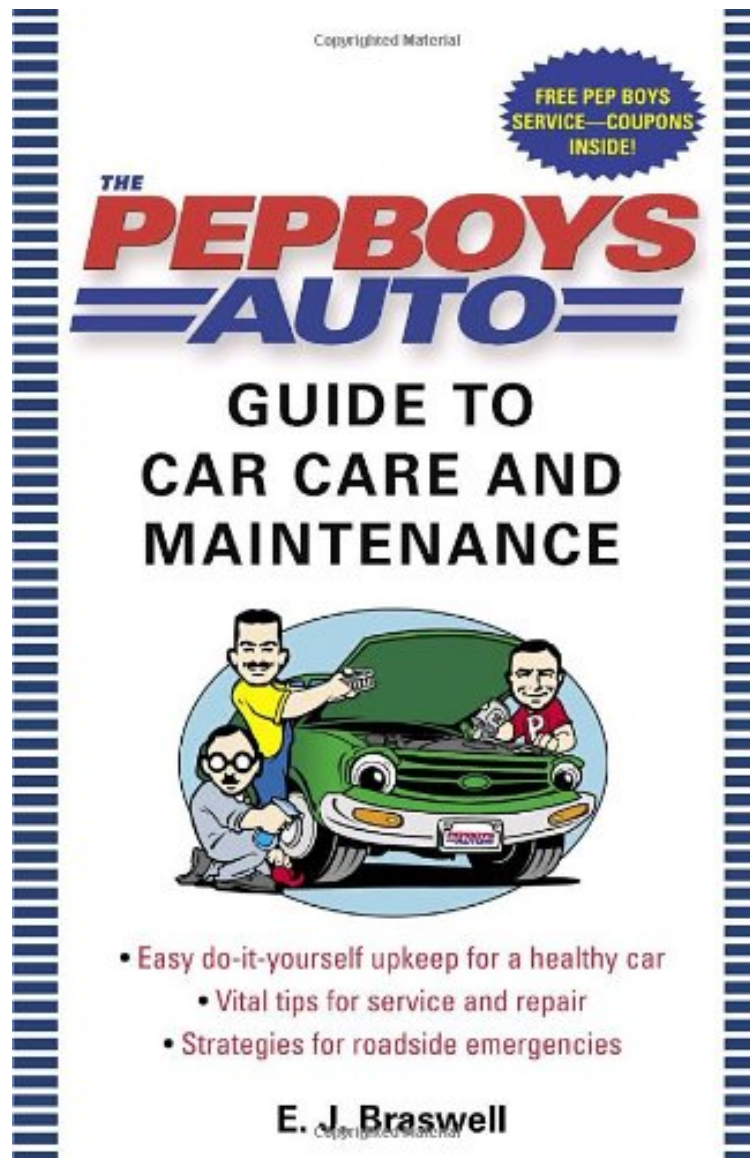


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The Pep Boys Auto Guide to Car Care and Maintenance: Easy, Do-It-Yourself Upkeep for a Healthy Car, Vital Tips for Service and Repair, and Strategies for Roadside Emergencies

E.J. Braswell

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#2600085 in Books E J Braswell 2005-04-26 2005-04-26 Original language: English PDF # 1 7.95 x .40 x 5.181, .39 #File Name: 0345476859144 pages The Pep Boys Auto Guide to Car Care and Maintenance Easy Do It Yourself Upkeep for a Healthy Car Vital Tips for Service and Repair and Strategies for Roadside Emergencies | File size: 53.Mb

E.J. Braswell : The Pep Boys Auto Guide to Car Care and Maintenance: Easy, Do-It-Yourself Upkeep for a Healthy Car, Vital Tips for Service and Repair, and Strategies for Roadside Emergencies before purchasing it in order to gauge whether or not it would be worth my time, and all praised The Pep Boys Auto Guide to Car Care and Maintenance: Easy, Do-It-Yourself Upkeep for a Healthy Car, Vital Tips for Service and Repair, and Strategies for Roadside Emergencies:

Okay, so you're not a gearhead, but like most folks, you want to keep your car in peak condition. For more than eighty years, the Pep Boys-Manny, Moe, and Jack-have been the three best friends your car ever had. And now, with The Pep Boys Auto Guide to Car Care and Maintenance, any Tom, Dick, or Harriet can learn how to keep his or her car running smoothly and looking its best. The ideal car care guide for do-it-yourselfers, this is your one-stop source for everything from the basics to the hard stuff (so you'll know what to tackle yourself and when to call in the experts). Inside you'll discover - a simple anatomy of your car and a handy glossary of terms- accident prevention measures and how to handle emergencies on the road, from jump-starting your engine to changing a flat tire- key seasonal and monthly maintenance tasks-including checking oil levels and battery life, tire rotation, and monitoring tread wear- tips for improving fuel mileage - how to diagnose major and minor problems-and how to fix them Straightforward and easy to use, The Pep Boys Auto Guide to Car Care and Maintenance will give you the knowledge and confidence you need to keep your car in top condition.

