

OIL AND FILTER CHANGE –

You can do this fairly easily for yourself. You will need enough of the correct oil to fill your engine, the appropriate oil filter for your car, an oil filter wrench to fit your filter, a wrench to fit your oil drain plug, a pan to catch your drained oil, and a place or plan to dispose of used oil and filters (these need to be recycled). You will need a pad or tarp or piece of box cardboard to lay on, and lots of rags or paper towels to clean up as you go. You may need jackstands and jacks to raise the car high enough to get under it.

This is best done with the engine warm but not fully hot. The oil needs to be about 100 F to drain easily and quickly. Hotter will burn you. Jack the car up onto stands if necessary. Loosen the oil filler cap to vent the crankcase. With drain pan in position, remove the drain plug. Be careful not to drop it, its washer, or your tools into the pan.

When it quits dripping, replace and retighten the drain plug. Move your oil pan (carefully! do not slop the oil out!) under the oil filter. Remove the old filter with the oil filter wrench. Some oil will spill from this location into your pan. Drain the oil from the old oil filter into the pan as best you can, then wrap it in a paper towel and set it aside.

Dip the very tip of your finger into the oil in the pan, and smear this oil onto the rubber gasket of the new filter. Spin it on with your hand, to hand tight. Then turn it no more than another quarter turn (90 degrees) with the wrench. Mop up the oil on the car frame elements where it dripped when you removed the old filter. Carefully pull everything from under the car.

The owner’s manual will tell you how much new oil to add. Add all but one quart, then start the engine. Look underneath for leaks. If you find one, stop the engine and tighten whatever you forgot. No leaks – stop the engine, add the last quart, and lower the car from the jacks and stands, if any. Check on the dipstick – level should be right at the full mark. If you do not run the engine for the leak check, the level will read erroneously high, due to air bubbles in the oil system.

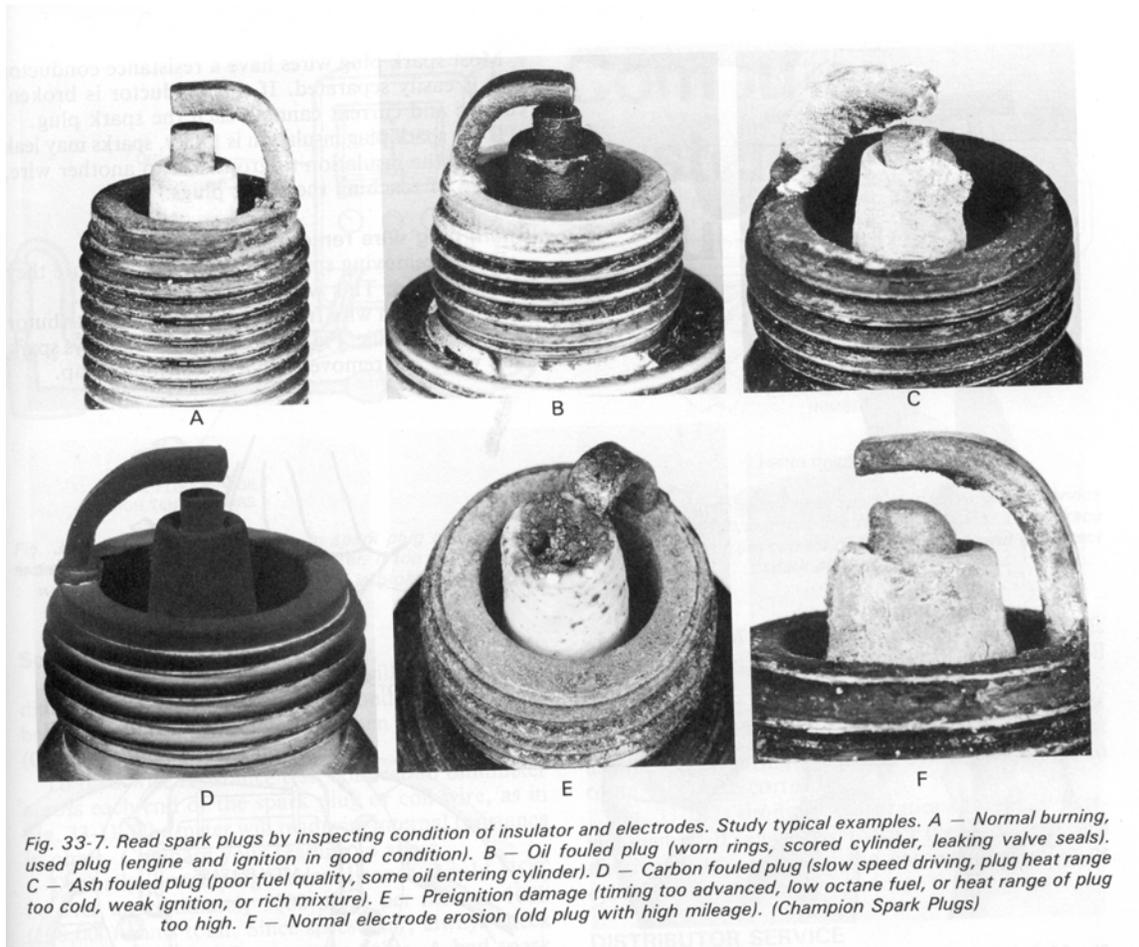
NEW SPARK PLUGS –

This is usually quite easy to do with the transverse 4-cylinder or in-line 6 cylinder engines, because they are usually right on top, or near the top. It is maybe not so easy with V-6 and V-8 configurations, because the plugs are buried on the sides.

