MODULE

05

TRANSPORTATION MAINTENANCE

Life Skills & Employment Success

Module 5 - Transportation Maintenance

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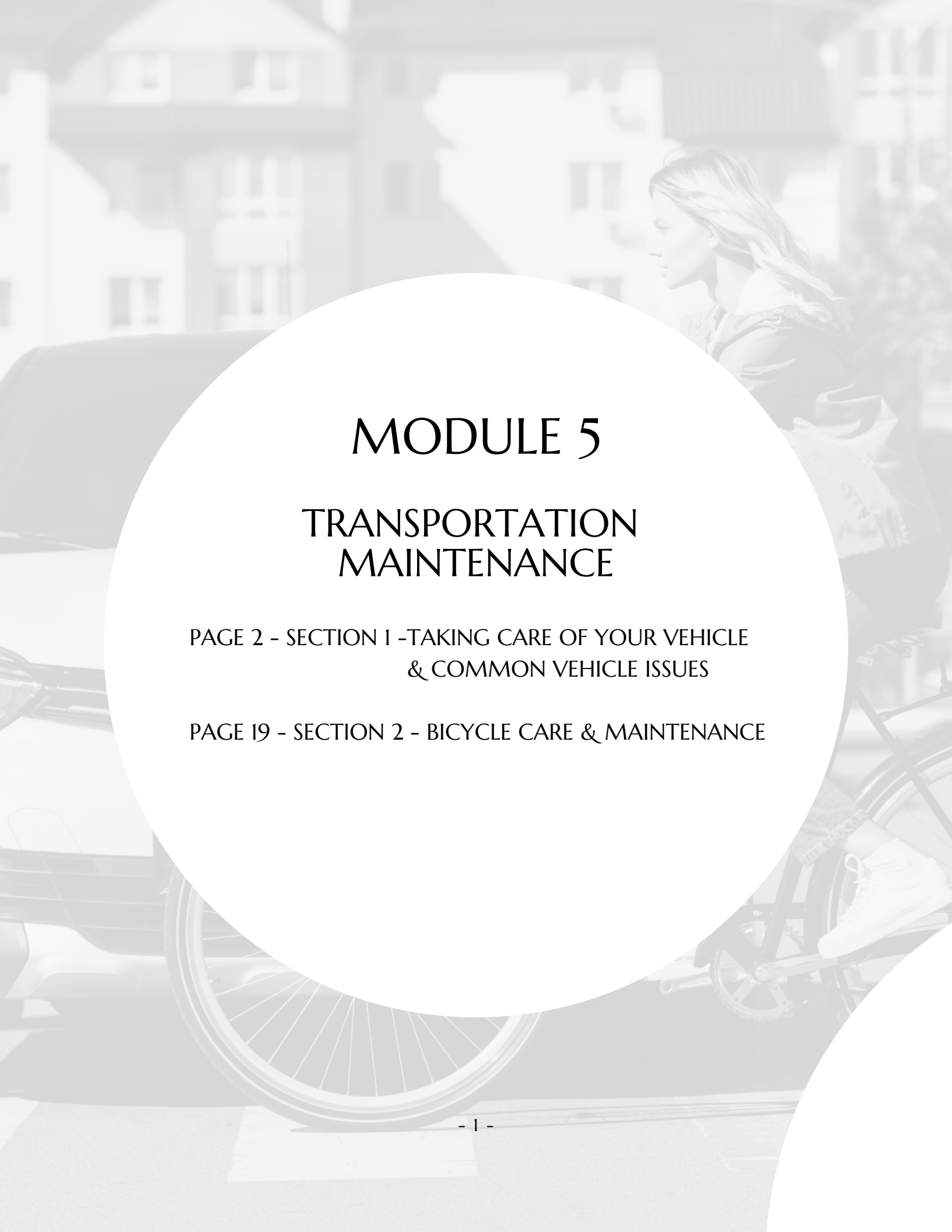


MODULE 5

TRANSPORTATION MAINTENANCE

Module 5
Section 1

TAKING CARE OF YOUR VEHICLE

Keep your vehicle in good shape so you can drive it for many years.

IN THIS SECTION YOU WILL:

Learn about the different fluids your vehicle needs.

Discover how to identify tire problems and the importance of proper tire care.

Recognize how easy it is to change wiper blades.

Find ways to fix common car problems such as overheating and flat tires.

TAKING CARE OF YOUR VEHICLE

Fluid Maintenance

Vehicles are more complicated that most people realize. Cars with an engine need many fluids to work well. You probably know about some fluids like engine oil, gasoline, coolant, windshield washer fluid, and transmission fluid. But there are other fluids like differential fluid, brake fluid, power steering fluid, and air conditioning refrigerant. All of these fluids need to be checked regularly and changed on a schedule.