From the Inside Flap Okay, so you're not a gearhead, but like most folks, you want to keep your car in peak condition. For more than eighty years, the Pep Boys-Manny, Moe, and Jack-have been "the three best friends your car ever had." And now, with "The Pep Boys Auto Guide to Car Care and Maintenance, any Tom, Dick, or Harriet can learn how to keep his or her car running smoothly and looking its best. The ideal car care guide for do-it-yourselfers, this is your one-stop source for everything from the basics to the hard stuff (so you'll know what to tackle yourself and when to call in the experts). Inside you'll discover - a simple anatomy of your car and a handy glossary of terms- accident prevention measures and how to handle emergencies on the road, from jump-starting your engine to changing a flat tire- key seasonal and monthly maintenance tasks-including checking oil levels and battery life, tire rotation, and monitoring tread wear- tips for improving fuel mileage - how to diagnose major and minor problems-and how to fix them Straightforward and easy to use, "The Pep Boys Auto Guide to Car Care and Maintenance will give you the knowledge and confidence you need to keep your car in top condition. About the Author E. J. Braswell, the author of The Pep Boys Auto Guide to Car Care and Maintenance, comes from a long line of car tinkerers. He divides his time between New York and Vermont. Excerpt. Reprinted by permission. All rights reserved. A Tutorial of Your Car and How It Works Learning How to Drive Sure, you know how to put the key in, shift into drive, and pull away-but do you really know exactly what goes on inside the car when you're out there on the road? You will by the end of this section! When you're done, you'll no longer think of your car as a Big Black Box, but as a logical sum of its fairly simple to understand parts. Note: If you find this next part confusing or the terminology a little alien at first, don't worry. Continue to read through the next section on all the different systems in your car-and we'll go through all of this again. It will make sense-we promise. When you put your key into the ignition and turn it, you close a switch that allows electricity to flow from the battery to the starter, an electric motor that starts turning the crankshaft. As the engine spins, the pistons and the fuel start pumping and the valves start opening and closing. Compression is achieved, the spark plugs fire, and the engine itself takes over. The starter then disengages itself from the process. The fuel pump delivers gas to the cylinders of the engine through intake valves, where it is mixed with air and compressed by the pistons. This highly combustible mixture is lit by the spark plugs and explodes, forcing the pistons down, which then turns the crankshaft. The crankshaft connects to the transmission, which determines with how much power and at what speed the wheels should turn. To shift gears, the car must first release the transmission from the crankshaft, and this is done by a clutch if it's a car with a manual shift. Power is converted hydraulically through a torque converter in an automatic, transferring engine power by the use of fluid. In rear-wheel-drive vehicles, the driveshaft continues from the transmission on to the rear of the car, with a hinge on each end called a universal joint (or a CV joint in a front-wheel-drive car) to keep the whole thing flexible and from snapping like a twig when the car hits a bump. A differential (sometimes called a rear end) at the end of the driveshaft delivers the turning power of the shaft and converts the power through a ring and pinion gears "sideways" to the two rear wheels and determines the difference in speed that each wheel must have in order for you to execute a turn. When turning, the outside wheel must turn faster than the inside wheel or you would break the axles or gears. The differential is what allows this to happen. In front-wheel-drive cars there is a transaxle instead of a transmission, which handles gear-shifting as well as the individual speed of the left and right front tires for when you want to turn. Oil keeps everything lubricated and operating quietly and properly. . . Now, that wasn't so hard, was it? Okay, it was. So now let's break down your car system by system and go through

each one simply and clearly. We'll put it all together at the end of this section again-and you'll be amazed by how much you've already learned.

