

AUTOMOTIVE MAINTENANCE MERIT BADGE WORKBOOK

This Scoutmaster Bucky Merit Badge Workbook is based off the current *Scouts BSA Requirements*.

Consider also using the Automotive Maintenance merit badge class preparation page for clarification and expectations when participating in a Scoutmaster Bucky merit badge opportunity ([online](#) or [in-person](#)).

<https://scoutmasterbucky.com/merit-badges/automotive-maintenance/>

Scout's
Name:

You will need access to a car or truck and its owner's manual to meet some requirements for this merit badge. If you do not have your own vehicle, you should work with your merit badge counselor or other trusted adult to obtain access to a vehicle and the owner's manual for that vehicle.

REQUIREMENT 1: Do the following:

REQUIREMENT 1 A: Explain to your counselor the hazards you are most likely to encounter during automotive maintenance activities, and what you should do to anticipate, help prevent, mitigate, or lessen these hazards.

Most likely hazards

Anticipate hazards

Prevent hazards

Mitigate hazards

Lessen hazards

REQUIREMENT 1 B: Discuss with your counselor the safety equipment, tools, and clothing used while checking or repairing a motor vehicle. Use this equipment, tools, and/or clothing (when needed or called for) in meeting the requirements for this merit badge.

Safety equipment, tools, and clothing used

REQUIREMENT 2: General Maintenance, Safety, and Registration. Do the following:

REQUIREMENT 2 A: Review the maintenance chart in the owner's manual. Explain the requirements and time limits.

REQUIREMENT 2 B: Demonstrate how to check the following:

<input type="checkbox"/> 1. Brake fluid	<input type="checkbox"/> 2. Engine oil	<input type="checkbox"/> 3. Coolant
<input type="checkbox"/> 4. Power steering fluid	<input type="checkbox"/> 5. Windshield washer fluid	<input type="checkbox"/> 6. Transmission fluid
<input type="checkbox"/> 7. Battery fluid (if possible) and condition of the battery terminals		

REQUIREMENT 2 C: Locate the fuse boxes; determine the type and size of fuses. Demonstrate the proper replacement of burned-out fuses.

<input type="checkbox"/> Locate the fuse box	<input type="checkbox"/> Determine the type and size of fuses
<input type="checkbox"/> Demonstrate the proper replacement of burned-out fuses	

REQUIREMENT 2 D: Demonstrate how to check the condition and tension of belts and hoses.

<input type="checkbox"/> Completed

REQUIREMENT 2 E: Check the vehicle for proper operation of its lights, including the interior overhead lights, instrument lights, warning lights, and exterior bulbs.

<input type="checkbox"/> Interior overhead lights	<input type="checkbox"/> Instrument lights
<input type="checkbox"/> Warning lights	<input type="checkbox"/> Exterior bulbs

REQUIREMENT 2 F: Locate and check the air filter(s).

<input type="checkbox"/> Completed

REQUIREMENT 2 G: Explain the purpose, importance, and limitations of safety belts and passive restraints.

Purpose of safety belts and passive restraints

Importance of safety belts and passive restraints

Limitations of safety belts and passive restraints

REQUIREMENT 2 H: Find out the requirements for your state’s emissions and safety inspections (as applicable), including how often a vehicle needs to be inspected.

REQUIREMENT 2 I: Explain the importance of registering a vehicle and find out the annual registration fee for renewing your family car’s registration.

Importance of registering a vehicle

Annual registration fee for renewing your family car's registration

REQUIREMENT 3: Dashboard. Do the following:

REQUIREMENT 3 A: Explain the function of the fuel gauge, speedometer, tachometer, oil pressure, and engine temperature gauge. Point each one out on the instrument cluster.

Fuel gauge

Speedometer

Tachometer

Oil pressure

Engine temperature gauge



Pointed each one out on the instrument cluster

REQUIREMENT 3 B: Explain the symbols that light up on the dashboard and the difference between the yellow and red symbols. Explain each of the indicators on the dashboard, using the owner’s manual if necessary.

Symbols that light up on the dashboard

Difference between the yellow and red symbols

☐ Explain each of the indicators on the dashboard

REQUIREMENT 4: Tires. Do the following:

REQUIREMENT 4 A: Explain the difference between tire manufacturer’s and vehicle manufacturer’s specifications and show where to find them.

Difference between tire manufacturer's and vehicle manufacturer's specifications

☐ Show to find tire manufacturer's and vehicle manufacturer's specifications

REQUIREMENT 4 B: Demonstrate how to check tire pressure and properly inflate a tire. Check the spare tire and make sure it is ready for use.

☐ Checked tire pressure

☐ Inflated a tire

☐ Checked spare tire

REQUIREMENT 4 C: Explain why wheel alignment is important to the life of a tire. Explain caster, camber, and toe-in adjustments on wheel alignment.

Why wheel alignment is important

Explain caster, camber, and toe-in adjustments

REQUIREMENT 4 D: Explain the purpose of the lateral-wear bar indicator.