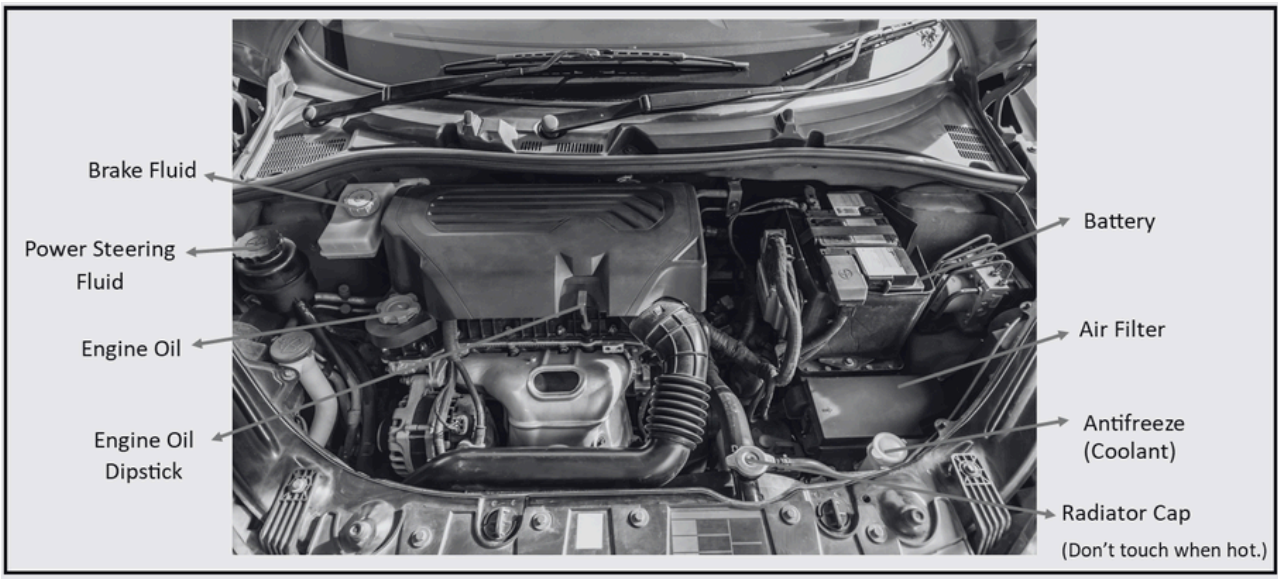
Depending on your car, you might need special tools to get to these fluids if you want to change them. But if you just want to check them, most are easy to reach.

Every car is different, so you should follow your owner's manual to find where these fluids are in your car and what kind of fluids your car needs. Keep reading and you will find out more about these fluids and why they are important for your car.

Checking Fluids

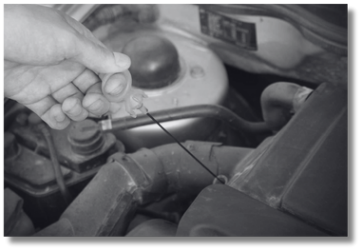
We all know we won't get very far without gasoline - the most obvious fluid. It is just one of the many fluids your car needs. Some fluids, like engine oil, transmission oil, and coolant, are easy to see, but there are a few others you may not know about. Here's a list of the eight fluids you should pay attention to:

- Engine oil
- Transmission fluid
- Brake fluid
- Power steering fluid
- Coolant (Antifreeze)
- Air conditioning refrigerant
- Differential oil/transfer case fluid (4WD)
- Clutch fluid (For manual transmissions)



Engine oil

Checking engine oil is easy. Most newer cars have a dipstick with an orange or yellow top that you can pull out. When you take out the dipstick, look at the color of the oil. Dark, black oil means it needs to be changed. Oil that looks lighter and a caramel-color is newer and doesn't need changing. It's best to wipe the dipstick with a clean white rag to be sure of the color, then put it back in and check. Also look at the level at the bottom of the dipstick to make sure the engine has enough oil.



Additionally, it's best to check the oil in your car's engine after it has warmed up completely. But remember to turn off the engine before doing the test. The frequency of changing the engine oildepends on the type of oil you use. If you use conventional oil, you should change it every 3,000 miles. If you use full synthetic oil, you can wait until 10,000 miles before changing it. Change the filter when you change the oil, also.

Transmission fluid

The transmission fluid in your car is also important to check. Just like the engine oil, you can find the dipstick for the transmission fluid under the hood. It is usually located towards the back of the engine bay and may have a different color or a symbol on it. However, some newer cars have a sealed transmission that doesn't need new fluid.

To check the transmission fluid, you need to warm up the car and let it idle. Then, pull out the dipstick and check the level at the bottom. Make sure there is enough fluid and use a white rag or towel to check the color. Healthy transmission fluid should be red or pink, while fluid that needs to be changed will look brown or black. It's important to consult your car's owner's manual for the recommended interval to change the transmission oil.

Brake fluid

The brake fluid in your car is stored in a reservoir under the hood. You can usually find it near the firewall and it has a black lid with a circular image. Checking the brake fluid is easy. Just look into the reservoir and see what color it is. Make sure it is close to the

"full" line. New brake fluid is almost see-through with a golden tint.

If your brake fluid is dark brown or black, it needs to be flushed. Low brake fluid could indicate a leak or the need for brake replacement. Also, make sure to use the specific type of brake fluid recommended by your car's manufacturer, as stated in the owner's manual.

The frequency of changing brake fluid depends on your driving habits. If you

drive a high-performance vehicle and brake forcefully often, you should flush the brake fluid multiple times a year. For most other drivers, changing the brake fluid every two years is sufficient. Fortunately, you can purchase test strips to check the quality of the brake fluid.

Power steering fluid

The power steering fluid is a liquid that helps the steering wheel turn smoothly. You can find the reservoir for the power steering fluid under the hood of your car. It is usually darker than the brake fluid reservoir and has a black cap with the words "Power Steering" on it. Some reservoirs are clear, so you need to look at the color and how full it is to check them.

For the dark reservoirs, there is a little stick attached to the cap. You can use this stick to check how much fluid is in the reservoir. To check the quality and age of the fluid, you need a white cloth to clean the stick. The power steering fluid is usually red or pink, so if it looks brown or black, it needs to be changed.

Different car companies use different types of power steering fluid, but a good rule is to change it every 30,000 miles. However, if your car has an electric steering system, you don't need to worry about changing the power steering fluid.

Coolant (Antifreeze)

Coolant is a liquid that helps keep the engine of your car cool. It is important to check the coolant, even though you can't see it easily. To check the coolant, you need a special tool called an antifreeze coolant tester. It looks like a funny turkey baster. You also need to be careful and only open the radiator cap when the car is cool. You can use the tester to take some coolant from the radiator and check the reading. You can also look at the bottom of the radiator cap and inside the radiator for any signs of dirt or sludge. Some cars have a separate reservoir for coolant that you can check instead of the radiator.

