



Automotive Maintenance

Scouts BSA · Trades

Name

Started

Completed

Knowing how a car works saves money, keeps your family safe, and builds real confidence. This badge takes you under the hood to check fluids, tires, brakes, and more. Find a patient adult or mechanic and get your hands a little dirty.

Requirements

Every official requirement, in plain language. Check the official wording when you sign off (scouting.org/merit-badges/automotive-maintenance/). Tips and examples are ideas, not extra requirements.

1 Safety and registration

Tips for this section: Look through your family's registration and insurance cards with a parent. Talk about how gas, hybrid, and electric cars differ.

Example for this section: Compare power types with a chart: a gas car burns fuel in the engine, a hybrid pairs an engine with a battery and motor, and an electric car runs only on a battery you plug in. Add one pro and one con for each, like range or fuel cost.

- ☐ **1a** Explain to your counselor the hazards you're most likely to face while working on vehicles and how to anticipate, prevent, or reduce them

- ☐ **1b** Discuss with your counselor the safety gear, tools, and clothing for checking or repairing a vehicle, and use them as needed for this badge's requirements

- ☐ **1c** Explain the different ways motor vehicles can be powered

- ☐ **1d** Explain the safety concerns when maintaining a vehicle that has a high-voltage electrical system

- ☐ **1e** Review the maintenance chart in the owner's manual and explain what it requires and when

- ☐ **1f** Explain what safety belts and passive restraints (like air bags) do, why they matter, and their limits

- ☐ **1g** Find out your state's emissions and safety inspection rules, if any, including how often a vehicle must be inspected

- ☐ **1h** Explain why vehicles must be registered and find out the yearly fee to renew your family car's registration

2 General maintenance

Tips for this section: Use the owner's manual to find each fluid, fuse, belt, and light. Work only with the engine off and cool, with an adult beside you.

Example for this section: Do a monthly check with an adult using the owner's manual: engine cool and off, check oil and coolant levels, look at the brake and washer fluids, inspect belts for cracks, then walk around the car while someone works the lights and turn signals.

2a Fluid and battery checks

- ☐ **2a1** Show how to check the brake fluid

- ☐ **2a2** Show how to check the engine oil

- ☐ **2a3** Show how to check the coolant

- ☐ **2a4** Show how to check the power steering fluid

- ☐ **2a5** Show how to check the windshield washer fluid

- ☐ **2a6** Show how to check the transmission fluid

- ☐ **2a7** Show how to check the battery fluid (if possible) and the condition of the battery terminals

- ☐ **2b** Find the fuse boxes, identify the fuse types and sizes, and show how to replace a burned-out fuse correctly

- ☐ **2c** Show how to check belts and hoses for condition and tension

- ☐ **2d** Check that all the vehicle's lights work, including interior overhead, instrument, and warning lights and exterior bulbs

- ☐ **2e** Find and check the air filter(s)

3 Dashboard and driver information center

Tips for this section: Sit in the driver's seat with a parent and go through each gauge and warning light using the owner's manual.

- ☐ **3a** Explain what the fuel gauge, speedometer, tachometer, oil pressure gauge, and engine temperature gauge do, and point each out on the instrument cluster

- ☐ **3b** Explain the dashboard symbols, how yellow and red symbols differ, and every indicator on the dashboard (use the owner's manual if needed)

- ☐ **3c** Explain the messages and alerts the dashboard or driver information center can show, including maintenance reminders

4 Tires

Tips for this section: Use a tire gauge to check pressure and compare it to the sticker in the driver's door. Look for uneven wear on the tread.

Example for this section: Read a tire sidewall like 215/60R16 95H and explain each part: width, height ratio, radial construction, wheel size, load index, and speed rating. Then use a penny or tread gauge to check tread depth in three spots across the tire.

- ☐ **4a** Explain how the tire maker's specifications differ from the vehicle maker's, and show where to find each

- ☐ **4b** Show how to check tire pressure and inflate a tire correctly, then check that the spare is ready to use

- ☐ **4c** Explain why wheel alignment affects tire life, and explain caster, camber, and toe-in adjustments

- ☐ **4d** Explain what the lateral-wear bar indicator is for

- ☐ **4e** Explain how to get rid of old tires following local laws and rules

5 Engine

Tips for this section: Ask a mechanic or parent to show you the dipstick, oil filter, and oil type listed in the manual.

