

Day 13 Make Up Assignment

Objective: The student will evaluate the driving environment and adapt to adverse driving conditions appropriately.

Emergency situations can arise at any time in any driving environment. By responding correctly to emergency situations, you can reduce your risk of being involved in an accident. By planning ahead and rehearsing proper responses, you can be prepared to deal with any possible situation that may arise. Given normal driving conditions, the driving environment is dangerous and always changing. Mix in visibility problems, extreme weather conditions, and other adverse conditions, the driving environment can become even more unpredictable and emergency situations can occur more easily and unpredictably. You must be able to adapt your driving to the changes in the driving environment. By doing so, you will reduce your risk of being involved in a collision.



Keeping your vehicle well-maintained will help you be prepared for any kind of changes in the driving environment due to weather. Such things as new wiper blades, proper tire tread and inflation, clean windows without glare, and head lights that shine brightly are all essential to keeping you safe and ready to overcome potential dangers on the roadway when conditions are less than ideal.

Visibility

Modern day vehicles have been specifically designed by industry and safety engineers to provide you with accessories to keep you safe when driving your car. Vision is the most important source of information to ensure safe driving. You must be able to keep your vehicle in top shape so that your vision is not obstructed in any way. When conditions on the roadway are less than ideal, it is important that other vehicles can see you and that you can see other vehicles. It is advisable to always turn on your headlights whenever you drive, regardless of conditions. Headlights often get covered with dirt and dust resulting in a film that reduces the brightness of the light given off. Even when your car is dirty, make it a point to clean your headlights regularly. In addition, keep your windshield and rear windows clean from dirt and film. Clean them regularly on the inside and on the outside to reduce glare and increase your ability to see through the glass. Finally, be sure that passengers or cargo in your vehicle do not obstruct your view of the roadway. If your car is loaded with people or cargo, try to minimize the amount of area that is blocked from your view and increase the use of your exterior mirrors.



Night Driving & Vision

Anytime you drive in darkness, the driving environment becomes more dangerous and more difficult to predict because night driving effects your vision. Here are some problems associated with night driving:

- ** your field of vision is restricted to the small area of light provided to you by your headlights
- ** decreased judgment of distance and depth perception occurs when it is dark
- ** your eyes must constantly adjust to changes in the amount of light they are exposed to (oncoming headlights, street lights overhead lights, etc)
- ** fatigue associated with your eyes straining to see
- ** Colors, shapes, are harder to distinguish and you will not see things as clearly as you do during daylight
- ** driving at dusk is the most dangerous time. Your eyes are battling between the brightness of the horizon coupled with a dark road. Your headlights are not yet effective in helping you to see the roadway.



There are important techniques you can use to help yourself be a good driver at night. Keep these in mind anytime you know that you were going to be driving after dark.

- ** Allow a larger safety margin and following distance to give yourself enough time to judge distance and speed. Understand that all maneuvers will take longer during darkness and limited visibility conditions.
- ** Reduce your speed.
- ** Use your high beam headlights when traveling on especially dark roads. Be sure to dim them to low beams whenever you approach and follow a vehicle (within 300 feet) or are faced with oncoming traffic (within 500 feet)
- ** Search well beyond the range of your headlights.
- ** Adjust your interior dash lights to reduce brightness and glare and avoid using the interior dome light while driving.
- ** Be sure to communicate your intentions with other drivers by using your turn signals, brake lights, hazard lights, and high beam headlights.
- ** Be sure your windshield and other windows are clean and use your defroster as needed.

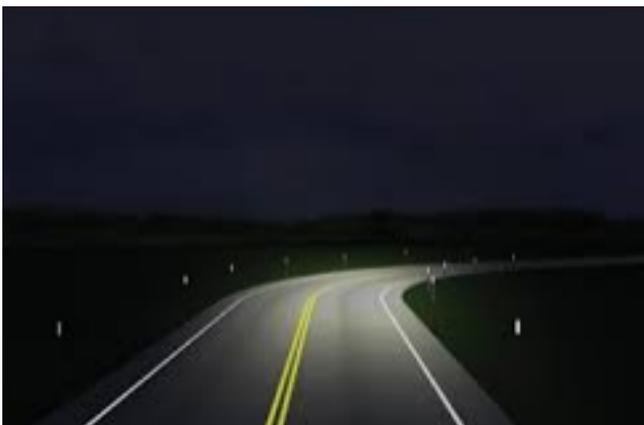




One particularly common mistake that occurs while driving at night happens when you overdrive your headlights. This means that your total stopping distance is larger than the area that can be seen with your headlights. It is important to maintain a safe speed that allows you plenty of stopping distance when driving in the dark. Low beams typically shine 150 feet in front of your vehicle and high beams typically shine 350 feet when properly aligned. If you are driving too fast, and you encounter a hazard in your headlight area, you will

