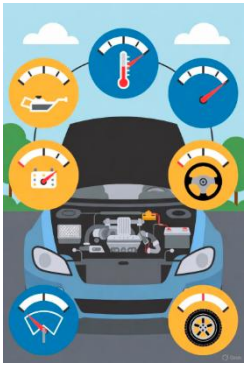
LAB – Full Fluid Check



Students: 1. _____
2. _____

There is ZERO guarantee that the previous (or current) owner took care of your car. One of the easiest things you can do is check all the fluid levels, and if in doubt (and even better), CHANGE all the fluids for new.

This lab is a bit of RESEARCH (Owner's Manual? Online?), and a bit of INVESTIGATION (you).

Fill in each box with the appropriate information. Be sure to have the Instructor's initials at each step. These are there to ensure everything is SAFE and CORRECT. Each team member must be able to answer questions from your instructor to receive credit for this lab.

LAB CREDITS				
ALL:		**1 LAB**		
VEHICLE IDENTIFICATION				
Year:		**Make:**		
Model:		**Engine:**		
Circle:	**Front-Wheel-Drive (FWD)**	**Rear-Wheel-Drive (RWD)**	**Four-Wheel-Drive (4WD)**	**All-Wheel-Drive (AWD)**
ENGINE OIL				***(ie: 20W50, SQ, Full-Synthetic, 5L)***
Specified Viscosity:		**Specified Quality:**		
Specified Capacity:		**Service Interval:**		

New oil is usually a light almost transparent TAN colour.

The older engine oil gets, the darker it gets.

Diesel turns oil black almost instantly.

Engine oil is never checked while running. It is usually checked via a dipstick on the motor. Where is the dipstick located?

Pull the dipstick out, wipe it clean with a paper towel or a rag, re-insert it and immediately remove it again. The oil should be easily visible at the bottom of the stick.

There is usually a FULL line and an ADD line. It usually takes 1L to go from ADD to FULL.

SHADE where the oil is on the dipstick:

DESCRIBE the colour of the oil:

DESCRIBE the smell of the oil (does it smell like oil? Carbon? Exhaust? Burnt? Fuel?)

STOP!!! ***INSTRUCTOR'S INITIALS:***

ENGINE COOLANT			*(eg: Ethylene Glycol, Green, 8L, 2 years)*
Specified Type:		**Specified Color:**	
Specified Capacity:		**Service Interval:**	

While there a variety of types (colours) of Engine Coolant, there is NO GUARANTEE they are interchangeable

On old cars I cannot get parts for, I have machined new hose outlets and TIG-welded them on.

Old cars did not have an overflow bottle – the radiators were filled 1" below the top, and when the coolant expanded it just puked on the ground!

Do you want a Rad Cap demo?
(Free!)

Engine coolant has an expected life. Coolant becomes acidic over time, which may cause the soft metals in your engine (like Aluminum) to begin dissolving (notably radiator hose outlets). Old coolant tends to look a "sickly" version of the original colour.

On most vehicles there are two places you want to check for coolant:

1. **The Overflow Bottle**
   There is usually a plastic container under the hood with a small hose going to the radiator, and a large cap on the top. The cap might be labeled, or it may not.

   When the engine heats up, coolant in the radiator expands into this container. When the engine cools off, the coolant is drawn back into the radiator. If the overflow is empty, you MUST make sure the radiator is full. Locate the overflow bottle:

   At what level is the coolant in the overflow bottle?

   What color is the coolant in the overflow bottle?

2. **The Radiator**
   With an "overflow system" the radiator should be completely full at all times.

   If the engine is HOT – you should put a rag over the radiator cap and SLOWLY release the pressure in the cooling system – too quickly will blast coolant everywhere and possibly burn you (I've been burned when a hose popped off, it's not fun!)

   Is the radiator right full of coolant?

