



## Course Outcome Summary

### Course Information: **Small Engines**

**Description:** This course will give the student the opportunity to service and repair low horsepower engines as they relate to the small engine industry. The student will learn to apply the mechanical, scientific and technical principles to individual small engine projects. The student will learn to correctly handle and manipulate all tools and test equipment in the shop.

**Instruction Level:** **Grades 9-12**

**Total Credits:** **1**

### Course Standards:

#### *ACT College and Career Readiness Standards*

- Show competent use of language to communicate ideas
- Locate and interpret minor or subtly stated details in complex passages
- Analyze and draw conclusions based on a set of conditions

#### *CTE Common Core Standards*

- Students will communicate and collaborate with others to accomplish tasks and develop solutions to problems and opportunities.
- Students will identify and apply employability skills
- Students will assess the benefits and challenges of working in diverse settings and on diverse teams
- Students will apply leadership skills in real-world, family, community and business and industry applications.

#### *Career and Technology Standards*

- Identify examples of safety related to the use of simple tools and equipment.
- Explain that tools are used to design, make, use, assess technology and extend human capabilities such as holding, lifting, carrying, fastening, separating and computing.
- Select appropriate resources and explain how trade-offs between competing values, such as availability, cost, desirability and waste influenced their decision.
- Demonstrate safe and proficient use of specialty tools and equipment related to servicing transportation vehicles.
- Perform career research related to the transportation field.
- Explain career preparation, career pathways and the importance of on-the-job training as well as further education with regard to the transportation field.
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- Identify that systems have parts or components that work together to accomplish a goal.

- Identify the types, functions and applications, of simple mechanical components (e.g. levers, linkages, cranks, cams, gears, pulleys & belts, sprockets & chains).
- Recognize that transportation vehicles need to be cared for in order to prolong their useful life.
- Explain that malfunctioning components must be repaired or replaced to restore intended operation
- Explain that all systems demand specific repair procedures in order to achieve highest performance and efficiency.
- Develop measurement skills in electrical/electronic, mechanical and hydraulic applications that are necessary to efficiently repair vehicles.
- Science, Technology, Engineering and Math to solve problems related to the transportation field.
- Students will perform tasks related directly to current national standards per transportation area (i.e., NATEF).
- Identify that a transportation system may lose efficiency or fail if one part is missing or malfunctioning or if a subsystem is not properly working.

## Unit

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1. **Safety**
2. **Intro to Small Engines**
3. **Tools and Parts**
4. **Small Engine Operations and Principles**
5. **Overhaul Procedures**
6. **Troubleshooting and Tune-ups**

## Unit Outlines

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### 1. Safety

#### Standards:

- Identify examples of safety related to the use of simple tools and equipment.
- Explain that tools are used to design, make, use, assess technology and extend human capabilities such as holding, lifting, carrying, fastening, separating and computing.
- Select appropriate resources and explain how trade-offs between competing values, such as availability, cost, desirability and waste influenced their decision.
- Demonstrate safe and proficient use of specialty tools and equipment related to servicing transportation vehicles.

#### Essential Question:

Students will be able to answer the question(s):

- What impact does safety have on us, our coworkers, and our jobs?

**Essential Knowledge:**

- The student will be able to explain the importance of personal safety in the shop and how to contribute to overall shop safety when working with others.

**2. Intro to Small Engines****Standards:**

- Perform career research related to the transportation field.
- Explain career preparation, career pathways and the importance of on-the-job training as well as further education with regard to the transportation field.

**Essential Question:**

Students will be able to answer the question(s):

- How are small engines used today?

**Essential Knowledge:**

- The student will be able to distinguish what a small engine is. The student will also determine what types of jobs are available for someone interested in the small engine industry.

**3. Tools and Parts****Standards:**

- Demonstrate safe and proficient use of specialty tools and equipment related to servicing transportation vehicles.
- Explain career preparation, career pathways and the importance of on-the-job training as well as further education with regard to the transportation field.

**Essential Question:**

Students will be able to answer the question(s):

- How does using the proper tool make for a more efficient and timely repair?

**Essential Knowledge:**

- The student will be able to determine the proper tool to complete the job in a safe and efficient manner.

**4. Small Engine Operation and Principles****Standards:**

- Identify that systems have parts or components that work together to accomplish a goal.
- Identify the types, functions and applications, of simple mechanical components (e.g. levers, linkages, cranks, cams, gears, pulleys & belts, sprockets & chains).

**Essential Question:**

Students will be able to answer the question(s):

- How does an internal combustion engine work?

**Essential Knowledge:**

- The student will be introduced to the basics of the internal combustion engine, its components, the 4 cycle theory and stock market, how news events affect stock price and participate in a stock market simulation.

**5. Overhaul Procedures**

**Standards:**

- Recognize that transportation vehicles need to be cared for in order to prolong their useful life.
- Explain that malfunctioning components must be repaired or replaced to restore intended operation
- Explain that all systems demand specific repair procedures in order to achieve highest performance and efficiency.
- Develop measurement skills in electrical/electronic, mechanical and hydraulic applications that are necessary to efficiently repair vehicles.

**Essential Question:**

Students will be able to answer the question(s):

- Why are engines built to exact specifications but still given tolerances?

**Essential Knowledge:**

- The student will be able to tear down an engine and inspect it for wear indicators to determine if that engine is suitable for a rebuild.

**6. Troubleshooting and Tune-Up**

**Standards:**

- Science, Technology, Engineering and Math to solve problems related to the transportation field.
- Students will perform tasks related directly to current national standards per transportation area (i.e., NATEF).
- Identify that a transportation system may lose efficiency or fail if one part is missing or malfunctioning or if a subsystem is not properly working.

**Essential Question:**

Students will be able to answer the question(s):

- In our consumable society, how do we decide if an engine should be repaired or not?

**Essential Knowledge:**

- The student will be able to evaluate a non-running engine and determine if that engine is a suitable candidate for a repair or rebuild.