not be able to stop your vehicle in time or perform an evasive maneuver if necessary. At night, reduce your speed so that you can stop within the range of your headlights and reduce this high-risk driving situation. By slowing down, you will be able to stop or avoid any hazard in the roadway.

Just like driving during the daytime, you will need time to avoid a hazard. Imagine if you came across old, blown out tires in the roadway like in the picture here. During the daytime you would most likely be able to see it and avoid it by steering around it. However, at night, dark black objects such as tire tread would be nearly impossible to see way ahead of time and avoiding it becomes much more difficult in the dark. You will need time to see the hazard, decide what to do, and then react. Your ability to stop or avoid the hazard is directly related to how fast you are driving. If you are over driving your headlights, you will not be able to stop in time. When your total stopping distance is greater than the distance you can see with your headlights you will not have time to stop, avoid, or maneuver around a hazard. Allow for a larger margin of safety by slowing down, driving within the range of your headlights ahead of you.



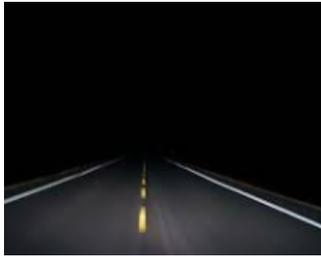
Curves and turns in the roadway present another problem for drivers. The headlights on your vehicle shine straight ahead making visibility on a turn or a curve more difficult. The path of light made by your headlights will be smaller on a curve or a turn so it is important to slow your speed even more than usual. Also be sure to cooperate with other drivers as on a curve your headlights will shine directly into the other driver's eyes. Always switch to your low beams to try to minimize the glare from your headlights shining into the eyes of an oncoming driver.

Urban areas

City driving causes our eyes to be overloaded by lighting from advertisements, street signs, neon shopping center signage, and traffic signals. When driving in urban areas it is important to be selective and focus on the lighting that matters to you as a vehicle operator. In extremely bright areas, it may be necessary to increase the brightness of your dash lights so that you can keep an eye on the information associated with your vehicle.



Rural areas



Conversely, on quiet residential streets or in darker rural areas, it will be harder to see because visibility is reduced. This reduced visibility and high-speed make for a dangerous combination. You will want to reduce the intensity of your dash lights to help with glare and to allow the eyes to better adapt to the darkness outside your vehicle. Be sure to continually search well ahead of your vehicle down the road and to the sides of your vehicle to identify hazards before you encounter them. When driving on country roads, you will want to keep a watchful eye beyond the area lit up by your headlights. If available, it is also helpful to keep an eye on the white line marking the edge of the roadway, utility poles, trees along the roadway, reflections from oncoming headlights, and light positions at entrances to homes or properties. All of these will give you information about the roadway.

Glare

When driving at night glare presents a specific problem for drivers. Glare is caused by too much light, the reflection of bright light, or a sudden change in the amount of light seen. When your eyes are confronted by too much light, you may experience a type of temporary blindness as your eyes adjust back to the darkness. Most rear-view mirrors have a night position that will allow you to reduce the blinding light from a car approaching from the rear. Be sure to return the mirror back to the original day time position as soon as the blinding headlights are gone. By doing so you will be aware of any other vehicles that approach you from the rear. Your side mirrors may also be a source of glare. You can use the “BGE” method for setting your mirrors to help reduce the amount of glare reflected into your eyes. This acronym stands for, Blind spot\Glare Elimination. This method of setting your mirrors requires that you place your head against the side window before adjusting the driver side mirror. Similarly, to adjust the passenger side mirror you would move your head to the center line of your vehicle and then adjust the mirror. This places the outside mirrors in a rotated position looking into the worst blind spot area around your vehicle. This method of mirror placement also helps to reduce the amount of glare experienced through your side mirrors.



