Virginia CTE

# Small Engine Repair (8082 - 36 weeks)

**Small Engine Repair (8082) 36 weeks** SER

## A Demonstrating Personal Qualities and Abilities SER.1

1 Demonstrate creativity and innovation. SER.1.1

2 Demonstrate critical thinking and problem solving. SER.1.2

3 Demonstrate initiative and self-direction. SER.1.3

4 Demonstrate integrity. SER.1.4

5 Demonstrate work ethic. SER.1.5

## B Demonstrating Interpersonal Skills SER.2

6 Demonstrate conflict-resolution skills. SER.2.6

7 Demonstrate listening and speaking skills. SER.2.7

8 Demonstrate respect for diversity. SER.2.8

9 Demonstrate customer service skills. SER.2.9

10 Collaborate with team members. SER.2.10

## C Demonstrating Professional Competencies SER.3

11 Demonstrate big-picture thinking. SER.3.11

12 Demonstrate career- and life-management skills. SER.3.12

13 Demonstrate continuous learning and adaptability. SER.3.13

14 Manage time and resources. SER.3.14

15 Demonstrate information-literacy skills. SER.3.15

16 Demonstrate an understanding of information security. SER.3.16

17 Maintain working knowledge of current information-technology (IT) systems. SER.3.17

18 Demonstrate proficiency with technologies, tools, and machines common to a specific occupation. SER.3.18

19 Apply mathematical skills to job-specific tasks. SER.3.19

20 Demonstrate professionalism. SER.3.20

21 Demonstrate reading and writing skills. SER.3.21

22 Demonstrate workplace safety. SER.3.22

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**D Examining All Aspects of an Industry** SER.4

23 Examine aspects of planning within an industry/organization. SER.4.23

24 Examine aspects of management within an industry/organization. SER.4.24

25 Examine aspects of financial responsibility within an industry/organization. SER.4.25

26 Examine technical and production skills required of workers within an industry/organization. SER.4.26

27 Examine principles of technology that underlie an industry/organization. SER.4.27

28 Examine labor issues related to an industry/organization. SER.4.28

29 Examine community issues related to an industry/organization. SER.4.29

30 Examine health, safety, and environmental issues related to an industry/organization. SER.4.30

**E Addressing Elements of Student Life** SER.5

31 Identify the purposes and goals of the student organization. SER.5.31

32 Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult. SER.5.32

33 Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects. SER.5.33

34 Identify Internet safety issues and procedures for complying with acceptable use standards. SER.5.34

**F Exploring Work-Based Learning** SER.6

35 Identify the types of work-based learning (WBL) opportunities. SER.6.35

36 Reflect on lessons learned during the WBL experience. SER.6.36

37 Explore career opportunities related to the WBL experience. SER.6.37

38 Participate in a WBL experience, when appropriate. SER.6.38

**G Exploring Leadership Opportunities through FFA** SER.7

39 Identify the role of supervised agricultural experiences (SAEs) in agricultural education. SER.7.39

40 Participate in an SAE. SER.7.40

41 Identify the benefits and responsibilities of FFA membership. SER.7.41

42 Describe leadership characteristics and opportunities as they relate to agriculture and FFA. SER.7.42

43 Apply for an FFA degree and/or an agricultural proficiency award. SER.7.43

**'' Applying Safety Practices in the Small Engine Lab** SER.8

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44 Demonstrate safety practices in the small engine lab. SER.8.44

45 Explain methods for mitigating risks and accidents related to small engine work. SER.8.45

46 Follow federal, state, and local code, regulations, and recommended guidelines. SER.8.46

47 Demonstrate the use of personal protective equipment (PPE). SER.8.47

48 Use safety shields and guards on all equipment. SER.8.48

49 Demonstrate safety practices for flammable materials and hazardous waste. SER.8.49

50 Identify safety procedures when operating small engine equipment. SER.8.50

51 Identify marked safety zones and nonskid areas. SER.8.51

52 Identify the location and use of eyewash stations. SER.8.52

53 Identify the location of posted evacuation routes. SER.8.53

54 Demonstrate knowledge of safety data sheets (SDS). SER.8.54

55 Demonstrate precautions in the use, storage, and disposal of chemicals and hazardous wastes. SER.8.55

56 Describe the use of standard and metric hand tools. SER.8.56

57 Describe the use of power tools. SER.8.57

58 Describe the use of standard and metric precision measuring and other specialty tools. SER.8.58

59 Explain the types and use of fire protection equipment. SER.8.59

## I Describing the Operation of an Internal Combustion Engine SER.9

60 Identify the five engine events. SER.9.60

61 Explain the operation of a four-stroke engine. SER.9.61

62 Explain the operation of a two-stroke engine. SER.9.62

63 Explain the interrelationship of parts during each stroke for an internal combustion engine. SER.9.63

## J Demonstrating the Use of Tools SER.10

64 Demonstrate the use of basic hand tools and commonly used power tools in small engine repair. SER.10.64

65 Identify fasteners, adhesives, sealants, and gaskets used on small engines. SER.10.65

66 Demonstrate torque technique for threaded fasteners. SER.10.66

67 Demonstrate use of measuring and testing devices. SER.10.67

68 Repair threaded holes. SER.10.68

## Jnderstanding Engine Nomenclature and Selecting Repair Parts SER.11

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69 Explain nomenclature used in the small engine industry. SER.11.69