If you do this, you will need the appropriate spark plug wrench, ratchet and extension, a gap-setting tool, anti-seize compound for the threads, possibly a magnet on an extension handle, and possibly a pair of needle-nose pliers. You will need paper towels or rags with which to clean up, and a full set of the correct spark plugs. Your owner’s manual will tell you what type and part number, and what gap, to use. Your auto parts counter

man can tell you what equivalent types and part numbers you can use with other brands of plugs.

Pull the wire connectors loose from the plugs and lay the wires aside in an order where you can re-match the proper wire with each plug. Use the ratchet to loosen the plugs and unthread them from their holes. If they do not stay inside the spark plug wrench, you can use the magnet to pull them out of the deep places we find on a lot of the newer engines. If you keep track which plug came from which cylinder, you can sometimes learn exactly where a problem is. The illustration below gives you some idea what your old plugs are trying to tell you.



Check the gaps on the new plugs and make sure they are correct for your car. Adjust as needed. Put a little anti-seize on the threads of the new plugs, and be sure the washers (if any) are still in place. In deep recesses, you can use the needle nose pliers to gently drop the plugs in, without banging the gap out of adjustment or the washer out of place. Use the spark plug wrench to hand-thread the plugs in place, and then tighten them with the ratchet. Not too tight – usually just a one-hand twist on the ratchet handle. Re-install the wires and connectors.

AIR FILTER SERVICE –

There is usually a plastic “box” at the inlet to the air passage into the engine, with some sort of clips on it. Inside is a paper air filter element. Undo the clips and pry the box open just enough to get the filter out; there is usually just enough “give” to the plastic air inlet passage hardware to let you do this without taking everything apart.

Look at the sun through the paper filter. If there are dark spots that do not let light through, the paper pores there are clogged with dirt. You can try blowing the filter element clean with compressed air. Often this works: no more dark spots means you can continue using the filter. Just put it back in.

Otherwise, just install a new paper filter element. They are very inexpensive. For those without access to compressed air, this is always the best choice.

WIPER BLADES –

Most cars have wiper blade assemblies that accept “refills” for the rubber blade elements. Check with your parts house counter guy to determine which of his products fit your car. Many cars use different lengths left and right, and there are two widths, so be sure. If you keep a logbook, these are part numbers you should record.

These usually snap off the wiper arm in one of about 2 or 3 ways. Have the parts house counter guy show you how, when you buy the parts. With the wiper free of the arm, you can pull off the old rubber blade element and push-on the new one. A pair of needle-nose pliers is needed to compress the little metal clips to get the old one off.

The new one just threads back through the little “feet” on the wiper. All of the 3-4 plastic retainer clips will pop off as you do this. Pull it through just enough to snap the metal clips in place. It goes on the same way the old one came off.

Snap the wiper back onto the arm. Do the other side.

LUBRICATING LINKAGES –

Throttle and other cables have linkages that they tie into. Put a drop or two of penetrating oil on these occasionally. Or a squirt or two, if your penetrating oil is in a spray can. Just look for moving parts, usually metal.

SPARK PLUG WIRES –

Not all cars have these anymore, but those that do usually have a distributor at the other end of the wires, a “round thing” where they all come together. Most spark plug wiring is now carbon core resistor wire. There is no metal in such “wire”. The carbon core will break (if kinked), or deteriorate (with age) into high resistance, before the insulation fails. This causes the engine to miss on the affected cylinder. (The old metal-core wires always

failed by an electrical leak through the insulation, seen as “blue fire” at night; but one almost never finds wires like these anymore.)

To test a wire, pull the connector off the plug, and pull the other end out of the distributor cap, but otherwise, leave the wire in place. You connect the probes of a multimeter (set for thousands of ohms resistance) to the spark plug connector at one end, and the distributor cap connector at the other, and read the resistance. Then take a tape measure and measure the length of the wire, following its curved path. Once done, record your data and reconnect both ends of the wire. Then measure the next wire, until all are done. Don't forget to measure the coil wire, it sees the most high voltage!

Calculate the resistance per unit length for all wires. These values should be in the neighborhood of 3000-7000 ohms per foot, but it is more important that they are all close to the same, than any particular value. If they are the same, you are good to go. If one (or more) wires calculates very high, it is bad, and that explains why your car has been running poorly. Replace all the wires. You can buy a set to fit your car at the dealer or the auto parts store. This problem is more common than most people think. And it is something you can easily fix for yourself, and thereby make a huge difference.