Different car companies use different types of coolant, so it can be hard to know which one is right for your car. You should follow the instructions in your car's manual to find the correct type of coolant. Most coolant needs to be changed every three years or 36,000 miles.

Air conditioning refrigerant

Checking the air conditioning refrigerants a bit tricky because it requires special tools. However, you can buy a recharge kit that comes with an easy-to-use gauge. This kit allows you to attach a special tool to your car's air conditioning system and read the gauge while the air conditioning is running. It's pretty simple, but there are a few more things you need to do.

A good rule to remember is to have your AC system checked every year. If you skip a check, you might not have air conditioning in the summer. If you notice that your car's AC system needs to be recharged often, you can use a special

refrigerant with UV dye to check for leaks. The dye will glow a certain color under UV light. If you don't have the tools or knowledge, it's best to let a mechanic or AC specialist take a look.

Differential oil/transfer case fluid (4WD)
Checking differential oil and transfer case fluid can be difficult. These fluids are usually hidden behind bolts that need to be removed to check the quality and level of the fluid. We don't recommend removing these bolts unless you know what you're doing, have extra fluid, and have a pump to put new fluid in. Instead, it's best to follow the automaker's schedule and regularly check for leaks. Conventional gear oil should be replaced every 30,000 miles, while synthetic oil should be replaced every 60,000 miles.

Clutch fluid (For manual transmissions)
In today's auto world, manual transmissions are not as common as they used to be. However, some vehicles still use manual transmissions and require special fluids like clutch fluid. Clutch fluid is important because it helps lubricate the components of the transmission and allows the clutch assembly to engage and disengage properly. If there isn't enough clutch fluid, the vehicle won't be able to perform these operations and it can cause damage to other parts of the car.

To prevent this from happening, you can replace the clutch fluid yourself or have a qualified mechanic do it. On average, clutch fluid should be replaced every two to three months or during routine maintenance. If you suspect a leak, it's important to replace the clutch fluid more often to ensure your car continues to drive well and safely.

What Does it Cost to Change All the Fluids in a Car?

When you change all the fluids in your car, the most expensive part is the fluids themselves. Some cars need expensive fluids with extra things added to them, which can make the cost go up. Using synthetic fluids can also make it more expensive, but they last longer. If you do it yourself with a manual and help from YouTube, it can be easy. If you go to a shop, it could cost you anywhere from $500 to $1,000 to change all the fluids in your car.

Changing all the fluids in your car might seem hard but checking them is usually easy. You should check all these fluids every year, especially before going on a trip. When the fluids get old, your car won't run as well, and it might make the parts of your car start to fail.

Checking your fluids regularly might seem like extra work, but it's cheaper than replacing the parts they protect. So, take some time to check and change the fluids in your car often, and it will last longer without as many problems.

Taking Care of Your Tires

The tires on a car are very important because they keep the car on the road. It's easy to forget about them, but it's important to take care of them.

Luckily, taking care of your tires is something you can do yourself and it can help you avoid having to get them repaired. If you have a Tire Pressure Monitoring System (TPMS) it will show a yellow warning light if there is a problem with a tire. When the TPMS light comes on, it means that one or more of your tires may have the wrong amount of air in them. Some TPMS lights only come on when the pressure is too low, while others come on for both low and high pressure. Either way, the light is there to let you know that you need to check your tires. It's not safe to drive with tires that don't have enough air or have too much air. If your tires have too much air, it can make it harder for your car to grip the road, make the ride uncomfortable, and increase the risk of a blowout.

On the other hand, if your tires don't have enough air, it can make your car use more fuel, make the tires get really hot, and make it harder for your car to respond when you steer. Sometimes, the TPMS light comes on because there's a problem with one of the sensors. If that's the case, you'll need to get it fixed.

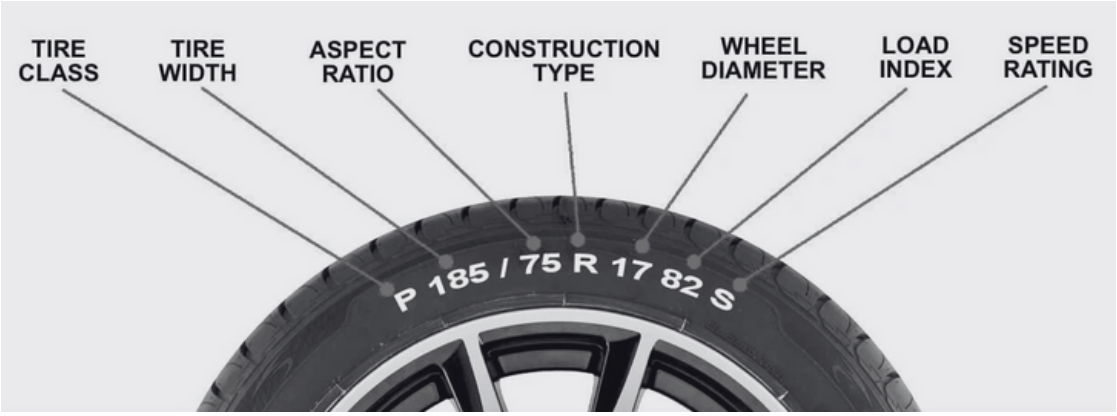
Here are some tips for taking care of your tires:

To **check the air pressure** in your tires, you'll need a tire pressure gauge. It's a good idea to have a regular tire pressure gauge in your car in case of an emergency. If you are not sure what the tire pressure should be for your car, look inside the driver's door near the door lock and find the label. If the label is missing, check the service manual that often is stored in the glovebox. If that is missing also, the next step is to locate your car's VIN number and use a locator to find the information you need.

Having tires inflated to the correct level is vital to the car's performance, safety, and gas mileage. The pressure to which tires should be inflated differs depending on the make and model.

