

**Technical Education Standards**

**Transportation and Small Engines**

**Course Overview: This is a hands-on course where the students will learn the knowledge and skills to completely service small engines. Learning the theory behind the design and function of small engines will allow the student to completely disassemble, test, measure parts and reassemble an engine.**

**Unit 1: Safety Unit (4 day and ongoing)**

**Description:** This unit students will explore many different types of literature.

**Standards**

1. The students will be able to demonstrate proper use and inspection of personal protection equipment (PPE). MnF1.a.7.h
2. The students will be able to demonstrate proper safe operation practices in work area. PE1.b.11.h
3. The students will be able to demonstrate proper use and inspection of ventilation equipment. PE1.b.11.h
4. The students will be able to demonstrate proper “Work Zone “operation. PE1.b.11.h
5. The students will be able to demonstrate proper use of precautionary labeling and MSDS information. PE1.b.11.h
6. The students will be able to safely demonstrate the proper use of all shop tools and equipment (maintain a personal safety license). PE1.b.11.h
7. Take the responsibility to get trained on the safe and proper operation of all Fab Lab equipment as needed. MNF1.g.11.h, TR1.c.11.h

**Unit 2: Lab Policies, Safety and Tooling (4-5 days)**

**Description:** Learn what we must know to ensure everyone’s productive safe work in an small Engines lab

**Standards**

1. The student will learn the Lab general operating and safety rules. PE1 b.11.h
2. The students will recognize and know the functions common small engine hand tools. PE1.b.10.h
3. The students will choose the right tools for the job. PE1.b.10.h
4. The students will predict potential accidents and hazards. PE1 b.11.h
5. The students will distinguish between safe and unsafe actions in the lab. PE1 b.11.h

**Unit 3: Engine Construction and Specifications (15-20 days)**

**Description:** Students will learn the subsystems and basic principles of all internal combustion engines

**Standards**

1. The student will learn and be able identify the 4 subsystems of an engine. PE1.a.15.h
2. The students will identify the major parts of an internal combustion engine by subsystem. PE1.a.15.h
3. The students will explain the function of major engine parts. PE1.d.10.h, PE1.a.15.h
4. The students will assess engine parts and determine if they are outside of specification. PE1.a.12.h
5. The students will distinguish the 4-strokes of an internal combustion engine. PE1.a.15.h
6. The students will distinguish the 2-strokes of an internal combustion engine. PE1.a.15.h
7. The students will characterize common engine terms. PE1.a.15.h

**Unit 4: Engine disassembly, service and reassembly (8-9 weeks)**

**Description:** Students will learn the techniques and skills needed to disassemble service and reassemble a single cylinder engine.

**Standards**

1. The students will disassemble follow a process/procedure a single cylinder small engine PE1.a.15.h
2. The students will reassemble follow a process/procedure a single cylinder small engine PE1.a.15.h
3. The student will perform the measurements and settings to accurately assemble the engine. PE!.b.11.h
4. The student will know to torque and be able to perform proper torque on all require engine components. PE1.b.12.h
5. The student will be able to troubleshoot the engine during and after assembly to get the engine to run smoothly. PE1.b.12.h

**Unit 5: Diagnostic Systems of an internal combustion engine (1 week)**

**Description:** Students will learn how we know when there is something wrong with a component/part and what can we do about it

**Standards**

1. The students will justify the need and purpose of different test equipment. PE1.b.12.h
2. The students will be able to accurately use precision measuring equipment to measure parts. PE1.b.12.h, TR1.c.9.h
3. The students will be to access manuals and databases for specifications on parts. PE1.b.12.h
4. The students will diagnose trouble parts by using a combination of spec sheets and the Internet. PE1.b.12.h, TR1.b.9.h

**Unit 6: This unit will develop the student’s knowledge of related careers. (2-3 Days)**

**Description:**

**Standards**

1. The student will be able to research occupations related to Manufacturing. TR1.c.12.h
2. The student will be able to use their skills learned in class to design and product a product for another Technology education course. (entrepreneurship) CD3.a.10.h
3. The student will review their results from the Career Cruising web site to compare skills to this course. TR1.c.12.h

**Unit 7:** **Occupational Orientation (ongoing)**

**Description:** This unit is an ongoing unit to demonstrate important employability skills in the working world?

**Standards**

1. The students will be able to prepare work reports or records. PE1.b.9.h, MNF1.c.9.h
2. The students will be able to perform housekeeping duties.
3. The students will be able to follow verbal and written instructions to complete work assignments.
4. The students will be able to use work time efficiently. MNF1.c.10.h, MNF1.c.7.H
5. The student will be able to use critical thinking skills to problem solve assignments. ENG4.b.5.h