

LEARNING MADE EASY



2nd Edition

Auto Repair

for
dummies[®]
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Perform routine
repairs and maintenance

Troubleshoot problems and
handle roadside emergencies

Save fuel and extend
your car's life

Deanna Sclar

Acclaimed auto repair expert



Auto Repair

2nd Edition

by Deanna Sclar
John O'Dell, Technical Advisor

for
dummies[®]
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Auto Repair For Dummies®, 2nd Edition

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What's So Special about Auto Repair For Dummies, 2nd Edition

This book is designed for people who think that anything technical will make their brains shut like garage doors, who sincerely care about how their vehicles affect the environment, and although they believe they can't work on their cars themselves — and wouldn't like it if they could — are willing to give it a try. How do I know that it will work for these reluctant readers? Because it's written by a genuine, certified ex-Dummy who has found that, despite total ignorance and a complete lack of manual dexterity, getting personally involved with a vehicle is enjoyable, rewarding, and easy. Believe me: If I can do it, so can you!

It Is Not Written for Confirmed “Do-It-Yourselfers.” It Is for You If:

- » You have never held a wrench.
- » You are positive that, in your case, manual labor can lead only to disaster.
- » You haven't the vaguest idea of how a car works.
- » You have failed shop or arts and crafts.
- » You believe that if you do something wrong, your car can blow up.

To Enjoy This Book, It Would Help If:

- » You don't believe that working on your vehicle can possibly be fun, but you're willing to give it a try for any reason whatsoever.
- » You are sincerely tired of being ripped off because of your own ignorance.

Why Is That Enjoyable? Because You Will Be Delighted to Find:

- » Cars run on principles that are as easy to understand as common sense.
- » You can save a tremendous amount of money, extend the life of your vehicle, save on fuel, and do your bit for the environment if you know more about your car!
- » Most of the devices on your vehicle will not hurt you unless you really go out of your way to hurt yourself.

Here's How *Auto Repair For Dummies* Accomplishes These Miracles:

- » It starts from scratch. It even shows you what a screwdriver looks like!
- » It explains each system in simple terms *before* you get to work on it.
- » It provides step-by-step instructions for even the simplest tasks.
- » It tells you exactly what you need and how to know if you've been given the wrong part, the wrong diagnosis, or an outrageous estimate.

It Tells You the Truth About:

- » What makes your vehicle go (and how and why as well)
- » How the car you drive, how you drive it and maintain it, and how you recycle or dispose of used parts and toxic fluids affect fuel economy and global warming
- » The easy work involved in keeping your vehicle well maintained and running efficiently, and how to tell what's wrong if trouble strikes
- » How 15 minutes of "preventive medicine" avoids breakdowns
- » Whether you can handle a problem yourself, and how to get it fixed at a fair price if you can't
- » How to extend the life of your vehicle; keep it clean and healthy; and repair the minor dents and dings it acquires on the road

These Features Will Make Life Even Easier:

- » A *Practical Glossary of Automotive Terms* that are in *special type* throughout the book so that you can refresh your memory if you've forgotten what something means
- » A detailed *Index* where you can look up a part, a problem, a symptom, or a specific job and find the page you need
- » A *Maintenance Record* so you can keep track of what you've done and when you did it
- » A *Specifications Record* for the data you need to buy the right parts
- » Tons of illustrations that show you how things look and where they are

This Revised Edition Also Tells You:

- » About alternatively fueled vehicles and other innovations so you can choose a safe and efficient vehicle when Old Faithful finally heads for the Used Car Lot in the Sky

You Have a Few Things to Supply, Too!

- » You have to buy the book . . . and read it!
- » You have to try to do one small, easy job yourself (you can pick the job).

There Are Fringe Benefits, Too!

- » Your vehicle will run better and live longer.
- » Automotive technicians will respect you.
- » You'll have more money to spend on other things.
- » You'll no longer be a Dummy!