You also should understand **the numbers on the side of your tire**. Most tires have a combination of letters and numbers that tell you things like the size of the tire, what kind of vehicle it's for, and how fast it can go. Even if your car can go really fast, your tires might not be able to handle it. They might have a lower speed rating. Putting on the wrong size tires can lead to dangers and impact your car's overall function.

Here is what those numbers mean:



Tire Class: (P) The first letter or letters on some tires tell us what type of tire it is. The types include Passenger (P), Light Truck (LT), Special Trailer (ST), Commercial (C), and Temporary (T), which is only used for spare tires and not for regular use. Not all tires have a class code displayed.
Tire Width: (185) The first number in the code tells us the width of the tire, measured in millimeters. It's a good idea to replace your tires with new ones that have the same width as the original tires. This is because your car's manufacturer designed the rest of the vehicle to work best with tires of that width. If you want to use tires with a different width, it can be expensive because you'll need to make additional adjustments to your car.
Aspect Ratio: (75) : The next part of the code tells us the ratio of the tire's height to its width. In this example, the height is 50% of the tire's width. If you use tires with different height ratios, it can change how your car's suspension works. This is usually not necessary for everyday driving, but people who go off-road might find it useful because it gives them more ground clearance. However, making these adjustments can be costly.
Construction Type: (R) After the ratio, there is a code that tells us how the tire is made. Most tires today are made with radial construction. This means that the rubber cords are laid out in a radial pattern, 90 degrees from the direction the tire moves. Sometimes, bias-ply tires are used on trailers. These tires have cords that crisscross over each other.

Wheel Diameter: (17) This part of the code tells us the diameter of the wheel that the tire fits on, measured in inches. You can't use tires with a different diameter unless you also buy new wheels.
Load Index: (82) The next number in the tire code shows the load index. This is a measure that engineers use to show the maximum weight the tire can support when it's fully inflated. Passenger car tires usually have load indexes that range from 70 to 126. For example, tires with a load index of 70 can hold up to 739 pounds. A load index of 102 means the tire can hold 1,874 pounds. Tires with an index of 126 can carry 3,748 pounds. To find the maximum weight that all four tires can carry, you multiply the load index by four.
Speed Rating: (S) The next letter in the code tells you how fast the tire can go. It's called the speed rating. The speed rating for this tire is V, which means it can go up to 149 mph. But it's really important to remember that the speed rating is only tested on a tire that's in good condition. If the tire has a hole in it (even if it's been fixed by a professional), if it's been damaged from hitting a curb, or if it's not filled with enough air, it might not be safe to drive at its top speed.

Common Speed Ratings
Here we will explain how to understand the speed ratings on tires. These ratings use a letter code to represent the maximum speed that the tire can handle.

- L: 75 mph
- M: 81 mph
- N: 87 mph
- P: 93 mph
- Q: 99 mph
- R: 106 mph
- S: 112 mph
- T: 118 mph
- U: 124 mph
- H: 130 mph
- V: 149 mph

Tire Tread

Your tire's tread depth shows how much rubber is touching the road. When tires are new, they have a tread depth of about 10/32 to 11/32 inches. But as you drive, the tread on your tires wears down. Some states require safety inspections, and they have a minimum legal limit for tread depth. In most states, that limit is 2/32 of an inch. You can check this by using a tire tread depth gauge or you can use a penny:

1. Place a penny between the tread ribs on your tire.
2. Turn the penny so that Lincoln's head points down into the tread.
3. See if the top of his head disappears between the ribs.
4. If it does, your tread is still above 2/32".

If you can see his entire head, it may be time to replace the tire because your tread is no longer deep enough. If your tread is below that amount, it's dangerous to keep driving.

Checking the condition of your tires is pretty simple. All you have to do is look at them and see if there are any scratches, cuts, bulges, or cracks on the sides. Some of these things mean that your tires are old and need to be replaced, while others mean that they're damaged and need to be replaced. Either way, you'll want to get new tires.

Depending on where you buy your new tires, you might be able to get a free tire rotation. If not, you'll need to follow the instructions in your car's manual or the tire manufacturer's recommendations. Usually, you should rotate your tires every 5,000 to 10,000 miles.

The sun is not good for car tires. It can make them age faster. The sun's UV rays can break down the rubber in tires, which makes them weak and likely to crack. This can cause leaks, blowouts, and even the tread to come apart. The heat from the sun also makes the rubber break down faster. When your car is parked in direct sunlight, the tires can get much hotter than the air around them. This makes the rubber wear out even more quickly. So, it's best to park in the shade whenever you can.

Taking care of your car's tires is important because it helps them last longer, saves you money on gas, and keeps you safe while driving.

Replacing Windshield Wipers

Changing windshield wipers is important because if they get old or worn out, they can make it hard to see while driving. The first step is to figure out what kind of wiper you have. There are three types: hooked, straight, or side-mounted. Most cars use one of these types, so you can find replacement blades at an auto parts store.

To protect your windshield, put something soft between the wiper and the glass. Then, lift the wiper arms up and remove the old blades. Different cars have different attachments, but it's not hard to figure out. If your car has a "J-Hook" style attachment, just push the blade down and it will come off. If it's a different style, check the manual or ask someone for help.

After taking off the old blades, compare them to the new ones to make sure they're the same size and style. Make sure you use the same attachment type as the blades you took off if more attachment brackets come in the package. Clip the new blades into place, the opposite way you took off the old ones. Finally, remove anything covering your windshield, turn on your car, and test the new blades on the lowest speed setting. If they move smoothly and stay on the windshield, you're done!

Common Vehicle Issues

Dead Battery

A dead battery is a common problem for cars. It can happen unexpectedly and leave you unable to start your car. But don't worry, there are two main ways to fix this problem: jumpstarting the car or getting a new battery.