The most important thing you can do in terms of bright light and glare is to cooperate with other roadway users. On well-lit roads use only your low beam headlights. When using your high beam headlights, be sure to dim them when you approach another vehicle from the rear. Your high beam headlights are very bright and will be blinding to the driver ahead of you once you are

within 300 feet of their vehicle. When meeting an oncoming vehicle, dim your high beam headlights to the low beam setting within 500 feet. Dim your headlights before the oncoming headlights irritate or bother you but not too soon as to leave a large dark area between you and the oncoming vehicle. When getting ready to pass a slow-moving vehicle, dim your high beam headlights once you are within 300 feet of the vehicle you wish to pass. You can communicate with the vehicle you wish to pass by flashing your high beams on and off to warn them that you plan to pass. Only use your low beam headlights during the passing maneuver, and do not return to high beams until you have fully passed the vehicle. If you are the one being passed, it is alright to leave your high beams on until the vehicle that is passing you is directly beside you. By doing so you light the way for both of you. Once the car that is passing is directly beside you, switch to your low beams. Do not re-activate them until the other car is farther than 300 feet or so in front of you so that your high beam headlights do not blind the other driver. Remember to drive friendly. There will be times when an oncoming vehicle forgets to dim his or her headlights. It is never alright to leave your headlights on high beam out of spite or to get even. If you are faced with extremely bright low beam headlights or high beam headlights, look toward the right side of the road to minimize the effects of the oncoming glare. After checking your rear-view mirror to make sure it is safe to do so, it may also be a good idea to reduce your speed and increase your following distance until the source of the glare has passed. By doing so you give your eyes a moment to adjust and then you can resume your original speed.

VIDEO: What to do to make night driving easier

Adverse Driving Conditions

In this section we will begin to explore a variety of weather and reduced visibility situations that you may encounter when driving. Each requires you to adapt your driving to assure your safety and the safety of other roadway users.

Sun Glare/ Driving at Dusk



Similar to bright headlights at night, the sun can also cause a glare that may reduce your visibility when driving. When the sun begins to set and fall close to the horizon, its glare and rays can reflect off the roadway and make it difficult for you to see the roadway and oncoming traffic. Coupled with a dirty windshield and your visibility can be almost down to zero.

When you know you will be traveling on a sunny day, be sure to take along your sunglasses and make use of your sun visor to block the glare ahead of you without disrupting your view of the roadway. Adjust the visor so that it blocks the bright light from the sun but not the area between your eyes and the front of your vehicle. Oncoming vehicles and vehicles traveling in front of you will be difficult to see and require an adjustment in your driving habits. Slow down and search the driving environment more often than you would under good, normal driving conditions. When sun glare is a factor, brake lights and turn signals are more difficult to distinguish. Increase your following distance and try to predict what drivers ahead of you plan to do well in advance. If the sun is setting behind your vehicle, cars

behind you will be having the trouble with sun glare. Be aware, communicate your intentions well in advance, and realize that they may have difficulty seeing you. Monitor traffic ahead of you and behind you carefully and be aware of where vehicles are at all times. Give yourself extra space and time when dealing with the glare of the setting sun. Related to this, is the time of day when the sun has already set but it is not quite dark yet. This time of day is often referred to dusk. It is a particularly dangerous time of day to be driving as it is not bright enough to see well without your headlights, and yet not dark enough for your headlights to be effective. Once again, it is extremely important to give yourself extra space and time, communicate your intentions well in advance so that other drivers have plenty of time to react.

Fog and Smog

Fog occurs when humidity levels are high and air temperatures decrease. When warm humidity filled air passes over the ground that is cold, water droplets form creating a cloud like formation called fog. Fog sometimes occurs in small patches or in large dense areas spanning long distances and creating near zero visibility. Patchy fog is particularly dangerous because drivers pass through the patches quickly and do not feel the need to reduce speed. Trouble occurs when they suddenly enter a large patch of fog at a high rate of speed with little or no visibility. In reaction, they brake suddenly causing them to either crash into a vehicle stopped ahead of them or another vehicle crashes into them from the rear. The best advice when driving in and around foggy conditions is to slow down and remain aware as conditions can change quickly. By slowing your speed, you will have more time to react to changes in the roadway ahead of you. Here are some tips when driving in foggy conditions:



- ** Slow down but continue to drive at a steady speed.
- ** Increase your following distance and use the markings on the roadway your guide. Avoid following tail lights in front of you as other drivers can see as little as you can and may not be of much help.
- ** Do not try to pass, be patient and alert.
- ** Use your hazard lights or tap on your brake lights to warn vehicles approaching you from the rear.
- ** Use your windshield wipers, defrost setting, heat or AC setting as needed to help keep your windshield as clear as possible.
- ** Avoid the temptation to turn on your high beam headlights. The light from these will simply reflect back at you making it difficult for you to see. Use only your low beam headlights in fog, or specially installed fog lights that shine low below your headlights.

When traveling in particularly dense fog, reduce your speed even more but do not stop in your lane. If you are uncomfortable it is best to move off of the roadway before coming to a stop. Look for an exit or move off the roadway as far as possible. Activate your hazard lights, dome lights but turn off your headlights. Once you have left the roadway, stay off the road and wait until conditions improve enough to make it safe for you to re-enter the roadway.



Smog is similar to fog but usually involves particles of dirt, dust, or smoke that mix with sunlight. Areas of high air pollution also sometimes experience smog conditions.

VIDEO: Driving in fog

Heavy Smoke and/or Rain

As we have mentioned before, the driving environment can change rapidly and unexpectedly. As soon as you realize driving conditions are deteriorating, you must take precautions and adjust your driving to the conditions on the roadway. Let's have a look at some scenarios.

1. You are traveling down the road way and see smoke visible ahead of you. It appears the smoke is close to the roadway, so you must take precaution and reduce your speed in the event that your vision is obstructed. Smoke and ashes from a brushfire along the roadway will restrict your sight distance. Smoke from a brushfire is usually limited to a short area and you should be able to pass through it quickly. If it appears that the fire is spreading over a much larger area, it may be necessary to exit the roadway and find an alternate route.



2. You are traveling down the roadway and you notice it's starting to sprinkle. You turn on your windshield wipers but they are only necessary every few seconds because the rain is light. Suddenly, the drops become much larger, the wind becomes much stronger, and the rain is coming down in sheets blowing across the roadway. These heavy rain cells usually do not last very long; however you must adapt you're driving by slowing down and creating a larger following distance between you and other vehicles on the roadway.

In both of these scenarios it is important to take evasive maneuvers to protect yourself and the safety of other roadway users. Pay attention, slow down to a speed that is reasonable for the conditions and activate your hazards if necessary. Keep your vehicle centered in your lane, be alert for vehicles that have pulled over to the side of the roadway and be ready for the unexpected. Use your low beam headlights, use your windshield wipers as needed, and continue to steer, accelerate, and break smoothly and avoid some harsh

maneuvers with your vehicle. These types of driving environments typically do not last long but they can be very hazardous if you do not adapt your driving to the conditions.

Extreme Weather Conditions

The state of Texas is very large and depending on which part of Texas you are driving in you could be faced with all types of extreme weather that could change very quickly. You may have heard the saying, “If you don’t like the weather in Texas, just wait five minutes.”

One particularly dangerous type of extreme weather is rain. Storm conditions can change very quickly and suddenly and can become severe and extreme without much notice. Rain in particular can occur at any time of year in Texas and presents a very real and dangerous hazard to motorists and their vehicles. Rain in particular reduces traction. Traction occurs and involves how well your tires grip and contact the surface of the roadway. When it rains, traction is reduced and visibility becomes a problem. This is a dangerous combination. Roads become especially slippery during the first few minutes of rainfall especially when there has been no rain for a long period of time. Dirt, dust, oil, and other materials collect on roadways and when mixed



with water from rainfall create an oily film over the top of the roadway. This makes for very slippery conditions for motorists. Traction is reduced and stopping distances will increase. During a heavy downpour it will only take a few minutes for this slippery feel to wash away and traction will improve. When rainy conditions are light, it takes much longer for this film to go away making the slippery roadway a particularly hazardous environment for drivers. If the rain is continuous and lasts for some time, water may begin to accumulate on the road. As a

result, puddles form and pavement may become flooded, and large areas or sheets of water may cover the roadway. Areas such as these may cause your vehicle to slow suddenly or veer to one side or the other. These areas may also hide potholes and you should try to avoid them if at all possible. Also be aware that when there is a lot of water on the roadway, your vehicle will create splashing and you should be mindful of pedestrians that may be walking near a roadway with lots of water on it. When driving in rain you must slow down and grip the steering wheel firmly so that you have control over your vehicle. In addition, there are other things that you, as the driver, can do to reduce hazards when driving in wet weather.

