

Automotive Maintenance

Merit Badge Workbook



Merit badges are earned by doing: reading the pamphlet, practicing the skills, and showing your counselor what you have learned.
This workbook gives you a place to organize your notes and track your progress along the way.
Merit badge counselors may not require the use of this or any similar workbook.
You still must satisfy your counselor that you can demonstrate each skill and have learned the information.
Use the space under each requirement to note what you have done and what you want to talk about, not to write out full answers.
When a requirement says discuss, show, tell, explain, or demonstrate, that is what you must do.
No one may add to or subtract from the official requirements found on scouting.org (Guide to Advancement 7.0.4.8).
Scouting America last updated this badge's requirements page on December 31, 2025.
Requirements change from time to time. Double-check scouting.org before you start.

Scout's name: _____ Unit: _____ Date started: _____

Counselor's name: _____ Phone no.: _____ Email: _____

Links marked "Scouting America resources" are the ones Scouting America shares on its official badge page.
This workbook is unofficial and not endorsed by Scouting America.

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1. Safety and Registration. Do the following:

(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.

Scouting America resources: Automotive Repair Safety Observations (video)

Hazards in automotive maintenance

Hazard	How I anticipate and help prevent it	How I lessen it if it happens

(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.

Scouting America resources: Garage and Shop Safety Basics (video)

What I discussed with my counselor

Type	Items I discussed	When I used them for this badge
Safety equipment		
Tools		
Clothing		

(c) Explain the different ways motor vehicles are powered.

Scouting America resources: Difference Between Diesel and Gas Engines (video) · Different Types of Motors in Electric Vehicles (video) Different Types of Hybrid Engines (video) · How Do Hydrogen Cars Work (video)

Ways motor vehicles are powered

Power source	How it works

(d) Explain the safety considerations when performing maintenance on a vehicle equipped with a high-voltage electrical system.

Scouting America resources: Working on High Voltage Vehicles (video)

Safety considerations for a high-voltage electrical system

(e) Review the maintenance chart in the vehicle owner's manual. Explain the requirements and time limits.

Scouting America resources: Should I Follow the Manufacturer's Maintenance Schedule (video)

Vehicle (year, make, model)

From the maintenance chart

Requirement	Time or mileage limit

(f) Explain the purpose, importance, and limitations of safety belts and passive restraints.

Scouting America resources: Seatbelt | How Does it Work? (video) · Seatbelts (website) · On Air Bags (website)

	Purpose	Importance	Limitations
Safety belts			
Passive restraints			

(g) Find out the requirements for your state's emissions and safety inspections (as applicable), including how often a vehicle needs to be inspected.

Scouting America resources: Tips on How to Pass State Inspection (video)

My state

Inspection	Requirements in my state	How often
Emissions inspection		
Safety inspection		

(h) Explain the importance of registering a vehicle and find out the annual registration fee for renewing your family car's registration.

Scouting America resources: Vehicle Registration Near Me (video)

Why registering a vehicle is important

Our family car's annual registration fee

Requirement 1 completed on counselor initials

2. General Maintenance. Do the following:

Scouting America resources: Your Car's Fluids (video)

(a) Demonstrate how to check the following:

Scouting America resources: Your Car's Fluids (video)

(1) Brake fluid

Date What I found

(2) Engine oil

Date What I found

(3) Coolant

Date What I found

(4) Power steering fluid

Date What I found

(5) Windshield washer fluid

Date What I found

(6) Transmission fluid

Date What I found

(7) Battery fluid (if possible) and condition of the battery terminals

Scouting America resources: How to Care for Your Automotive Battery (video)
How to Check & Properly Fill Water Levels in a Car Battery (video)

Date What I found

(b) Locate the fuse boxes; determine the type and size of fuses. Demonstrate the proper replacement of burned-out fuses.

Scouting America resources: How to Check Car Fuses (video)

Fuse boxes

Where the fuse box is	Type of fuses	Sizes

Date I replaced a fuse _____ Which fuse _____

(c) Demonstrate how to check the condition and tension of belts and hoses.

Scouting America resources: How to Inspect Belts (video) · How to Check Serpentine Belt (video) · How to Inspect Hoses (video)

Date _____ Vehicle _____

Part	Condition I found	Tension I found
Belts		
Hoses		

(d) Check the vehicle for proper operation of its lights, including the interior overhead lights, instrument lights, warning lights, and exterior bulbs.

Scouting America resources: How to Check Car Lights (video) · Basics of Automotive Lighting Systems (video)

Date _____ Vehicle _____

Lights	Working?	Notes
Interior overhead lights		
Instrument lights		
Warning lights		
Exterior bulbs		

(e) Locate and check the air filter(s).

Scouting America resources: Check and Change Air Filter (video)

Date _____ Where the air filter is _____

Condition I found _____

Requirement 2 completed on _____ counselor initials _____

3. Dashboard/Driver Information Center. Do the following:

(a) Explain the function of the fuel gauge, speedometer, tachometer, oil pressure, and engine temperature gauge. Point each one out on the instrument cluster.