Breakdown: Your Car, System by System

Engine

Okay. This is actually a far simpler thing than you might imagine. Relax, take a deep breath and imagine yourself in a tropical paradise . . . on a bicycle. In the same way that bicycle pedals go up and down, the crankshaft in a car pumps up and down, transferring rotation and power to the wheels. But instead of legs (and feet), a car engine has pistons that push down on the crankshaft. The pistons are propelled downward by an explosion above them in the cylinder. So the more cylinders you have, the more pistons you have; the more feet pedaling on the bike, the faster and more powerful the bike-er, the car. This is why a V8 is so much more powerful than a V6 or a four-cylinder engine. (The V refers to how the cylinders are set up. Either they're in line and called an inline 4, 6, or 8, or sort of alternately positioned like the two tops of a V. They can also be directly opposing each other in a flat design, as in old VWs.) How the explosion occurs is where our little human-and-bicycle metaphor breaks down. It takes four cycles or up-and-downs to make things happen.

1. As the pistons move down, a mixture of gas and air is sucked into the cylinder through the intake valve.
2. As the piston heads back up, it creates compression, and the gas mixture is lit (or detonated, if you want to be precise) by a spark plug, which-you guessed it-creates a little spark. It's kind of like the electric ignition on a gas stove that causes the burner to light.
3. The resulting explosion (in the cylinder, not your stove) pushes the piston back down against the crankshaft with power, the transmission transmits this power to the wheels, and your car goes zooming off.
4. As the piston comes back up the exhaust valve lets out the burned gases, and the cycle starts all over again.

Back to your bike. Even if it's instinctive by now, your brain figures out which leg pushes down to keep your bike rolling smoothly. If you tried to push down both legs at once, nothing would happen. The same thing is true with a car-the pistons have to push down on the crankshaft in precisely timed movements. Ignition, or spark, is timed exactly when the piston nears the top so the explosion will force the piston back down again.

Electrical

The electrical system in your car does three important things:

1. It cranks your engine to help it start.
2. It makes your car start once it's cranking by causing the spark plugs to fire.
3. It runs all the electric devices in your car; the headlights, the radio, the fan, the computers . . .

Starting Your Car

When you put your key into the ignition and turn it, you're doing two things. First, you're closing a circuit that allows a current to run from the battery to the starter motor. Second, the starter gear physically moves into and engages the flywheel. The starter is a little electric motor that jump-starts your car by turning a flywheel that then turns the crankshaft, causing the pistons to go up and down, beginning their cycle. When your car has started-and you let your key turn back-the motor disengages itself from the engine, which is now merrily chugging along of its own accord.

Running Your Car

At the same time you start your car and electricity flows to the starter motor, some electricity also goes to a coil that amplifies the voltage to about 50,000 volts. (And yes, that's more than enough to kill you, especially if you have heart problems, so be very careful.) From there the current runs to your engine through the distributor cap in an older car or the coil wire on a newer one, sending that 50,000-volt spark of electricity to each of your (yes, you guessed it) spark plugs. The voltage or pressure of the current is so great at this point that it leaps across the open space between the two electrodes of the spark plug in the cylinder. The spark sets off an explosion of gas and air in the cylinder, and the piston fires, the cycle begins, and off you go.

Running Other Things

Everything in your car that draws electrical juice-the fan in the heater, the map light, the computer that controls your engine, your CD player, etc.-is capable of having its expensive inner parts fried if there's a sudden overload of electricity, which happens more often than you might think. That's why the current for each one runs through a fuse. Think of a fuse as a really weak, badly made lightbulb: The slightest power surge causes the filament inside to burn out. In the same way, a fuse blows out if there's a problem in the system to stop the electricity from traveling any farther up the line and damaging anything.

The fuse box for most of the passenger and driver utilities (radio, map light, etc.) is somewhere under or behind the dashboard; for the onboard computer, fuel pumps, and other operational items, the fuse box is often under the hood in the engine compartment. If a fuse blows, it generally means you have a problem with a component in that system or that a wire has rubbed up against a metal part and is grounded out. Merely replacing the fuse generally will not fix the problem. Never replace the fuse with one with a higher value.

Your Battery and Alternator

The electricity to start your car is stored in the battery, just as the electricity to power a flashlight is stored in its batteries. Unlike a flashlight, however, your car battery is recharged every time you run the car from the power of the engine. An alternator (really a generator) runs off a drive belt attached to the engine, and converts this physical power into electricity, sending it to the battery and all of the other components in the car that require electrical power.

Efficient, no?