- ☐ **5a** Explain how an internal combustion engine works, how gasoline and diesel engines differ, and how a gas-electric hybrid gets its power

- ☐ **5b** Discuss what engine oil does, and explain the API service code, SAE number, and viscosity rating

- ☐ **5c** Explain where to look up the right oil type and amount for the vehicle's engine

6 Cooling system

Tips for this section: Have an adult point out the radiator and coolant reservoir. Never open a hot radiator cap.

- ☐ **6a** Explain why the cooling system needs coolant and why using the right type for the vehicle matters

- ☐ **6b** Explain how to flush and replace the engine coolant and how to dispose of the old coolant safely

7 Fuel system

Tips for this section: Ask a mechanic to show you the air filter and fuel filter, and explain how the engine's computer controls fuel injection.

- ☐ **7a** Explain how air intake and fuel delivery cooperate in the engine, and why it needs both an air filter and a fuel filter

- ☐ **7b** Explain how fuel injection works and how the onboard computer works with it

8 Ignition and electrical systems

Tips for this section: Practice the jump-start steps with an adult using the owner's manual, wearing eye protection and following the correct order exactly.

Example for this section: Explain the safe jump-start order from the owner's manual: red clamp on the dead battery's positive post, red on the good battery's positive, black on the good battery's negative, and black on bare metal away from the dead battery. Remove in reverse order.

8a Diagram an electrical system: Choose 1 of 3

- ☐ **8a1** Diagram the starting/charging system and explain its parts

- ☐ **8a2** Diagram a hybrid or electric vehicle inverter and explain its parts

- ☐ **8a3** Diagram the lighting system and explain its parts

- ☐ **8b** Explain the engine's firing order

- ☐ **8c** Explain what the spark gap is for

- ☐ **8d** Show how to hook jumper cables to your car battery safely

- ☐ **8e** Discuss with your counselor what affects an electrified vehicle's range, and explain how to recharge an electric or plug-in hybrid vehicle

- ☐ **8f** Explain which other vehicle systems rely on a dependable electrical system

9 Drive train

Tips for this section: Draw a simple diagram of the drive train with labels. Ask someone who drives a manual to explain how it feels different from an automatic.

Example for this section: Draw the drive train from engine to wheels: engine, transmission, driveshaft or axles, differential, and wheels. Label which ones a front-wheel-drive car uses and explain how an automatic shifts without a clutch pedal.

- ☐ **9a** Diagram the drive train and explain its parts

- ☐ **9b** Explain how automatic and standard (manual) transmissions differ

- ☐ **9c** Explain the types of automatic transmission fluid

- ☐ **9d** Explain the lubricants used in a standard transmission, the differential, and the transfer case

- ☐ **9e** Explain how front-, rear-, and four-wheel-drive vehicles differ

10 Brake system

Tips for this section: Ask a mechanic to show you brake pads and rotors, and how they check them for wear.

- ☐ **10a** Explain how the brake system works, including antilock brakes

- ☐ **10b** Explain how disc brakes and drum brakes differ

- ☐ **10c** Show how to check a vehicle's brakes, then recommend any repairs needed

11 Hands-on vehicle projects: Choose 2 of 4

Tips for this section: Do these tasks with an experienced adult. Always use jack stands, never just a jack, before working near a raised car.

Example for this section: For an oil change with an experienced adult: warm the engine briefly, raise the car on ramps or jack stands, drain the old oil, swap the filter, refill with the oil type in the manual, and take the used oil to a recycling drop-off.

- ☐ **11a** Price 3 vehicles you'd like to buy (1 new, 1 used, 1 either), find insurance needs and costs (liability, collision, comprehensive, towing, rental), fill in the pamphlet's operation/maintenance chart with your counselor, figure each one's cost per mile, and discuss what you learned

- ☐ **11b** Pick a car cleaner and wax, explain clear-coat paint and how to care for it, clean the vehicle inside and out, wax the outside, and apply vinyl and rubber protectant while explaining why it matters

- ☐ **11c** Find the manufacturer's jack, show how to place and use it correctly on the vehicle, and then change a tire correctly

- ☐ **11d** Change the oil and oil filter on a vehicle, and explain how to dispose of the used oil and filter properly

- ☐ **12** Learn about 3 automotive careers, research the education, training, and experience one of them needs, and discuss with your counselor why it interests you

Tip: Visit a repair shop or dealership and ask technicians about their training and what they like about their work.