   You can also test the strength of the coolant (how cold it can go before freezing, and how high it can go before boiling). Use a Coolant Tester to suck up some coolant and see what its temperature is:

   What temperature can the coolant go down to?

STOP!!!	***INSTRUCTOR'S INITIALS:***	

BRAKE FLUID			*(eg: DOT 6, 2 years)*
Specified Type:		**Service Interval:**	

Most people truly neglect maintaining their brake fluid and brake system, and yet it is probably the most one of the most important systems in your car!

Brake Fluid is HYGROSCOPIC, meaning it *absorbs* moisture.

This moisture will eventually boil under the heat of hard braking making your brake pedal feel "mushy" and reduce braking performance, AND can rust the wheel cylinders and calipers solid reducing (or eliminating) braking performance.

Brake Fluid is a PAINT STRIPPER, wash it off whatever it drips on immediately.

Brake Fluid is VERY BITTER in taste (it makes it easy to tell "what that leak is").

NEW Brake Fluid is VERY CLEAR. It becomes very dark and dirty as it ages.

Find the Brake Master Cylinder (it usually sits in front of the brake pedal, in the engine compartment). Modern cars have a plastic *translucent* reserviour and an aluminum body beneath it. Lids are usually a "Snap into place" or a "Screw top."

Do you dare taste it?

Is the Brake Fluid level between the Add and Full lines?

How clear is the Brake Fluid in colour?

POWER STEERING FLUID			
Specified Type:		**Specified Capacity:**	
		Service Interval:	

Way back, GM required "Power Steering Fluid" in their Power Steering (P/S) systems. People would cheap out and just use Automatic Transmission Fluid (ATF) – which destroyed the seals in the steering system!

Interesting Note: Many Diesel-powered vehicles use the Power Steering Pump to add a Hydraulic Boost to your brake pedal as well (GM calls this system "Hydroboost").

Most cars today have power steering. Newer cars are using ELECTRIC assist, but most still use Hydraulic Pressure from a pump to add extra force to move the steering gear.

There will be a fluid reserviour ON the actual pump or remotely mounted. There is usually a labeled "twist-off" cap with either text, or a picture of a steering wheel on it.

The system should be fully warm, but the engine should be OFF when checking. If the reserviour is translucent, you can immediately see the level. If the reserviour is opaque, you will need to remove the cap.

Is the Power Steering Fluid level between the Add and Full lines?

STOP!!!	***INSTRUCTOR'S INITIALS:***	

WASHER FLUID			
Where is it located:		**Can you see anything:**	

AUTOMATIC TRANSMISSION FLUID (IF EQUIPPED)			(ie: Dexron III, full-synthetic, 10L)
Specified Type:		**Specified Capacity:**	
		Service Interval:	

New ATF is usually a light almost transparent RED colour.

The older ATF gets, the darker it gets.

If the transmission is old and the clutches are starting to slip, you will KNOW just by the smell – and you don't even need to be a mechanic to say "that's burnt!"

Automatic Transmission Fluid (ATF) is usually checked by a dipstick on the Transmission. The engine is usually running, but your transmission might need to be in PARK or it might need to be in NEUTRAL to properly check.

HOW does YOUR transmission need ATF to be checked?

With the engine running and the transmission set as required, check the fluid level. It is usually 1/2L from ADD to FULL on a transmission.

SHADE where the oil is on the dipstick:

DESCRIBE the smell of the oil (does it smell like oil? Burnt?)

MANUAL TRANSMISSION FLUID (IF EQUIPPED)			*(ie: 75W85 GL-4, full-synthetic, 2L)*
Specified Type:		**Specified Capacity:**	
		Service Interval:	

Manual transmissions are usually designed for either:

- **Motor Oil**
- **ATF**
- **Gear Oil (GL-4)**

They are NOT interchangeable

(When I was 16, I ruined a transmission because I had never checked the fluid level)

First, KUDOS on being able to drive stick. Most manual transmissions are checked through a plug threaded into the side of the case. You remove the plug and if oil drips out you're good. If no oil drips out, but you can touch oil with your finger in the hole, you're good.