70 Identify the manufacturer, model number, serial number, specification number, and other unique equipment numbers. SER.11.70

71 Use service, repair, and operating manuals for equipment. SER.11.71

72 Locate replacement part numbers. SER.11.72

**L Exploring the Fundamentals of Electricity, Magnetism, and Electronics** SER.12

73 Explain Ohm's law and how electricity is produced and used in small engines. SER.12.73

74 Explain magnetism and its role in the way electricity is produced and utilized in small engine applications. SER.12.74

75 Identify electrical test equipment used in small engine diagnostics. SER.12.75

**M Repairing Manual Starters** SER.13

76 Identify the components of a manual starter. SER.13.76

77 Repair a manual starter. SER.13.77

**N Identifying Electric Starters** SER.14

78 Identify the components of an electric starter. SER.14.78

79 Repair an electric starter. SER.14.79

**O Servicing Spark Plugs** SER.15

80 Identify the components of a spark plug. SER.15.80

81 Evaluate the spark plug. SER.15.81

82 Set the spark plug electrode gap. SER.15.82

**P Repairing Ignition Systems** SER.16

83 Identify ignition systems components and their functions. SER.16.83

84 Identify types of ignition systems used in small engines. SER.16.84

85 Identify parts used in repairing the ignition circuit. SER.16.85

86 Service ignition parts. SER.16.86

**Q Evaluating Battery Systems** SER.17

87 Describe the safety hazards associated with battery systems. SER.17.87

88 Evaluate system operation. SER.17.88

89 Install a battery. SER.17.89

90 Test a battery. SER.17.90

**R Examining Functions and Types of Fuel Systems** SER.18

91 Explain the principles of a fuel delivery system. SER.18.91

92 Identify the types of fuel delivery systems, system components, and fuel types. SER.18.92

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93 Service the fuel system. SER.18.93

**S Repairing Carburetors and/or Fuel Injection Systems** SER.19

94 Identify types of carburetors and fuel injection systems. SER.19.94

95 Explain the operation of a carburetor and a fuel injection system. SER.19.95

96 Evaluate the operation of a carburetor. SER.19.96

97 Service a carburetor and/or fuel injection system. SER.19.97

98 Determine the replacement vs. repair of a carburetor and/or a fuel injection system. SER.19.98

99 Replace a carburetor. SER.19.99

**T Repairing Governors** SER.20

100 Identify types of governors. SER.20.100

101 Explain the operation of a governor. SER.20.101

102 Evaluate operation of a governor. SER.20.102

103 Adjust the governor. SER.20.103

**U Servicing Valves on Four-Stroke Engines** SER.21

104 Describe the operation of intake and exhaust valves. SER.21.104

105 Describe the differences between the OVH and L-head valve design. SER.21.105

106 Evaluate valve clearance. SER.21.106

107 Evaluate valves and accessories for defects. SER.21.107

108 Demonstrate valve adjustment and installation. SER.21.108

109 Replace the cylinder head. SER.21.109

**V Repairing Valves on Two-Stroke Engines** SER.22

110 Identify types of valves. SER.22.110

111 Explain how valves work. SER.22.111

112 Evaluate the reed valve for proper operation. SER.22.112

113 Replace the reed valve assembly. SER.22.113

**W Examining Internal Engine Parts** SER.23

114 Identify internal engine parts. SER.23.114

115 Explain how pistons and the compression system work. SER.23.115

116 Explain how various piston rings work. SER.23.116

117 Remove internal engine parts. SER.23.117

118 Inspect the cylinders for wear. SER.23.118

119 Analyze the camshaft assembly for defects. SER.23.119

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120 Evaluate a crankshaft. SER.23.120

## X Understanding Principles of Engine Cooling and Servicing Air Filters SER.24

121 Explain the principles of engine cooling. SER.24.121

122 Describe the types of cooling systems. SER.24.122

123 Identify types of air filters. SER.24.123

124 Service air filters. SER.24.124

## Y Servicing the Lubrication System SER.25

125 Explain the principles of lubrication in a small engine. SER.25.125

126 Select engine oil. SER.25.126

127 Change the engine oil. SER.25.127

128 Change the oil filter. SER.25.128

129 Inspect the breather. SER.25.129