To jumpstart a car, you just need a few things. First, you'll need jumper cables and another car with a working battery. Then, follow these steps:

1. Park the two cars close together, but not touching.
2. Turn off both cars and make sure the parking brakes are on.
3. Connect the red jumper cable to the positive (+) terminal on the dead battery.
4. Connect the other end of the red jumper cable to the positive (+) terminal on the good battery.
5. Connect the black jumper cable to the negative (-) terminal on the good battery.
6. Connect the other end of the black jumper cable to a metal part of the engine block on the dead car.
7. Start the engine of the good car and let it run for a few minutes.
8. Try to start the dead car. If it doesn't start, wait a few more minutes and try again.
9. Once the dead car starts, leave the engine running for at least 30 minutes to charge the battery.
Remember, it's important to be careful and follow these steps correctly.

If your car doesn't start even after jumpstarting it or if you have to jumpstart it often, it might be time to get a new battery. Here's what you need to do to **replace your car battery**:

1. Buy a new battery that matches your car's make and model.
2. Turn off the engine and make sure the car is in park (or in gear if it's manual).
3. Open the car's hood and find the battery.
4. First, remove the negative cable from the battery terminal. It's usually marked with a minus (-) sign.
5. Next, remove the positive cable from the battery terminal. It's usually marked with a plus (+) sign.
6. Take out any screws, bolts, or brackets that are holding the battery in place.
7. Carefully lift the battery out of the car and dispose of it properly.
8. Put the new battery in the same position as the old one and secure it.
9. Attach the positive cable to the positive battery terminal.
10. Attach the negative cable to the negative battery terminal.
11. Start the engine to test the new battery.

By following these easy steps, you can jumpstart your car or replace a dead battery and get back on the road quickly. Remember to always be safe when working with car batteries and ask for professional help if you're unsure or uncomfortable with the process.

Flat Tire

A flat tire is a common problem for drivers. It can happen if the tire gets punctured, has a slow leak, or if you hit a pothole. No matter the reason, it's important to know how to change a tire.

To change a tire, you'll need a few basic tools:

- Spare tire
- Lug wrench
- Jack
- Wheel chocks (or bricks, or large rocks)

1. Find a safe place to change your tire. Pull over to the side of the road or a parking lot away from cars.
2. Put on the parking brake, turn off the car, and put it in park (if it's automatic) or gear (if it's manual).
3. Use the lug wrench to loosen the lug nuts on the flat tire. Don't take them off yet.
4. Put the jack under the car where it should go, according to the car's manual.
5. Raise the jack until the flat tire is about six inches off the ground.
6. Take off the lug nuts and the flat tire.
7. Put the spare tire on the car, making sure the holes line up with the studs.
8. Put the lug nuts back on and tighten them by hand.
9. Lower the car back down to the ground with the jack.
10. Use the lug wrench to tighten the lug nuts in a star pattern (tighten one, then the one across from it, and so on).
11. Check the air pressure in the spare tire and adjust it if needed.

It's important for every driver to know how to change a tire. A flat tire can happen anytime, and if you don't know how to change it, you might have to wait for help. Learning how to change a tire can also save you money because you won't have to pay for a tow truck or roadside assistance. Take the time to learn and keep the necessary tools in your car.

Car Overheating
Sometimes cars can overheat, and it's a common problem. Overheating happens when the engine gets too hot, which can cause serious damage to the engine and other parts.

The most common reasons for overheating are a broken cooling system or low levels of coolant. Other causes include a broken thermostat, a damaged radiator, a faulty water pump, a damaged head gasket, and a blocked coolant hose. It's important to find out why the car is overheating before trying to fix it because different problems need different solutions.

Taking care of your car can help prevent it from getting too hot. You should regularly check the coolant level and replace it when the manufacturer says to. It's also important to look at the cooling system and its parts, like the radiator, water pump, and hoses, to make sure they're not damaged or leaking.

If your car starts to get too hot, there are a few things you can do to stop it from getting worse. First, find a safe place to pull over and turn off the engine. It's not a good idea to keep driving when your car is overheating because it could seriously hurt the engine. If your car isn't too hot yet, you can check the coolant level and add more if you need to. But remember to let the engine cool down before adding more coolant. If your car keeps getting too hot, it's best to call a professional to figure out what's wrong and fix it.

Tools Needed for Vehicle Care

You'll need a set of basic tools to take care of your car. Here are some of the tools you should have:

- **Socket Set**: You need a set of sockets in different sizes to remove bolts and nuts of different sizes.
- **Wrenches**: You need a set of open-end and box-end wrenches in different sizes to tighten and loosen nuts and bolts.
- **Screwdrivers**: You need a set of screwdrivers in different sizes and types (Phillips, flathead) to remove and install screws.
- **Pliers**: You need a set of pliers including regular pliers, needle-nose pliers, and locking pliers to grip and turn small parts.
- **Spare Jack and Jack Stands**: You need a hydraulic jack and jack stands to lift the car and work on the wheels or undercarriage.
- **Oil Filter Wrench:** A tool used to remove and install oil filters.
- **Funnel:** Used to pour fluids into the car without spilling.

Tools Needed for Emergencies

Car emergencies can happen anytime, so it's important to be prepared with the right tools. Here are some essential emergency tools that every car owner should have:

- **Spare Tire, Jack, and Lug Wrench**: These tools are important in case of a flat tire. Make sure to know how to change a tire and check that your spare tire is properly inflated and in good condition.
- **Jumper Cables**: Jumper cables can help start your car if the battery dies. It's important to know how to use them correctly to avoid damaging your car or getting hurt.
- **Flashlight and Extra Batteries**: A flashlight can be very useful if your car breaks down at night. Remember to keep extra batteries on hand too.
- **Reflective Triangles or Flares**: These tools can alert other drivers to your presence and help prevent accidents if your car breaks down on the side of the road.
- **First Aid Kit**: Accidents can happen, so it's good to have a first aid kit to address minor injuries until help arrives.