Scouting America resources: Understanding the Car Gauges (video)

Gauge	What it does	Pointed out
Fuel gauge		
Speedometer		
Tachometer		
Oil pressure		
Engine temperature gauge		

(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.

Scouting America resources: Dashboard Warning Lights Explained (video)

Yellow symbols compared with red symbols

Dashboard indicators

Symbol (name or sketch)	Color	What it means

(c) Explain the messages and alerts that may be displayed on the dashboard/driver information center including maintenance-related reminders.

Messages and alerts

Message or alert	What it means

Requirement 3 completed on _____ counselor initials _____

4. Tires. Do the following:

(a) Explain the difference between tire manufacturer's and vehicle manufacturer's specifications and show where to find them.

Scouting America resources: How to Read aTire (video)

Specifications	What they tell you	Where to find them
Tire manufacturer's		
Vehicle manufacturer's		

(b) Demonstrate how to check tire pressure and properly inflate a tire. Check the spare tire and make sure it is ready for use.

Scouting America resources: How to Properly Check and Fill Tires (video)

Date _____ Recommended pressure _____ Pressure I found _____

☐ Inflated the tire properly

☐ Checked the spare tire

Spare tire condition _____

(c) Explain why wheel alignment is important to the life of a tire. Explain caster, camber, and toe-in adjustments on wheel alignment.

Scouting America resources: Understanding Wheel Alignment Process (video)

Why wheel alignment matters to the life of a tire

Adjustment	What it is
Caster	
Camber	
Toe-in	

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

Scouting America resources: What is a TIre Wear Indicator Bar? (video) · Knowing When to Replace Your Tires (video)

Purpose of the lateral-wear bar indicator

(e) Explain how to dispose of old tires in accordance with local laws and regulations.

Scouting America resources: Tires: How Do I Get Rid Of Them? (video)

How to dispose of old tires where I live

Requirement 4 completed on _____ counselor initials _____

5. Engine. Do the following:

(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.

Scouting America resources: Engines 101: Basics of How Engines Work (video) · Engines 101: How Does a Diesel Engine Work (video) How Hybrid Cars Work (video)

How an internal combustion engine operates

Differences between gasoline and diesel engines

How a gasoline-electric hybrid vehicle is powered

(b) Discuss the purpose of engine oil. Explain the API service code, the SAE number, and the viscosity rating.

Scouting America resources: API Motor Oil Ratings Explained (video) · What Do SAE Grades Mean (video)

Purpose of engine oil

Term	What it means
API service code	
SAE number	
Viscosity rating	

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

Scouting America resources: Choosing the Correct Engine Oil (video)

Where I found it | Oil type | Amount

Requirement 5 completed on | counselor initials

6. Cooling System. Do the following:

(a) Explain the need for coolant in the cooling system, and the importance of selecting the correct coolant type for a given vehicle.

Scouting America resources: Role of Antifreeze/Coolant (video)

Why coolant is needed, and why the correct type matters

(b) Explain how to flush and change the engine coolant in the vehicle, and how to properly dispose of the used coolant.

Scouting America resources: Flushing and Filling Your Coolant System (video)

How to flush and change the engine coolant

How to dispose of used coolant

Requirement 6 completed on _____ counselor initials _____

7. Fuel System. Do the following:

(a) Explain how the air and fuel systems work together and why it is necessary to have an air filter and fuel filter.

Scouting America resources: How Air Filter Works (video) · Animation Fuel Filter (video)

How the air and fuel systems work together

Filter	Why it is necessary
Air filter	
Fuel filter	

(b) Explain how a fuel injection system works and how an onboard computer works with the fuel injection system.

Scouting America resources: How a Car Fuel Injection System Works Explained Step-by-Step! (video)

How a fuel injection system works

How the onboard computer works with it

Requirement 7 completed on _____ counselor initials _____

8. Ignition and Electrical Systems. Do the following:

(a) Diagram and explain the parts of one of the following electrical systems:

Scouting America resources: Car Electrical System Explained (video)

My diagram of the system I picked (draw here or attach)

Its parts

Part	What it does

- ☐ **(1)** Starting/charging system
  Scouting America resources: Automotive Starting and Charging System (video)
- ☐ **(2)** Hybrid or electric vehicle inverter
  Scouting America resources: The Role of Inverters for EV Propulsion Systems (video)
- ☐ **(3)** Lighting system
  Scouting America resources: Automotive Lighting Circuits (video)

(b) Explain the engine's firing order.

Scouting America resources: Explain Engine Firing Order | Automobile Engineering (video)

The engine's firing order

(c) Explain the purpose of the spark gap.

Scouting America resources: What You Need to Know About Spark Plugs (video)

Purpose of the spark gap

(d) Demonstrate how to safely connect jumper cables to your car battery.