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Introduction

For many people, getting a driver's license is an event that runs second only to getting a diploma or a marriage license. Most of us succeed in passing the test and hop happily into our vehicles, headed for the freedom of the open road. Unfortunately, most of us don't know the first thing about the machines we're licensed to drive — and this can turn a ticket to freedom into a ticket to trouble.

I'm not necessarily talking about physical danger. State motor vehicle bureaus have made fairly sure that, before we can get a driver's license, we know how to drive defensively and can handle a vehicle under poor driving conditions. What I'm referring to is the kind of trouble that comes from depending on other people to care for and repair our vehicles. If you're like most people, you probably tend to drive around until something goes wrong and then incur the expense of replacing worn and burned-out parts — or the entire vehicle! — when low-cost, regular maintenance could have kept your wheels turning for a long time.

Whether you're trying to cut expenses, are tired of being patronized, or have just fallen in love with your first car, this book tells you how your vehicle works, what it needs in the way of tender loving care, how to reduce its impact on the environment, and how to keep from getting ripped off if you have to entrust repairs to someone else. By handling the simple maintenance and being able to diagnose trouble and perform the less complex repairs yourself, you'll earn the respect of your family, your mechanic, and your car — and you'll feel pretty good about it!

About This Book

This new edition is about much more than auto repair. In this book, I introduce you to the wonders of the internal combustion engine and to the even more wondrous alternative fuels and alternatively fueled vehicles that reduce dependence on the rapidly dwindling supply of fossil fuel and will play a huge role in the battle against global warming that threatens the future of the planet. I'm proud to say that this edition of *Auto Repair For Dummies* is the first “green” automotive guide that focuses on how the vehicles you choose; the way you maintain them; and how you recycle used oil, parts you've replaced, and other waste products directly affects the environment.

The book starts off with the basics every driver should know, from how to get the hood open and fill up with fuel, to using a jack and changing a tire safely. You learn

the basic safety rules to follow when dealing with your vehicle, and how to take *anything* apart and reassemble it without losing anything, including your mind! After identifying the basic tools you may need, I gently lead you into an easy preventive maintenance check-up that you can do to extend the life of your vehicle and keep it from breaking down on the road.

Next, there's a quick overview of how your vehicle's principal systems work together to start it, operate it efficiently on the road, and bring it safely to a stop. After you have a general idea of how things work, we explore each system, part by part, and what needs to be done to maintain it, troubleshoot it, and do minor repairs yourself. Don't worry about getting in over your head. If a repair can get you into trouble if you attempt to do it yourself, I tell you how to be sure the work is done properly by a professional at a fair price. So don't chicken out on me! Start with the easy stuff and then take on the more challenging tasks.

How I Became Intimately Involved with My Car, and Why You Should Too

Before I moved to California, I was an ordinary urban cliff dweller: I had only a nodding acquaintance with cars. Ours was locked up in a garage, and I used subways, buses, and taxis. All the maintenance on our car was done by the garage that housed it. When we moved to California, my enthusiasm for a life in the sun was considerably dampened by the knowledge that this would also include a life on the freeways, but the first time I took the family car to the supermarket myself I had an epiphany in the parking lot: I could drive anywhere I wanted to, instead of just being driven home. It wasn't long before I was looking for a car of my own.

The best I could do was a secondhand Mustang with more than 70,000 miles on it. A friend of mine checked out the car and pronounced it drivable. He said that it might need "a little work." We took it to a reliable mechanic, who checked it over, tuned it up, and told me that it was "a classic."

Thus reassured, I drove the car to the Department of Motor Vehicles to register it. I parked the car, turned off the ignition, locked it, and found that the car was singing! A bit puzzled, I rechecked the ignition and the radio, but everything was truly shut off. And still the car sang. By the time I returned, all was quiet. But that night, when I took the family out to dinner, old Tweety Bird began to sing again. After several weeks of expensive and unsuccessful repairs, I found out that all she had needed was an inexpensive radiator cap. To my amazement, the shop was unwilling to refund the money I'd spent on all the other stuff they'd tried! I realized that it would be impossible to communicate with Tweety properly if I didn't know anything about her, and the repair bills were going to send both of us down the drain.