Conclusion

Regular maintenance is important for your car's long life, and checking fluid levels is a simple but essential part of that maintenance. By regularly checking and maintaining fluid levels like oil, coolant, and transmission fluid, you can avoid expensive repairs and breakdowns in the future.

Another easy car care tip is to regularly check your tire pressure. Proper tire pressure not only gives you a smoother ride but also improves fuel efficiency and reduces tire wear and tear. With the right tools like a tire pressure gauge, you can easily check and fill your tire pressure yourself.
It's important to have the right tools for emergencies, in addition to regular maintenance. Essential emergency tools like a spare tire, jack, and jumper cables can make a big difference when something goes wrong.

Doing regular maintenance tasks like car washes, engine cleaning, waxing, and rust prevention can also help keep your car looking and running well. If you learn how to do these tasks yourself, you can save money and make sure your car stays in great shape.

It's also important to know how to fix common car problems like a dead battery, flat tire, and overheating. If you know how to jumpstart a car, change a tire, and prevent overheating, you can avoid getting stuck and having to pay for expensive repairs.

To sum it up, these car maintenance tips for beginners can save you time, money, and stress in the long run. By regularly taking care of your car, having the right tools, and knowing how to fix common problems, you can make sure your car runs smoothly and lasts for a long time. Remember to stay safe and keep learning about car maintenance to improve your skills and knowledge.

NOTES

DISCUSSION QUESTIONS

1

How do you think checking and changing fluids regularly can help your car run smoothly?

2

Why is it important to use the right kind of fluid recommended by the car's maker?

3

What are some things you should carry in your vehicle for emergency situations?

4

What are some signs that indicate a car's fluids need to be checked or changed?

5

How can regularly checking and changing fluids contribute to the overall lifespan of a car?

6

Why is it important to let your car cool down before checking the coolant or touching the radiator cap?

RESOURCES

- Nick Dinger is a steward of BIC Repair. BIC repair is a recovery garage located in Aitkin at 42299 State Highway 210. They we repair cars for the public and we also help people in recovery, multiple churches, Bridges of Hope, Aitkin County social services, Minnesota Homeless and Wounded Warriors, and other entities. They aim to be a good service to the community and keep their prices low.

Module 5
Section 2

BICYCLE MAINTENANCE

Care for your bicycle to keep your ride running safely.

IN THIS SECTION YOU WILL:

Identify the basic parts of a bicycle.

Discover the importance of caring for your bike.

Learn how to clean and lubricate your bike.

Find out the steps to fixing a flat tire.

BICYCLE MAINTENANCE

There are many things in life we take for granted because we don't take the time to learn their details. Taking care of your bicycle can be one of those things. Getting to know your bike and all of its different parts will help you feel more connected and appreciative while you ride. It will also make it easier to do maintenance when you read repair guides or when you need to talk with someone at a repair shop.

Bicycle Parts: An Overview

Here's a quick breakdown of basic bicycle parts:

Bike Frame
The frame is like the bike's backbone. Most modern bikes are made of aluminum alloy, but high-end bikes are often made of carbon fiber or titanium.

Fork
The fork connects the front wheel to the frame. The handlebars connect to the fork with the stem, and that's how you steer the bike.

Headset
The headset is in the frame's headtube. It connects the fork and frame so the fork can turn and steer.

Stem
The stem connects the handlebars to the bike's frame. The length and angle of the stem affect how the bike steers. A shorter stem makes steering more active, while a longer stem makes small movements in the handlebars less noticeable.

Handlebars
Handlebars are used to steer the bike, like a steering wheel in a car.

Gear/Brake Levers
Brake levers work with the brake pads. Hydraulic brakes use fluid to engage the brake pads, while mechanical brakes use a cable.

Crankset
The crankset is an important part of the bike's drivetrain. It is powered by your legs and connected to the rear derailleur with the chain. The front and rear derailleur guide the chain to the right gears based on what the cyclist wants and the type of terrain they're riding on.

Bottom Bracket
The bottom bracket connects the crankset to the bike's frame. It keeps everything stable and moving. It is an important part of the bike's drivetrain.

Chain
When you pedal, the chain moves and makes the bike go forward. This part needs regular upkeep and maintenance.

Cassette
The cassette is a group of gears on the rear wheel. They are part of the drivetrain and make the rear wheel move.

Derailleur
The derailleur changes gears on the bike. It moves the chain from one set of gears to another.

Caring For Your Bike

It's important to have a regular schedule for taking care of your bike. Depending on how often you ride and the conditions you ride in, you may need to clean your bike more often. If you ride in wet or muddy conditions, or if you ride fast and often, you should plan to clean your bike more frequently.

Keeping your bike parts clean and lubricated is really important for making sure your bike works well. Lubrication helps protect the moving parts from getting worn out from rubbing against each other, and it also helps prevent rust and corrosion.

First, let's start with some basic things you'll need to clean and take care of your bike:

- **Clean rags**: You'll need these to clean up grease, oil, and wax, as well as for general cleaning and drying.
- **Brushes**: It's helpful to have different sizes and shapes of brushes to clean hard-to-reach places where rinsing alone won't work. Old toothbrushes are great for this!
- **Water**: Water can be useful for cleaning your bike, but you have to be careful. Using water, especially from a high-pressure hose, can actually damage the sensitive parts of your bike.
- **Soap or cleaner**: You can use diluted dishwashing soap, or a special cleaner made for bikes to clean the frame of your bike.
- **Degreaser**: A degreaser made specifically for bikes (not kerosene or turpentine) will help clean up sticky parts like your bike chain. Make sure to choose a degreaser that is safe for the environment and for you. And remember to dispose of any solvents properly.
- **Chain lubricant**: Putting the right kind of lubricant on your bike chain will help it last longer. Always apply a lubricant made specifically for bikes to a clean chain. There are **two types of lubricant: wet and dry**. Wet lubricant is best for riding in wet conditions because it sticks to the chain and doesn't wash off easily in the rain. However, it can also attract dirt and grit, so make sure to wipe off any extra lubricant. Dry lubricant is better for riding in dry conditions because it doesn't attract as much dirt and grit. But if you find yourself riding in the rain, dry lubricant can wash off easily.
- **Bike repair stand**: This is a tool that helps you work on your bike. It holds the bike up at a good height for you. With the stand, you can easily turn the pedals and take off the wheels. This makes it easier to clean all the parts that move and are difficult to reach.