Scouting America resources: How to Properly Jump Start a Car (video) · How to Jump Start a Dead Battery (website)

Date _____ Vehicle _____ With whom _____

(e) Discuss with your counselor what factors can affect range on an electrified vehicle. Explain the procedure for recharging an electric or plug-in hybrid vehicle.

Scouting America resources: Factors Affecting Range (video)

Factors that can affect range

How to recharge an electric or plug-in hybrid vehicle

(f) Explain what other vehicle systems are dependent on a reliable electrical system.

Scouting America resources: Fundamentals of Automotive Electrical Systems (video)

Systems that depend on the electrical system

System	Why it depends on reliable electricity

Requirement 8 completed on _____ counselor initials _____

9. Drive Train. Do the following:

(a) Diagram the drive train and explain the different parts.

Scouting America resources: Ultimate Drive Train Guide (video)

My drive train diagram (draw here or attach)

Its parts

Part	What it does

(b) Explain the difference between automatic and standard transmissions.

Scouting America resources: Manual vs Automatic (video)

Transmission	How it works
Automatic	
Standard	

(c) Explain the types of automatic transmission fluid.

Scouting America resources: The Complexities of Today's Automatic Transmission Fluid (video)

Types of automatic transmission fluid

Type	What I learned about it

(d) Explain the types of lubricants used in a standard transmission, and in the differential and transfer case.

Scouting America resources: Which Fluids to Use (video)

Where it is used	Type of lubricant
Standard transmission	
Differential	
Transfer case	

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

Scouting America resources: Ultimate Drive Train Guide (video)

Drive type	How it works
Front-wheel drive	
Rear-wheel drive	
Four-wheel drive	

Requirement 9 completed on _____ counselor initials _____

10. Brake System. Do the following:

(a) Explain the brake system (including antilock systems) and how it operates.

Scouting America resources: Understanding ABS (video)

How the brake system (including antilock systems) operates

(b) Explain the differences between disc and drum brake systems.

Scouting America resources: Drum vs Disc Brakes - What Are the Differences? (Which Is the Better Choice?) (video)

Brake system	How it works and how it differs
Disc brakes	
Drum brakes	

(c) Demonstrate how to check the condition of a vehicle's brake system. After checking, make recommendations for repairs (if necessary).

Scouting America resources: How to Check Pads and Rotor (video)

Date _____ Vehicle _____

My brake check

What I checked	Condition	Repair I recommend (if needed)

Requirement 10 completed on _____ counselor initials _____

11. Do TWO of the following:

☐ **(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 counselor's assistance, complete the operation/maintenance chart provided in the Automotive Maintenance merit badge pamphlet. Use this information to determine the operating cost per mile for each vehicle, and discuss what you learn with your counselor.

Scouting America resources: How to Negotiate and Buy a Used Car (video)

Three vehicles I am interested in

Vehicle	Year, make, model	Value	Operating cost per mile
Vehicle 1 (new)			
Vehicle 2 (used)			
Vehicle 3 (new or used)			

Insurance requirements I found

Insurance costs

Vehicle	Basic liability	Collision	Comprehensive	Towing	Rental car
Vehicle 1					
Vehicle 2					
Vehicle 3					

☐ Completed the operation/maintenance chart from the pamphlet with my counselor

What I learned, to discuss with my counselor

☐ **(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.

Scouting America resources: How to Wax Your Car (video)

Cleaner and wax I chose Vehicle

Clear-coat paint and the precautions for its care

☐ Cleaned the inside
☐ Cleaned the outside
☐ Waxed the exterior
☐ Used vinyl and rubber protectant

Why the protectant is important

☐ **(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.

Scouting America resources: How to Change a Flat Tire (video)

Date Vehicle Where the jack is kept

☐ Engaged the jack correctly
☐ Changed the tire

☐ **(d)** Perform an oil filter and oil change on a vehicle. Explain how to properly dispose of the used oil and filter.

Scouting America resources: How to Change Your Oil (website)

Date Vehicle Oil and filter used

How to dispose of the used oil and filter

Requirement 11 completed on counselor initials

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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.

Scouting America resources: 10 Exciting & Rewarding Jobs in the Automotive Industry (website)
Automotive Jobs: The Highest Paying Ones (video) · Best Careers in the Automotive Industry (video)

Three automotive careers

Career	What I found out

The one I picked

What it takes	What I found out
Education	
Training	
Experience	

Why this profession might interest me

Requirement 12 completed on counselor initials

Counselor sign-off

Your counselor signs your blue card or approves the badge in Scoutbook, and your unit records it. This line is for your own records.

Counselor's signature Date completed

Official Scouting America resources

Scouting America resources: Automotive Maintenance merit badge page (requirements and resources)
Automotive Maintenance merit badge pamphlet (free PDF) · All merit badges

Made by Cole at ScoutSmarts.com, an Eagle Scout who loves helping Scouts.
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