4-H Science and Inventions Guidelines

General Department Expectations

1. Projects must demonstrate age-appropriate learning, planning, and understanding.
2. Operational projects must be capable of being safely displayed in a public setting.
3. Posters, notebooks, engineering logs, or display boards are strongly encouraged to demonstrate the learning process.
4. Projects should reflect one or more of the following: Problem solving, Design process, Technical skill development, and Innovation or improvement of an existing system.

For fair: Please bring one invention or technology. The technology or invention does not need to be functional, but its function must be explained in artist statement.

<u>Music and Sound</u>

- Demonstrate understanding of sound waves, amplification, or recording processes.
- Projects may include speaker builds, sound editing demonstrations, recording setups, or acoustic studies.
- Youth should explain components such as microphones, amplifiers, soundboards, or software used.
- Electrical safety must be clearly addressed.
- If operational, sound levels must be appropriate for public display.

<u>Computer and Technology</u>

- Projects may include coding, website development, hardware assembly, cybersecurity studies, or digital design.
- Youth should explain programming language used or hardware components installed.
- Screenshots, printouts, or demonstration videos are recommended for display.
- Online projects must not require internet access during judging unless pre-approved.
- Emphasis should be on understanding logic, structure, and digital safety.

<u>Robotics</u>

- Youth should explain sensors, motors, controllers, and coding logic. Engineering notebooks or build logs are encouraged.
- Robots must be safely contained during demonstrations.
- Projects should reflect understanding of troubleshooting and iteration.

- Projects should demonstrate mechanical design and programmed movement or automation.

Automotive

- Projects may include system models, repair demonstrations, tool identification, or automotive system studies.
- Youth should demonstrate knowledge of engine systems, braking systems, electrical systems, or maintenance procedures.
- Safety practices, including proper tool use and protective equipment, must be described.
- Fuel systems or hazardous materials may not be displayed.
- Emphasis should be placed on mechanical understanding and safe operation.

Engine

- Projects may include model engines, disassembled small engines, or cutaway displays.
- Youth should demonstrate understanding of:
    - Four-stroke cycle
    - Fuel systems
    - Ignition systems
    - Lubrication and cooling systems

        Fuel must be fully drained before exhibition.
        - Engines must not be operated indoors.
        - Diagrams or labeled parts are strongly encouraged.

Agriculture

- Projects may include scale tractor models, safety demonstrations, maintenance displays, or technology studies.

Health Technology

- Projects may include wearable tech analysis, heart rate monitoring studies, exercise tracking systems, prosthetic models, diagnostic tool studies, anatomy models, or biomedical engineering demonstrations.
- Youth must demonstrate understanding of biological systems involved.
- Youth should explain how the device measures data and how data is interpreted.
- Personal data should not be displayed without consent.