



# Small Engines Project



Imagine trying to mow a golf course without a lawnmower or clear a driveway without a snow thrower. Everyday tasks are possible because of small engines, powerful machines generally under 25 horsepower that keep your homes, farms, and communities running. Youth explore how engines work, how to maintain them, and how to diagnose and repair problems. Members gain hands-on experience with tools, fuel systems, and mechanical parts while learning important safety practices. Through problem-solving and real-world projects, youth build confidence, responsibility, and technical skills that prepare them to be Beyond Ready for college, careers, and everyday life.

## Starting Out *Beginner:*

- Learn personal and general shop safety rules.
- Practice safely using simple hand tools.
- Identify basic external parts of a small engine and what each part does.
- Understand basic steps of how an engine works: intake, compression, power, and exhaust.
- Learn how to check fuel, oil, and air filters as part of basic engine care.

## Learning More *Intermediate:*

- Study internal engine parts and understand how they work together.
- Learn about engine size, horsepower, and compression ratios and why they matter.
- Compare two-stroke and four-stroke engine designs and their uses.
- Practice basic maintenance (spark plug replacement, air filter care, and oil changes).
- Safely use advanced tools such as torque wrenches, feeler gauges, and compression testers.

## Expanding Horizons *Advanced:*

- Study **rules and regulations** for operating small engine equipment safely and legally.
- Tear down and **rebuild a small engine** using correct procedures and manuals.
- Use **diagnostic tools** to test compression, ignition, and fuel systems.
- Adjust carburetors, governors, and valve systems for peak performance.
- Measure engine tolerances and evaluate parts for wear or damage.

## Beyond Ready

### *Ready to Lead*

Youth involved in 4-H are **two times more likely to have the goal of becoming a leader**. Through real-world experiences and the guidance of caring mentors, they develop the confidence, communication, and decision-making skills needed to lead in today's changing world.

### *Ready to Serve*

Youth who participate in 4-H are **three times more likely to engage in community service**. Service learning provides them with purpose and connection at a time when **more than 53% of Gen Z report feeling lonely**. Through 4-H, youth are empowered to serve with compassion and make a meaningful impact.

### *Ready to Build*

With nearly **10 million unfilled jobs and 77% of employers seeking real-world skills**, 4-H helps youth build what matters. Through hands-on projects and career exploration, youth gain adaptability, problem-solving, and workforce readiness.

### *Ready to Conquer*

**While 52% of young people feel like they're failing at life goals**, 4-H youth rise with resilience. Backed by research and supported by caring adults, they learn to overcome challenges, set goals, and take charge of their future with confidence.

***Building a Ready Generation in a World of Change!***

## Small Engines Project

### Expand Your Experiences!

#### Healthy Living

- Conduct a workshop on safe small-engine use, including ventilation and CO<sub>2</sub> emission awareness.
- Demonstrate proper use of protective gear such as ear, eye, and hand protection.
- Explain how well-maintained engines reduce noise, fumes, and safety risks.
- Describe how small engines make farm and home tasks safer and more efficient.

#### Science and Agriculture

- Research alternative fuels and how they affect engine performance and the environment.
- Compare two-stroke and four-stroke engines for agricultural uses.
- List small engines around your home, farm, or ranch and how they are used to power different machines.
- Learn how weather conditions affect starting and operating small engines.

#### Community Vitality

- Service or tune-up a lawnmower for an elderly neighbor or community group.
- Give a demonstration on basic engine care to a local club or school class.
- Organize a safety check day for generators or yard equipment.
- Help maintain engines used by community parks, fairgrounds, or ball fields.

#### Communication and the Arts

- Create a video explaining differences between two-stroke and four-stroke engines.
- Restore an antique small engine with period paint and decals and display its history.
- Design a poster or infographic showing engine parts and how they work.
- Photograph repair steps to create a visual how-to guide for beginners.

#### Career Exploration:

- Job shadow a service technician, equipment dealer, or farm mechanic.
- Interview professionals who repair, design, or sell power equipment.
- Tour a small engine repair shop.
- Visit a technical college or training program.
- Learn about safety and environmental regulations related to small engine careers.
- Create a real/conceptual small engines product or service business and participate in a YEC (Youth Entrepreneurship Challenge) competition.
- Explore cybersecurity jobs in the small engines industry.

#### Contact Information

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#### Resources & Events:

Expand your small engines knowledge and skills by participating in educational events and learning opportunities.

- Contact your Extension office for local events and resources.
- Participate in Discovery Days classes.
- Exhibit a small engine project or display at your county fair and Kansas State Fair.
- Complete the Tractor and Machinery Safety Certification.

#### Curriculum & Resource:

- Kansas 4-H Small Engines Project — <https://www.kansas4-h.org/projects/engineering-technology/small-engines/>
- National 4-H Curriculum — <https://shop4-h.org/collections/engines-motors-machines-curriculum>
- Manufacturer's websites
  - Briggs and Stratton Owner Support
  - Outdoor Power Equipment Institute (OPEI)

#### 4-H Record Keeping:

Learning to keep accurate records is a life skill.

- Setting 4-H Project Goals (4H1100), [https://bookstore.ksre.ksu.edu/item/setting-4-h-project-goals\\_4H1100](https://bookstore.ksre.ksu.edu/item/setting-4-h-project-goals_4H1100)
- Kansas 4-H Record Keeping, <https://www.kansas4-h.org/resources/awards-and-recognition/LocalRecordKeeping.html>
- Complete a Small Engines Journal including:
  - Any accomplishments
  - Any challenges
  - New things learned

#### Project Exhibit Ideas:

- Create a tri-fold educational display:
- Identify different engine or equipment parts.
- Explain the functions of tools needed for small engine work.
- Display proper and improper or defective plugs.
- Routine maintenance procedures.
- Diagnosing and troubleshooting.
- Exhibit an operable small engine that has been overhauled or rebuilt.