REQUIREMENT 4 E: Explain how to dispose of old tires in accordance with local laws and regulations.

REQUIREMENT 5: Engine. Do the following:

REQUIREMENT 5 A: Explain how an internal combustion engine operates. Tell the differences between gasoline and diesel engines. Explain how a gasoline-electric hybrid vehicle is powered.

How an internal combustion engine operates

Differences between gasoline and diesel engines

How a gasoline-electric hybrid vehicle is powered

REQUIREMENT 5 B: Discuss the purpose of engine oil. Explain the API service code, the SAE number, and the viscosity rating.

Purpose of engine oil

Explain the API service code, the SAE number, and the viscosity rating

REQUIREMENT 5 C: Explain where to find the recommended oil type and the amount of oil to be used in the vehicle engine.

REQUIREMENT 6: Cooling System. Do the following:

REQUIREMENT 6 A: Explain the need for coolant in the cooling system, and the importance of selecting the correct coolant type for a given vehicle.

The need for coolant

Importance of selecting the correct coolant

REQUIREMENT 6 B: Explain how to flush and change the engine coolant in the vehicle, and how to properly dispose of the used coolant.

How to flush and change the engine coolant

How to properly dispose of the used coolant

REQUIREMENT 7: Fuel System. Do the following:

REQUIREMENT 7 A: Explain how the air and fuel systems work together and why it is necessary to have an air filter and fuel filter.

How the air and fuel systems work together

Why it is necessary to have an air filter and fuel filter

REQUIREMENT 7 B: Explain how a fuel injection system works and how an onboard computer works with the fuel injection system.

How a fuel injection system works

How an onboard computer works with the fuel injection system

REQUIREMENT 8: Ignition and Electrical Systems. Do the following:

REQUIREMENT 8 A: Diagram and explain the parts of the electrical system.

REQUIREMENT 8 B: Explain the engine's firing order.

REQUIREMENT 8 C: Explain the purpose of the spark gap.

REQUIREMENT 8 D: Demonstrate how to safely connect jumper cables to your car battery.

☐

Completed

REQUIREMENT 9: Drive Train. Do the following:

REQUIREMENT 9 A: Diagram the drive train and explain the different parts.

REQUIREMENT 9 B: Explain the difference between automatic and standard transmissions.

REQUIREMENT 9 C: Explain the types of automatic transmission fluid.

REQUIREMENT 9 D: Explain the types of lubricants used in a standard transmission, and in the differential and transfer case.

REQUIREMENT 9 E: Explain the difference between front-wheel, rear-wheel, and four-wheel drive.

REQUIREMENT 10: Brake System. Do the following:

REQUIREMENT 10 A: Explain the brake system (including antilock systems) and how it operates.

REQUIREMENT 10 B: Explain the differences between disc and drum systems.

REQUIREMENT 10 C: Demonstrate how to check the condition of a vehicle’s brake system. After checking, make recommendations for repairs (if necessary).

☐ Completed

REQUIREMENT 11: Do TWO of the following:

REQUIREMENT 11 A: Determine the value of three different vehicles you are interested in purchasing. One must be new and one must be used; the third vehicle can be new or used. For each vehicle, find out the requirements and cost of automobile insurance to include basic liability and options for collision, comprehensive, towing, and rental car. Using the three vehicles you chose and with your merit badge counselor’s assistance, complete the operation/maintenance chart provided in the merit badge pamphlet. Use this information to determine the operating cost per mile for each vehicle, and discuss what you learn with your counselor.

Value of a new vehicle and cost of insurance

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☐ Completed the operation/maintenance chart

Operating cost per mile

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Value of a new or used vehicle and cost of insurance

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☐ Completed the operation/maintenance chart

Operating cost per mile

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Value of a used vehicle and cost of insurance

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☐ Completed the operation/maintenance chart

Operating cost per mile

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REQUIREMENT 11 B: Choose a car cleaner and wax product for a vehicle you want to clean. Explain clear-coat paint and the precautions necessary for care. Clean the vehicle, both inside and out, and wax the exterior. Use a vinyl and rubber protectant (on vinyl tops, rubber door seals, sidewalls, etc.) and explain the importance of this protectant.

☐ Choose a car cleaner

☐ Choose a wax product

Explain clear-coat paint and the precautions necessary for care

☐ Clean the vehicle inside

☐ Clean the vehicle outside

☐ Use a vinyl and rubber protectant

☐ Wax the exterior

Explain the importance of vinyl and rubber protectant

REQUIREMENT 11 C: Locate the manufacturer's jack. Use the jack to demonstrate how to engage the jack correctly on the vehicle, then change a tire correctly.

☐ Completed

REQUIREMENT 11 D: Perform an oil filter and oil change on a vehicle. Explain how to properly dispose of the used oil and filter.

☐ Completed

REQUIREMENT 12: Find out about three career opportunities in the automotive industry. Pick one and find out the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you.

Three career opportunities

Education, training, and experience required for one profession