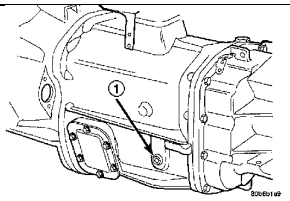


Fig. 5 NV5600 Fill Plug

1 – FILL PLUG

NOTE: There are often MANY threaded things on the side of the transmission – KNOW which one to undo!

Remove the plug, see/feel for results

Where is the transmission fill plug on your transmission?

OMG replace the plug!

Can you see or feel oil in the transmission?

STOP!!!	***INSTRUCTOR'S INITIALS:***	

DIFFERENTIAL FLUID (IF EQUIPPED)			*(ie: 75W85, GL-5, w/Friction Additive, 3.0L)*
Specified Type:		**Specified Capacity:**	
		Service Interval:	

FWD can SKIP this

If your car is Front-Wheel-Drive (and some AWD), the differential is usually INSIDE the transmission, and you ALREADY checked it with the Transmission Fluid.

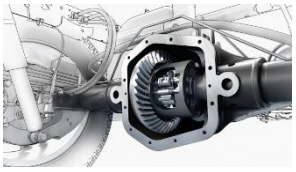
Gear Oil absolutely REEKS. I *HATE* the smell.

If it soaks into your clothes, they are ruined.

Limited Slip Differentials (LSD) REQUIRE a "Friction Additive" to keep the LSD alive!
Make sure you use it if you need it!

(An "open" differential will not be hurt by running friction additive)

The Differential is a device that directs the power from your engine and transmission to drive both wheels. ALL vehicles have a differential



All RWD, AWD, and 4WD, have a REAR Differential and a FRONT Differential. Some AWD have the FRONT Differential inside the Transmission.

Most differentials are checked through a plug threaded into the side of the case or the back cover. You remove the plug and if oil drips out you're good. If no oil drips out, but you can touch oil with your finger inside the hole, you're good.

Where is the fill plug on your differential?

Remove the plug, see/feel for results

Can you see or feel oil in the differential?

OMG replace the plug!

TRANSFER CASE FLUID (IF EQUIPPED)			*(ie: 75W85, GL-5, 3.0L)*
Specified Type:		**Specified Capacity:**	
		Service Interval:	

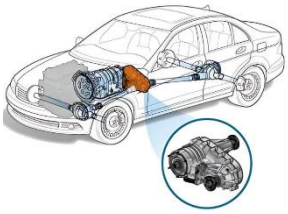
FWD and RWD can skip this

Transfer Cases are usually designed for either:

- **ATF**
- **Transfer Case Fluid**
- **Gear Oil (GL-5?)**

They are NOT interchangeable

The Transfer Case splits the power between the FRONT wheels and the REAR wheels. They are *selectable* in a 4WD vehicle but are usually always active in an AWD vehicle.



Most Transfer Cases are checked through a plug threaded into the side of the case or the back cover. You remove the plug and if oil drips out you're good. If no oil drips out, but you can touch oil with your finger inside the hole, you're good.

Where is the Transfer Case fill plug on your differential?

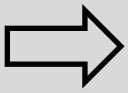
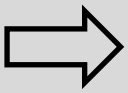
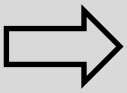
Remove the plug, see/feel for results

Can you see or feel oil in the Transfer Case?

OMG replace the plug!

STOP!!!	***INSTRUCTOR'S INITIALS:***	

REFLECTION

	**Sometimes an inspection like this tells you a bit of a story of how well the vehicle was maintained.** **What knowledge did you gain about the level or quality of maintenance on this vehicle?**
 	**What are TWO THINGS you learned in this LAB?** 1. 2.
STOP!	***INSTRUCTOR'S INITALS:***

