

# 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](#)

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# 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.