Kalamazoo County 4-H
Science & Technology Project Guidelines

Project Leader or Superintendent: N/A

Project Social Media: N/A

Project Objectives & Life Skills*

- Expand knowledge and skills in science and technology.
- Apply scientific and technological knowledge and skills.

- **Head**
  - Keeping records
  - Wise use of resources
  - Planning/organizing
  - Problem solving
- **Heart**
  - Communication
  - Social skills
  - Sharing
  - Nurturing relationships
- **Hands**
  - Leadership
  - Responsible citizenship
  - Marketable skills
  - Self-motivation
- **Health**
  - Self-responsibility
  - Character
  - Healthy lifestyle choices
  - Personal safety

**note these life skills are just some examples of what 4-H members will learn in this project*

Additional Resources:

MSU Extension – Heads In, Hearts, In Curriculum
Fundamental Engineering Design Principles | Neural Concept
Engineering Design Principles & Methodology - Cambridge DT
Creative Engineering Design - Unit - TeachEngineering
Shop 4-H Computer Science Curriculum
Click2ComputerScience
Computer programming - JavaScript and the web
Explore Hour Of Code Activities
HTML5: The Language That Runs the Internet - Spiceworks

Science and Technology Guidelines

Section K–Engineering and Technology

- Educational exhibit
    - Exhibit any display, poster, notebook, 3-D exhibit, etc. of any engineering principle 4-H'er finds of interest to them.
- Creative Engineering Designs
    - Exhibits must display a creative take on an engineering design.
    - Any materials are allowed to create the design.
    - Display must be all one piece, **no loose pieces.** If there are loose pieces the project will be sent home and not be able to be displayed.

Section L–Computers

- Computer programming
    - 4-H'ers must bring their own technology to share their computer program with the judges. For display a copy of the programming language and still images of your program working must be brought with the 4-H'er for judging in a secured folder.
    - 4-H'ers can submit programming projects in any programming language of their choice. A couple popular options are:
        - Block-based: Scratch, Code Studio, Alice, etc.
        - Text-based: Python, JavaScript, C/C++, C#, ASP.net, R, Go, Java, PHP, Perl, Ruby, etc.
    - Beginner (1st and 2nd year)
        - Create any type of program using the programming language of your choice. The program must include at least ten different commands.
        - Project can be a continuation from the previous year but must have huge improvements/changes from prior years documented.
    - Intermediate (3rd and 4th year)
        - Create any type of program using the programming language of your choice. The program must include at least ten different commands and commands must be more challenging than previous years.
        - Project can be a continuation from the previous year but must have huge improvements/changes from prior years documented.
    - Advanced (5th year and beyond)
        - Create any type of program using the programming language of your choice. The program must include at least ten different commands and commands must be more challenging than previous years.
        - Project can be a continuation from the previous year but must have huge improvements/changes from prior years documented.
- Educational Poster
    - 4-H'er can choose any topic they find interesting about computers, computer science, internet usage, careers etc.
    - The finished project must be a poster or 3-D exhibit. Resources used must be included in your project.
- Special Project/Display
    - Any other project that does not fit in any of the other categories in Section L (computer science).
    - Finished projects can be a poster, video, notebook, 3-D object or other display.

- Computer Hardware
    - Finished projects can be a poster, video, notebook, 3-D object or other display. Images of what you did during the project must be incorporated into this project.
    - Beginner (1st and 2nd year) suggested projects:
        - Explore different operating systems.
        - Learn about the binary, what the binary system is and how computers use the binary system.
        - Deconstruct and reconstruct a computer.
        - Learn about hardware problems and understand how to troubleshoot them.
        - Design a dream machine, give reasons for each accessory/upgrade/tech choice/etc.
        - Any other similar projects of interest dealing with computer hardware.
    - Intermediate (3rd and 4th year) suggested projects:
        - What is network hardware and how does it work?
        - Design a computer network.
        - What are different types of servers and what are the pros and cons of each type?
        - Set up a Raspberry Pi or other microcontroller
        - Any other similar projects of interest dealing with computer hardware.
    - Advanced (5th year and beyond) suggested projects:
        - Design and implement a computer network.
        - Learn how to secure a network.
        - Teach a computer science class.
        - Build your dream computer.
        - Research careers in computer science.
        - Any other similar projects of interest dealing with computer hardware.
- Web Design
    - 4-H'er must bring in their own technology to share their web design with the judges. Project should also be printed out for display and secured in a folder.
    - Beginner web design (1st and 2nd year)
        - The website must be a demonstration of:
            - Use of a website builder (such as wix or canva) to create your website
            - Insert at least one image you took yourself into your website.
            - Create a unified look across your website.
            - Must have a minimum of two different pages.
            - Know and be able to explain what CSS is and why it is important?
            - For security and privacy purposes you should not include personal information
    - Intermediate web design (3rd and 4th year)
        - The website must be a demonstration of:
            - All the items for beginner's web design
            - Modify the existing HTML
            - Use of HTML5
            - Modify existing CSS
            - Must have a minimum of five different pages.
    - Advanced web design (5th year and beyond)
        - The website must be a demonstration of:
            - All the items for beginner and intermediate web design
            - Create a custom site using appropriate industry tools
            - Have a responsive website
            - Add in useful and appropriate plugins
            - Test and eliminate bugs
            - Include links to social media
            - Include 4-H'er made audio/video
            - Must have a minimum of ten different pages.