On most cars the red-colored terminal on a battery is positive and the black is negative. Whenever doing any work on the battery, always remember to disconnect the black or negative side first-this prevents everything in your car from getting fried if there's a problem. As batteries age and distribute and receive recharges, they get white hair just as we do, in the form of a powder that will appear on the top. Once the battery is disconnected properly this can be cleaned up harmlessly, but eventually, like all batteries, it will have to be replaced when it fails to perform.

Oil

You probably already know a lot about this system already. Oil helps lubricate and clean all the different metal parts that would otherwise grind against one another in the engine, destroying your car. It's stored in the oil pan when the car is turned off; when the car is running, it's pumped around the moving parts of the engine by an oil pump, lubricating as it goes. An oil filter cleans out the sludge and particles. A dipstick lets you check how much oil you have (as well as its quality), and an oil filler

nearby lets you add more when it's low-or refill completely when you're changing the oil. Reading a Can or Bottle of Oil We'll say this again later when we talk about checking, filling, and changing your oil, but we'll say it now just to make sure it's burned into your head: Only buy the kind of oil recommended in your vehicle's owner's manual. Like any other liquid, oil is thinner when hot and thicker when cold (on its way to freezing). This texture or ease of flow is known as viscosity; high viscosity means thick and sludgy, and low means thin and watery. Oil needs to remain thin enough when cold to flow and lubricate everything completely when starting and thick enough to "stick" to the parts it's lubricating when hot. Most oil you buy is multiviscosity, so that you don't have to switch types at different times of the year. The numbers on a can that say something like 20W-50 indicate the range; the higher the number (50) the higher the viscosity, the lower the number (20), the lower the viscosity. The letter W after a number, usually on the lower end of the range, indicates that the oil has been winter tested. The quality of oil for a gas-powered car begins with an S and is followed by a letter, with A being the lowest. If you have a new car, your manual will probably recommend SL or SJ. Higher quality oils can always be used for cars whose manuals suggest lower quality oils; the reverse, however, is not true. In fact, SA through SH are considered obsolete now-it's best just to never use them. Oil is not the place to begin penny-pinching with your car; always make sure it's a quality brand that has been certified by the American Petroleum Institute and says "Energy Conserving." (If you drive under tough conditions-towing a trailer, navigating hilly areas, or just high-speed driving-you may want to consider the added performance of synthetic oil. Synthetics cost more but can help extend the life of your engine.)

Heating/Cooling For Your Car

If you hadn't already figured it out by now, with all those explosions going on in your engine, the bigger issue is cooling rather than heating. Temperatures can reach over a thousand degrees under the hood, and if left unchecked things could start to melt. To keep this from happening, your car's engine is equipped with a liquid cooling system (unless it's equipped with an air-cooled engine). Coolant is stored primarily in the radiator. When the engine is running, a pump runs the coolant into a hose at the bottom of the radiator and through the water jacket around the engine, where the liquid picks up heat. Coolant is then carried back to the radiator via a hose in its top. The radiator in your car works similarly to one you might find in a house: It helps radiate the heat off and out of the coolant and into the air (in front of the grille), with the help of a fan when the car isn't moving to flow air across the fins of the radiator to remove the heat. The now cooled-down coolant gets pumped back into the engine, and the process starts all over again. There will often be a coolant reservoir next to the radiator; if there is, you add coolant there instead of directly into the radiator. When coolant heats up it expands (as do most liquids), and the reservoir catches the extra when it overflows the system to keep it from leaking all over the ground. Leaked coolant is actually more of a hazard than a lot of the other toxic chemicals that could leak out of your car. Coolant is usually a mixture of water and antifreeze; this fluid has a higher boiling point than water and a lower freezing point. The antifreeze is usually ethylene glycol. Ethylene glycol tastes sweet and is deadly poisonous. Dogs love it. Small children love it. Even a tablespoonful can be fatal. So be very careful where you keep extra and when you refill the reservoir or radiator-clean any spills immediately.

For You Heating is easy!

Heat from the engine is carried via the heated coolant to a small radiator behind the dashboard, and just like the engine radiator this one dissipates heat and a fan distributes it through the appropriate vents.

Air-Conditioning Cooling is . . .

not so easy. Basically, a liquid called a refrigerant is pushed through an evaporator, where it absorbs and removes heat from inside the car. It does this because it has a very low boiling point (meaning it boils at a lower temperature than plain water), and when a liquid turns into a gas it picks up heat.