepare a paper or portfolio.

As you work through the proficiency program, your leader will date each skill item as you complete it. When all items in a proficiency level are completed, your leader will sign the Certificate of Achievement.

# ENGINEERING Level I - Explorer

Date  
Completed

- \_\_\_\_\_ 1. Identify five materials used in your engineering project and give an example of how each is used.
- \_\_\_\_\_ 2. Identify six pieces of equipment needed to produce items in your project.
- \_\_\_\_\_ 3. Explain the difference between two pieces of equipment or materials used in your project.
- \_\_\_\_\_ 4. Demonstrate how to handle knives or sharp objects safely.
- \_\_\_\_\_ 5. Explain two common courtesies expected during project activities.
- \_\_\_\_\_ 6. Describe three safety issues related to your project.
- \_\_\_\_\_ 7. Demonstrate how to follow basic directions, step by step, in correct order.
- \_\_\_\_\_ 8. Demonstrate how to replicate shapes, forms and patterns.
- \_\_\_\_\_ 9. Display an example of your engineering project to project members and tell about how you made it.
- \_\_\_\_\_ 10. Explain ten new terms that you have learned for this project.
- \_\_\_\_\_ 11. Complete four items in this project.
- \_\_\_\_\_ 12. Identify 5 different projects that you would like to make. Explore the cost, techniques, and materials required for each project. Make the project you feel you can complete.
- \_\_\_\_\_ 13. Write down a list of the items needed and figure out how much it will cost to make one engineering project.
- \_\_\_\_\_ 14. Demonstrate how "measuring" is used in your specific craft.
- \_\_\_\_\_ 15. Explain how the skills or knowledge you have learned in this project can help you in the future.

Member Name: \_\_\_\_\_ Date: \_\_\_\_\_

Project Leader's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## ENGINEERING Level II - Producer

Date  
Completed

- \_\_\_\_\_ 1. Explain how to prepare wood before you bend it.
- \_\_\_\_\_ 2. Participate in one field trip to a materials or equipment provider.
- \_\_\_\_\_ 3. Describe the steps or process necessary to complete your project.
- \_\_\_\_\_ 4. Explain how crossbeams affect a structure's strength.
- \_\_\_\_\_ 5. Demonstrate five basic techniques you learned while completing this project.
- \_\_\_\_\_ 6. Identify three locations where materials can be obtained or purchased.
- \_\_\_\_\_ 7. Explain to others outside of your project group what you have learned.
- \_\_\_\_\_ 8. Display your project at least once outside of your project meeting.
- \_\_\_\_\_ 9. Make four different items for this project.
- \_\_\_\_\_ 10. Experiment with two different techniques, materials, or methods then tell which you prefer and why.
- \_\_\_\_\_ 11. Describe the proper method for storing a finished product and for cleaning the equipment used to make the product.
- \_\_\_\_\_ 12. Keep a record of cash expenses and at the end of the year compare your product(s) value to your expenses. Could you have purchased the item(s) for less?
- \_\_\_\_\_ 13. Describe one mistake/error that you made in producing a product and what you did or could have done to correct or prevent it.
- \_\_\_\_\_ 14. Show how you have changed or modified your project from the original pattern or design.
- \_\_\_\_\_ 15. Help someone else by sharing your knowledge or by giving away a product from your project to show positive citizenship.
- \_\_\_\_\_ 16. Describe two ways to keep a healthy work environment in this project.

Member Name: \_\_\_\_\_ Date: \_\_\_\_\_

Project Leader's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**ENGINEERING**  
**Level III - Consumer**

Date  
Completed

- \_\_\_\_\_ 1. Invite a guest speaker to one of your meetings and introduce them to the group.
- \_\_\_\_\_ 2. Contact a local, state or national organization or company related to engineering and explain to your project group what this organization/company has to offer to its members/customers and interested individuals.
- \_\_\_\_\_ 3. Keep a personal reference library of literature that will be helpful in your project.
- \_\_\_\_\_ 4. Take part in a demonstration or judging contest specific to your project.
- \_\_\_\_\_ 5. Report the history of one aspect (origin, equipment, material, techniques, etc.) of your project.
- \_\_\_\_\_ 6. Visit one craftsman in the community and report what you learned at your next project meeting.
- \_\_\_\_\_ 7. Keep a record of costs, cash expenses, time and labor charges for each product made. At the completion of the specific item, compare your product's value to the total expense.
- \_\_\_\_\_ 8. Describe four ways to save money and be economical in obtaining materials.
- \_\_\_\_\_ 9. Describe at least four different types of gears and when you would use each of them.
- \_\_\_\_\_ 10. Make a project that uses three different techniques and three different materials or types of equipment.
- \_\_\_\_\_ 11. Alone or with your group, plan and complete a community service activity related to engineering.
- \_\_\_\_\_ 12. Give a demonstration about your project.

Member Name: \_\_\_\_\_ Date: \_\_\_\_\_

Project Leader's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**ENGINEERING**  
**Level IV - Leader**

Date  
Completed

- \_\_\_\_\_ 1. Serve as Junior or Teen leader in this project for one year.
- \_\_\_\_\_ 2. Assist younger members in making, selecting, and constructing their project.
- \_\_\_\_\_ 3. Prepare teaching materials for use at project meetings.
- \_\_\_\_\_ 4. Develop and put on a judging event, or train a junior team for a judging activity.
- \_\_\_\_\_ 5. Speak on a project-based subject before an organization other than your 4-H group.
- \_\_\_\_\_ 6. Assist at a local crafts fair, show or other expo.
- \_\_\_\_\_ 7. Assist younger members about learning a specific technique in the project.
- \_\_\_\_\_ 8. Develop your own special project-related activity. Chart your progress, plan the activities, analyze successes and problems, and report on your findings.

Member Name: \_\_\_\_\_ Date: \_\_\_\_\_

Project Leader's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**ENGINEERING**  
**Level V - Researcher**

Date \_\_\_\_\_  
Completed \_\_\_\_\_

- \_\_\_\_\_ 1. Report on the results of a demonstration comparing measurable differences in some aspect of your project. (Experiment)
- \_\_\_\_\_ 2. Prepare a paper of 300 words or more on one of the following topics:
- Evolution of techniques
  - History of a specific method/product
  - Markets and methods of marketing engineering products
  - Resource utilization and/or conservation
  - Development of an engineering process
  - Effect/use of color, shape, form, pattern, etc.
  - Other
- \_\_\_\_\_ 3. Prepare a speech or illustrated talk to orally summarize your findings and present at a club, project meeting or other educational event.

Member Name: \_\_\_\_\_ Date: \_\_\_\_\_

Project Leader's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

# Certificate of Achievement

*This certifies that*

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*has completed the Engineering Proficiency*

*in Solano County.*

*Explorer*

*Producer*

*Consumer*

*Leader*

*Researcher*

\_\_\_\_\_  
*Date*

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