So I conned a friend of mine into taking an auto shop class with me at a local adult-ed center. Instead of a bewildering array of weird objects and miles of hoses that threatened to blow up if I turned a screw in the wrong direction, I soon found that a car was just a series of simple mechanisms linked together and that vehicles are very good about sending out signals telling you clearly what's wrong — if you know how to hear, see, smell, or feel them.

Before long, it was no longer enough to be able to communicate with a mechanic; I wanted to be the mechanic *myself* whenever possible. Not only did I save money, but Tweety began running better, and I found that not only was I saving money and fuel, I was having *fun*!

Today, vehicles are more complex because computers control many systems and even professional mechanics need specialized equipment to deal with them. The upside is that these vehicles usually need fewer repairs, and there are much greater intervals between basic maintenance tasks, most of which are still easily done yourself. The same goes for making a variety of minor repairs and adjustments.

Unlike professional mechanics, when *you* do the troubleshooting (that's CarSpeak for diagnosing a problem by analyzing the symptoms), you can try the cheaper solutions first. For example, if your engine has been overheating constantly, you check the radiator cap and the coolant level, look for leaks in the hoses, and check the thermostat *before* paying for a new water pump. If it's the cap, a hose, or the thermostat, you may be able to easily replace it yourself, and the money you'll save is well worth the effort. If it finally comes down to changing the water pump, you can ask the mechanic about installing a good rebuilt pump instead of an expensive new one.

With this book as your guide to how cars work, you may discover that your vehicle stops being a mystery and begins to be fun to hang around with. When you realize that a vehicle exhibits most of the symptoms of life — it's self-propelled, reacts to outside stimuli, consumes fuel and discharges wastes, and even manages to sing a little tune now and then — it's really hard not to respond to it as though it were another living thing.

Conventions Used in This Book

The following conventions are used throughout the text to make things consistent and easy to understand:

- » All Web addresses appear in monofont.
- » Whenever you encounter a term set in **this font**, you'll find it defined in the glossary in Appendix A.

- » *Italic* is used to note technical terms that aren't defined in the glossary.
- » **Bold** is used to highlight the action parts of numbered steps as well as key information in lists.
- » Sidebars are the shaded boxes that appear here and there. They contain information that's interesting and insightful and that may help you out in your auto repair adventures. However, you won't be at a serious disadvantage if you stick to the regular text and save the sidebars to read later on.

How I Picture You

In order to make this book as relevant, readable, and enjoyable as possible, I envision it as a friendly conversation with the kind of person I feel would want to read it. Here's my mental portrait of my readers:

- » You're intelligent and may know a great deal about a lot of things (law, business, literature, medicine, and other nonautomotive subjects), but you need some help when it comes to cars.
- » You're tired of living as a "closet dummy" who nods and smiles at the incomprehensible mutterings of your mechanic, only to end up shelling out money for repairs that you neither fully understand nor always need.
- » You've decided that it simply isn't worth the extra money to have other people do things for you that you can do yourself.
- » You're tired of other people assuming (especially if you're a teenager, a senior, or a woman) that you aren't capable of handling repairs yourself.
- » You want to keep a good vehicle in good condition without paying dearly to have someone else do the simple maintenance, or you want to keep your old heap running just a little longer without spending a lot of money on it.
- » You want to maintain your vehicle *without* devoting every weekend, weeknight, and spare lunch hour to poring over the intricacies, details, and mysteries of the internal combustion engine.
- » You've realized (I hope!) that a vehicle that runs inefficiently because it's poorly maintained or is running on fossil fuel pollutes the environment, and you want to do something to turn that around.

