

Auto Mechanics Merit Badge:

Your Name: _____ Home Phone: _____

Date Starting This Merit Badge: _____

Counselor's Name: _____

How to Contact Your Counselor: _____

Note to the Scout and Merit Badge Counselor:

This set of worksheets is meant to facilitate earning this merit badge, but under no circumstances is it meant to be used in lieu of the appropriate BSA merit badge book.

NOTE: Access to an automobile or truck (with owners manual) is needed to meet some of the requirements for this merit badge.

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

Discussed? _____ Signed off by: _____

2. Explain how an internal combustion engine operates and the differences between gasoline and diesel engines.

Explained to counselor? _____ Signed off by: _____

3. Demonstrate your knowledge of general maintenance. Do the following:

- a. Demonstrate how to check the fluid level of the following:

- Brake Fluid
- Engine Oil
- Coolant
- Power steering fluid
- Windshield washer fluid
- Transmission fluid (automatic and standard)

Completed? _____ Signed off by: _____

- b. Check battery fluid, if possible, and the condition of battery terminals.

Completed? _____ Signed off by: _____

- c. Show the location of fuse boxes and the size of fuses, and demonstrate the proper replacement of burned-out fuses.

Completed? _____ Signed off by: _____

- d. Review the maintenance chart in the owner's manual. Explain the requirements and time limits.

Completed? _____ Signed off by: _____

- e. Show how to take proper care of the appearance of a vehicle.

- 1 Choose a care cleaner and wax product for the vehicle. Explain clear-coat paint and the precautions necessary for care. Clean and wax the vehicle, both inside and out.

Completed? _____ Signed off by: _____

- 2 Use a vinyl and rubber protectant (on vinyl tops, rubber door seals, sidewalls, etc.) and explain the importance of this protectant.

Completed? _____ Signed off by: _____

- f. Demonstrate how to check the condition and tension of belts and hoses.

Completed? _____ Signed off by: _____

- g. Demonstrate the following:

- 1 Check the lighting in the vehicle, including instrument, warning, and exterior bulbs.

- 2 Check headlight alignment

Completed? _____ Signed off by: _____

- h. Demonstrate how to check the vehicle exhaust system.

Completed? _____ Signed off by: _____

4. Demonstrate your knowledge of the following:

a.

- 1 Explain the difference between tire and vehicle manufacturer's information specifications and demonstrate where to find these specifications.

Explained? _____ Signed off by: _____

- 2 Demonstrate how to check pressure and properly inflate a tire.

Explained? _____ Signed off by: _____

- 3 Using the manufacturer's jack supplied with the vehicle:

- Demonstrate how to engage the jack correctly on the vehicle. ()
- Demonstrate how to correctly change a tire. ()

Completed? _____ Signed off by: _____

b.

- 1 Explain the difference between bias-belted tires and radial-belted tires.

Explained? _____ Signed off by: _____

- 2 Diagram and explain in writing how to rotate bias-belted and radial-belted tires.

Completed? _____ Signed off by: _____

3 Using the manufacturer's guidelines, rotate the tires on the vehicle.

Completed? _____ Signed off by: _____

c.

1 Explain the camber, caster, and toe-in adjustments on wheel alignment.

Explained? _____ Signed off by: _____

2 Explain why wheel alignment is important to the life of a tire.

Explained? _____ Signed off by: _____

d. Explain the purpose of the lateral-wear bar indicator.

Explained? _____ Signed off by: _____

e. Explain how to dispose of old tires properly.

Explained? _____ Signed off by: _____

5. Demonstrate your knowledge of engine lubrication. Do the following:

a. Explain the purpose of motor oil.

b. Explain where to find the recommended type and amount of oil to be used in the vehicle engine.

c. Explain the difference in viscosity (10W/30 versus SAE 30).

d. Perform an oil change and oil filter change on a vehicle.

e. Explain how to dispose of the used oil and filter properly.

Completed? _____ Signed off by: _____

6. Cooling system. Do the following:

a. Explain the need for coolant in the cooling system.

b. Flush and change the engine coolant in the vehicle according to the manufacturer's instructions.

c. Explain how to dispose of used coolant properly.

Completed? _____ Signed off by: _____

7. Demonstrate your knowledge of a fuel system. Do the following:
- a. Explain how the air and fuel system work together.
 - b. Explain how a carburetor works and how a fuel- injection system works.
 - c. Explain how an on-board computer works with the fuel injection system. Show where the computer is located.
 - d. Explain why it is necessary to have an air filter and a fuel filter. Locate them and change them according to the manufacturer's recommendations.
 - e. Explain what fuel additives are for both the carburetor and the fuel injection systems.

Completed? _____ Signed off by: _____

8. Demonstrate your knowledge of ignition and electrical systems. Do the following:
- a. Diagram and explain the parts of the electrical system.

Explained? _____ Signed off by: _____

- b. Explain the cylinder engine sequence.

Explained? _____ Signed off by: _____

- c. Explain the spark plug gap and if practical, change the spark plug. (Use an engine with spark plugs that can be reached without tilting the engine.)

Explained? _____ Signed off by: _____

- d. Demonstrate how to connect jumper cables on your battery properly. Explain how to jump-start a vehicle.

Explained? _____ Signed off by: _____

- e. Explain the difference between electronic and point ignition systems.

Explained? _____ Signed off by: _____

9. Demonstrate your knowledge of a drive train. Do the following:

- a. Diagram the drive train and explain the different parts.

Explained? _____ Signed off by: _____

- b. Explain the difference between automatic and standard transmissions.

Explained? _____ Signed off by: _____

- c. Explain the types of automatic transmission fluid.

Explained? _____ Signed off by: _____

- d. Explain the types of lubricants used in a standard transmission and in the differential.

Explained? _____ Signed off by: _____

- e. Explain the difference between front-wheel, rear-wheel, and four-wheel drive.

Explained? _____ Signed off by: _____

- f. Explain the gear ratio of the differential.

Explained? _____ Signed off by: _____

10. Demonstrate your knowledge of a brake system. Do the following:

- a. Explain the brake system (including anti-lock systems) and how it operates.

Explained? _____ Signed off by: _____

b. Explain the differences between disk and shoe systems.

Explained? _____ Signed off by: _____

c. Demonstrate checking conditions on a vehicle brake system. After checking make a recommendation for repairs (if necessary).

Explained? _____ Signed off by: _____

11. Explain the purpose, importance, and limitations of passive restraints.

Explained? _____ Signed off by: _____

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In completing all requirements for this merit badge, I have completely read the appropriate BSA merit badge book, and discussed same with my counselor.

signed

date

(Source: Courtesy USSSP Merit Badge Requirements, current as of the MB date on this document)