Bicycle maintenance is important for bike owners. It's not just about doing basic repairs sometimes. Whether you ride your bike to work, train for a race, or go on trails, regular maintenance keeps your bike in good shape.

Clean your bike regularly.
Taking care of your bike is very important, especially the chain. The chain can get worn out easily, so it's a good idea to clean and lubricate or oil it often. If the chain isn't too dirty, you can use a rag and a degreaser to clean it. But if it's really dirty, you might need a special chain cleaning tool. Have several sizes and shapes of brushes handy to get into hard-to-reach places to remove the grime that rinsing alone can't get. Old toothbrushes work great.

After cleaning the chain, let the degreaser dry. It's important to put some oil on the chain - just a little bit on each link. Let the oil dry, and then wipe off any extra so it doesn't attract more dirt.

Don't forget to clean the front and back parts of your bike where the chain goes (the front chain rings and rear cassette). You can use a brush and cleaner to scrub them while you turn the pedals. If there's still dirt, you can use a rag to wipe it away.

Check the tire pressure.
Just like in a car, proper tire pressure is important for bike repairs and maintenance. Check the pressure regularly and don't overfill the tires. You can use a floor pump with a tire pressure gauge for accuracy. The tire's recommended pressure range is printed on the side.

Inspect the brake pads. Brake pads wear out quickly and need regular checks. This is especially true for mountain bikes because of sudden braking and tough terrain. If the grooves on the brake pads are hardly visible, they are worn out. If squeezing the brake lever makes it go more than halfway to the handlebars, tighten the brakes. You can adjust the barrel adjuster or use an Allen key to tighten the brake wire. If your brakes make a loud noise, it might be time to change them. But sometimes they make noise just because they're dirty, so make sure to look for other signs of damage before buying new brake pads. If your brakes don't work as well after you've tightened and cleaned them, it's time for a change. Luckily, changing brake pads on a bike is usually quick, easy, and not expensive.

Remember to take care of your bike to keep it in good condition!

Lubricate your bike.
Friction is the main reason bikes get worn out, so it's important to take care of your bike. Remember what we said about the chain earlier? The chain is often the main problem, but there are other parts too. Get some special oil for your bike and use it gently on any metal parts that touch each other. But remember, you have to clean your bike before putting on the oil (including the chain).

In general, lubricate your chain whenever it squeaks or appears "dry." Lubing after wet rides will help keep your chain from rusting.

Be careful! Putting too much lubrication on your bike can actually make it work worse and can even damage the parts. Before you ride your bike, you should always wipe off any extra lubrication.

Here's a tip: When you're putting lubrication on different parts of your bike, remember the order you put them on. Wiping off the extra lubrication in the same order will give it enough time to soak in.

There are other parts of your bike that need attention too, besides the chain. The levers that control the brakes and gears (brake and derailleur levers) should have a drop or two of oil every now and then. This will help them work well.

The cables that connect the brakes and gears should be checked often, especially when it's wet outside. Sometimes they might need oil to work properly. Apply a drop or two of lube to all pivot points and to the barrel adjusters once in a while to keep them working properly.

Tighten bolts.
Bicycles are held together by dozens of nuts and bolts. Maintaining a "tight ship" is important because loose (or improperly tightened) bike parts can lead to serious wear and tear. Loose bolts can also cause poor performance and create a safety hazard.

When tightening bike bolts, consult your owner's manual. It's important not to over-tighten any bolts. That can lead to component damage or failure.

Have professionals inspect your bike.
Who doesn't want to save money on bike repairs? These days, we all want to spend less. It's easy to want to fix bike problems by yourself, especially if you like doing things on your own.

You can do a lot of things yourself, but sometimes it's better to have a professional check your bike. They have the right tools to take off, put on, and fix many bike parts. A professional can check your bike's overall health, like making sure it's balanced and fixing any small damage to the spokes.

Usually, it's a good idea to bring your bike in for a check-up once a year. If you're not trained in bike parts and fixing bikes, you might not see a problem before it's too late.

Fixing a Flat Tire

A flat tire can happen anytime, and it can be frustrating, especially during a long bike ride. But changing a bike tire is not as hard as it seems. With the right tools and a little bit of knowledge, you can get back on the road quickly.

Tools You Will Need
Before you start, you will need a few tools:

- Tire levers
- A spare tube or patch kit
- A bike pump
- A wrench (if your bike needs it)

Make sure you have these tools with you before you start your ride.

How to Tell If You Have a Flat Tire
The first step is to figure out if you have a flat tire. There are a few signs to look for:
- The tire feels soft or squishy.
- You hear a hissing sound when you ride.
- The bike feels wobbly or unstable.

If you notice any of these signs, it's time to check your tire.

Taking Off the Wheel
The next step is to remove the wheel. Depending on your bike, you might need a wrench for this. Here's how to do it:

1. Change the gears so that the chain is on the smallest chainring and the smallest cog at the back.
2. If you have rim brakes, release the brake by pulling the brake lever and unhooking the noodle.
3. Open the quick-release lever or loosen the nuts that hold the wheel in place.
4. Take the wheel out of the frame.