How This Book Is Organized

Basically, this book covers everything you need to know to understand, care for, maintain, and troubleshoot your vehicle, or choose a new, more efficient, and safer one. You'll be relieved to know that I explain everything in everyday terms, with no jargon, no unnecessary technical details, and lots of simple illustrations.

To help you find information easily, this book is divided into seven parts, each containing chapters that deal with a particular topic. Because the key to doing *any* job is to understand what you're working on and how it functions, I strongly recommend that you read the chapter that deals with the system you want to work on *before* you head for the chapter that tells you how to do a specific job. The following sections describe the information that you can find in each part.

Part 1: Getting to Know Your Vehicle

If you want the basics, this is the part for you. I cover things that everyone who drives should know, like how to decide whether you want to do a job yourself, how to get the hood open, how to use a jack and change a tire, and how to take *anything* apart and put it back together again. A monthly under-the-hood check that can prevent 70 percent of highway breakdowns will transform you from an “I-*can't*-do-it-myself” into a hands-on mechanic. I also describe the tools that you'll need to borrow or buy if you plan to do regular maintenance and simple repairs. Finally, a quick and simple run-through of how basic automotive systems work together gives you the confidence to explore further because what was once a mystery is now familiar territory.

Part 2: Powering Up with Air, Fuel, and Fire

This part provides a closer look at the electrical and fuel systems in vehicles with internal combustion engines and tells you how to do simple jobs related to each one. If you own or would like to own an alternatively fueled vehicle, you'll find information on how diesel, hybrid, multifuel, natural gas, and hydrogen vehicles work; descriptions of a variety of alternative fuels; and the advantages and disadvantages of each.

Part 3: Staying Cool and In Control

This part deals with the cooling system, how oil benefits your vehicle, and how the brake system works. You find out how to prevent and deal with chronic overheating, add and change coolant, find and repair leaks, change your oil, check and maintain your brakes, pack wheel bearings, and do a variety of other vital tasks.

Part 4: Smoothing the Ride: Steering and Suspension, Tires and Transmissions

How comfortably and efficiently a vehicle operates is hugely influenced by the systems covered in this part of the book. This part tells you how all these systems operate and shows you how to choose the right tires, read the wealth of information on the sidewalls and the treads to prevent tires from wearing out prematurely, about balancing and alignment, and how to fill tires with the proper amount of air. The chapters on transmissions explain how they work, how to troubleshoot symptoms, and how to obtain the best deal on repairs, along with driving techniques that will extend the life of your transmission.

Part 5: Staying Safe and Dealing with Emergencies

This part helps you deal with problems that may occur while you're away from home. It describes a variety of new safety systems that help children ride comfortably and securely, prevent accidents and injuries, increase traction and stability, avoid rollovers, and even call for help without your assistance when your car is disabled or stolen. It shows you how to decipher such symptoms as weird noises, smoke, smells, and leaks to determine what's wrong; I also share what to do to get off the road safely, jump a start, and cool things down if your car overheats in traffic.

If a job is just too hairy to deal with yourself, I tell you how to find a reliable service facility and establish a good relationship with it, describe a problem so a mechanic can diagnose it swiftly and accurately, decipher a mechanic's invoice, and get satisfaction on complaints if, despite your best efforts, you run into problems with *anything* you buy.

Part 6: Helping Your Vehicle Look Its Best

Because keeping a vehicle clean — inside and out — can extend its life and value, in this part I cover washing and waxing the body, tidying up under the hood, cleaning the interior, and removing stains from fabric, carpeting, windows, and other surfaces. If your vehicle has suffered minor damage, I show you how to repair small dings, dents, and rust spots; touch up paint; and patch or install weatherstripping instead of paying big bucks for body shops to do it. If major work needs to be done I tell you how to choose the right type of parts, and how to evaluate body shops and get the best deal and highest quality work from them.