HEADLIGHT ADJUSTING –

You will need the right screwdrivers to fit your car's lights, a flat driveway, and a blank garage door. In the dark, set the lights on high beam and watch the bright spots on the door as you roll the car forward and backward, straight at the door. If the bright spots move, adjust the headlight screws (two on each light) until they do not move. It's just trial and error. You can do this quite easily.

CHANGING BRAKE PADS –

This is slightly challenging for the amateur, but quite do-able for any wheel with disc brakes. Drum brakes (often found on rear wheels) are far more challenging. I'd leave those to your mechanic. They wear out far more slowly than the front disc brake pads.

In any event, go to the auto parts house and buy a shop manual to cover your car. The specific steps and instructions there are better than any generic help I can give you here, because each make and model is a little bit different in the details.

Jack up the wheel after loosening the lugs, as if changing a flat. But, set a jackstand under the car for safety! Remove the rim-and-tire wheel assembly, which exposes the brake caliper. There will be a bolt or two to remove, that will free the caliper assembly, so it can hang free, preferably on a piece of coat hanger or baling wire, and not the brake hydraulic hose.

You will need to pop loose some spring clips and shims to free the brake pads from the caliper. The inner and outer pads will be rigged different, and so might their clips and shims. Be sure to keep track of what goes where and how. Write it down!

There's usually some sort of "anti-squeal" goo that you need to put on the backs of the new pads, to seal them to their shims. You can get that at the auto parts house. Installing the new pads is the reverse of how the old ones came out, except that first, you need to depress the hydraulic piston back into its bore with a great big C-clamp. Install the new pads and shims. Be sure all the shims, retainers, and clips are in the right places. Re-bolt the caliper to the wheel hub. Put the wheel assembly back on, lower the car, and tighten the lugs. Now do the other one(s).

COOLANT CHANGE –

I'd really recommend you leave this to your mechanic. But, if you insist, here's how. You will need drain buckets, mixing buckets or containers, enough fresh antifreeze concentrate for your car's capacity, and some hand tools. You will also need a plan or place to recycle your old coolant. This stuff is poisonous, tastes sweet, and causes an agonizing death when ingested. Pets, children, and wildlife are all at very serious risk. A tablespoon is enough to kill.

Do this on a cold engine only. Remove the radiator cap as a vent. There is a drain plug or petcock low on the radiator. Use it to drain the system into your bucket. You won't get all of it, there will always be some residuals left in the engine block. There is usually a block drain plug through which more (but still not all) of the residuals may be drained, but it almost never works, so I never bother with it.

Once drained, close the petcock or drain plug. Mix up your antifreeze with clean potable water in another bucket or container. Mix exactly how many gallons your owner's manual says it holds. For most of us, the right ratio is 50-50. Snow-belt folks use 60% concentrate instead. Empty and refill the overflow bottle with new coolant – this won't take much. Just fill it up to the low "cold fill" mark.

Load coolant into the radiator until the level is about an inch or so below the filler neck, and turn the engine on. Once the thermostat opens as the engine gets warm (this takes several minutes), you will see the coolant level finally go down and stay down. Until then, you will see the level oscillate up and down several times.

Once the engine is warm and the level stays down, add more until it is close (about an inch) to the bottom of the filler neck. Keep running the engine. Repeat until all the air is vented and no more can be loaded. This will take quite a while, but the final fill level will be right at the bottom of the filler neck. Then cap the radiator and clean up. Keep whatever is left in one of the concentrate containers to top-off as needed in the future, but label it as mix (not concentrate)!!! It's almost impossible to tell the difference by eye.

WHEN TO SEEK HELP –

There are many things that can go wrong. Here are a few of the common things to watch for. I'd suggest that you take them to your mechanic.

Grinding or moaning noises during a turn that disappear on the straight. You very probably have a bad wheel bearing.

A sort of bump-bump-bump noise happens, coming from somewhere underneath, when you accelerate around a turn. In a front-drive car, this may indicate a bad CV joint. In a rear-drive car, your driveshaft U-joints might be worn out.

The car and maybe its steering wheel shake at certain speeds but not others – it is likely one or more tires are out of balance. If the shake happens at all speeds, you probably have one (or more) tires out of round or with a knot. That tire is bad.

Car smokes blue on start-up, and on hard acceleration. Your piston rings are bad.

Car smokes black on acceleration – your carburetion or fuel injection is bad, and you are running way too rich on fuel.

Car smokes white at idle in warm weather – probably unburned fuel from a missing cylinder. Less likely, a blown head gasket is letting coolant get into the cylinders.

Car runs very rough, engine shakes, lacks power (miss) – most likely bad plugs or plug wires. Very old machines with breaker-point ignitions, you most definitely need a tune-up. Rarely, a fuel injection or carburetion problem can cause this.

Car sounds like a small elf is hammering on the engine very rapidly with a tiny hammer, usually on a hot day when heavily loaded. It comes and goes. This is “ping”. Try the next grade higher octane gasoline.

Car wanders all over the road without steering inputs – your front end suspension is shot. Get it rebuilt.

Tires wear out in weird-looking non-uniform patterns – your front end suspension is shot. Same cure, get it rebuilt first, then buy new tires.