Taking Off the Tire and Tube
Once the wheel is off, it's time to take off the tire and tube. Here's how:

1. Use the tire levers to pry the tire away from the rim.
2. Once the tire is partially off, use your hands to pull it off the rest of the way.
3. Take the tube out from inside the tire.

Checking for Damage
Before you put in the new tube, you need to check the tire for damage. Look for any cuts, holes, or things that might have caused the flat tire. If you find any damage, replace the tire.

Putting in the New Tube
To put in the new tube, follow these steps:

1. Inflate the new tube slightly.
2. Insert the valve stem into the hole in the rim.
3. Work the rest of the tube into the tire, making sure it's not twisted.
4. Push the tire back onto the rim using your hands.
5. Use the tire levers to finish pushing the tire onto the rim.

To change a bike tire, follow these steps:

1. Slightly inflate the new tube.
2. Put the valve stem into the hole in the rim.
3. Put the rest of the tube into the tire, making sure it's not twisted.
4. Push the tire back onto the rim using your hands.
5. Use tire levers to finish pushing the tire onto the rim.

To reinstall the tire:

1. Check that the tire is evenly seated on both sides of the rim.
2. Use your hands to push the tire back onto the rim, starting at the valve stem and going around the rim. Make sure the tire is on properly and the tube is not pinched.

To put the wheel back on:

1. Align the wheel with the bike frame's dropouts.
2. Push the wheel into place, making sure the chain is on the smallest chainring and cog.
3. Tighten the quick-release lever or nuts, making sure the wheel is centered.
4. If you have rim brakes, reattach the noodle and squeeze the brake lever to check the brake pads.

To pump up the tire:

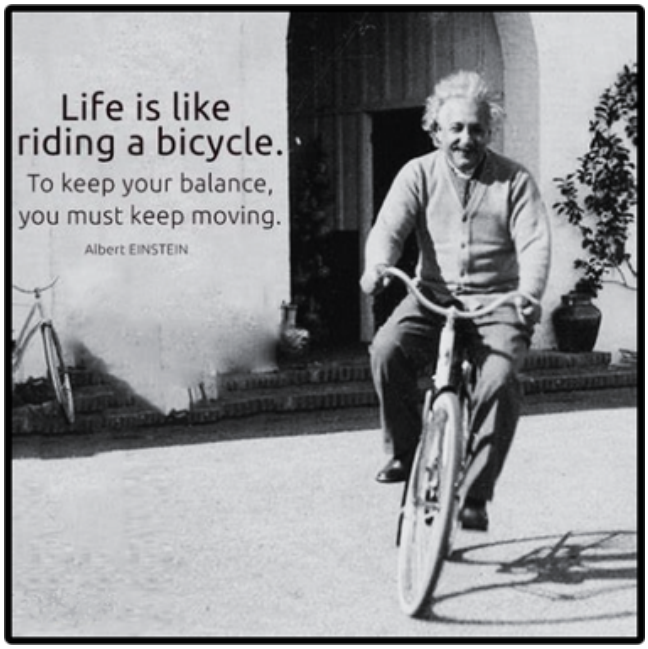
1. Make sure the valve stem is securely in the rim.
2. Attach the pump to the valve stem.
3. Pump up the tire until it's firm but not too hard.

To check the tire pressure:

1. Use a tire pressure gauge to check the recommended pressure.
2. Look for this information on the side of the tire.

To prevent flat tires:

1. Keep your tires properly inflated.
2. Avoid riding over debris or rough surfaces.
3. Regularly check your tires for wear and tear.
4. Consider using puncture-resistant tires.



To prevent flat tires:

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Changing a bike tire may seem hard at first, but with practice, it gets easier. Follow these steps to get back on the road quickly. Remember to carry necessary tools and maintain your tires properly.

Conclusion

It's important to know about bike parts and how to take care of them. If your bike breaks while you're riding, it can be very expensive to fix. That's not fun! Riding your bike should be enjoyable and not cost a lot of money. By knowing about bike parts and taking care of them, your bike will work better, and you'll be able to ride better too.

NOTES

RESOURCES

Fix your own bike with step-by-step Repair Help Guides. Go to www.parktool.com and click on the Fix-it section.

Christ Centered Corner

Extra encouragement from a Christian perspective.

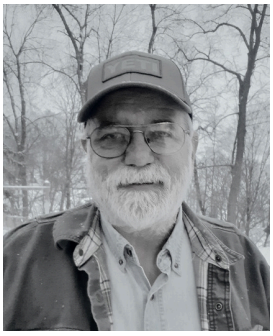
Taking care of our cars and bikes is an important job, just like being a good caretaker. God gave us the responsibility to take care of His creation. Everything we have comes from Him, including our vehicles. When we take care of them, it shows that we are responsible and thankful for what we have. The Bible teaches us to be responsible and diligent in everything we do, so it's important to keep our possessions in good shape. We are stewards (taking care of what really belongs to Him), and it's good to remember that.

When we take care of our cars and bikes, it also shows that we are grateful for them. Instead of always wanting something new or better, we should appreciate what we already have. Taking care of our vehicles helps us be happy with what we have. It's like saying thank you to God for giving us these things.

Taking care of our possessions can also show others what we believe in. It's like telling people about our values and priorities. When we take good care of our things, it also helps the environment by not wasting resources. So, by taking care of our cars and bikes, we are not only being responsible, but we are also helping the world around us.

MODULE PRESENTERS & CONTENT PROVIDERS

Nick Dinger is the owner (steward) of BIC Auto Repair - a recovery garage in Aitkin, MN. BIC (Brothers in Christ) Auto serves the public and also provides low-cost service to those in need.



Kris Kulju spends a lot of time on the road and knows the importance of learning how to handle common roadside issues. Kris is a husband, father, grandfather, and avid antique snowmobile collector.

Brian Moon is with Easy Riders, a bicycle store serving the Brainerd Lakes community since 1972. He is passionate about bicycling and encouraging others to have awesome riding experiences.

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