Tips & Tricks

- Reduce your speed and increase your following distance.
- Drive in the areas that vehicles in front of you have created. Their tires will push water out of the way and your tires can enter this space creating better traction.
- Brake and accelerate more gently to avoid a skid. Pump your brakes by moving your foot on and off the break 3 to 4 times to help dry brake pads.

- Grip the steering wheel firmly, use gentle motions when making turns and other movements.
- Maintain the best visibility possible by using windshield wipers, defrosters, the heater or air conditioner as needed.
- Inspect and maintain your tires to make sure they have proper inflation and good tread.

There will be times when you are faced with situations that are unavoidable. When you are faced with a roadway that is partially flooded, be sure you reduce your speed as much as safely possible and activate your hazards while checking traffic around you and holding the steering wheel firmly as deep water may cause resistance and make steering difficult. If water is particularly deep but still safe to travel through, reduce your speed and coast through the water slowly accelerating gently to help you get out of the situation. Once you are through the water, you must check to make sure that your brakes are working properly. Apply the break gently and if the break reacts normally and is working properly turn off your hazards and continue on down the roadway. If your brakes have become overly saturated, they may not react appropriately and your vehicle will not slow down. In order to dry the brakes, you must create friction to help dry them. In this scenario, it is alright to use your right foot gently on the accelerator and your left foot gently on the brake pedal simultaneously. This will help to dry the inner workings of your braking system.

VIDEO: Hydroplaning

Flash Floods

A flash flood is a rapid flooding of low-lying areas such as creek beds, drainage areas, rivers, or dry lakes. Flash floods may be caused by heavy rains associated with severe thunderstorms, hurricanes, tropical storms or water created from melted ice or snow. Flash flooding may occur after the collapse of a damn either natural or man-made.

Flash floods can occur under several types of conditions. Flooding occurs when it rains rapidly on soil that is already saturated or dry soil that does not absorb water well. This may occur when thunderstorms are particularly slow moving, or when thunderstorms pass over the same area repeatedly. As the water runs off of roadways it will collect in drainage areas, gullies, and streams. These streams will flow together to create larger flows of water and along the way they may pick up debris that will begin floating in the water. This debris may accumulate and create an obstruction that restricts the flow of water. Should the obstruction suddenly release water will flow very quickly and may cause a flash flood to occur downstream. Flash floods are very dangerous events because they often occur very suddenly and involve very fast-moving water.

Many people tend to underestimate the danger of flash flooding. A vehicle will provide little or no protection in a flood such as this. Flash flooding can occur in rural areas or in urban areas. Fast-moving water in large amounts can move rocks, dislodge large trees from their roots, destroy bridges, and cause mudslides. It is easy to underestimate the power of water. Only a few inches of water can cause you to lose control of your vehicle and as little as two feet of fast-moving water will carry most automobiles away. To reduce your risk, avoid driving through high

water, fast flowing water, especially when it is unclear how deep the water is and how fast it is flowing. “Turn around don’t drown!”



Low-water crossings can be found on any roadway and pose particular dangers when it is raining. In some places, bridges have been built over these low lying areas, however in many other areas the road will simply dip where a creek bed occurs. Under normal dry conditions this low-water crossing poses no threat, however these areas can feel quickly with water and flash flooding is very common in these areas. Low-water crossings can be deceiving. The amount of water and the rate at which is flowing is often hard to discern. Many drivers fail to recognize the risk properly when moving water is found flowing over one of these creek beds. Some of these crossings will have markers with depth measurements to help drivers determine how deep the water is over one of these low-water creek bed crossings. It is always better to turn around and find an alternate route if there is any doubt as to the depth of the water and the speed at which is it is flowing. Listen to the news and heed all flash flood watches and warnings as conditions can change quickly and unexpectedly. Do not take unnecessary chances with your life and the life of others.

VIDEO: Flash Flooding

Windy Conditions



Strong winds create pockets of air which can push and move your vehicle making it difficult to stay in your lane. These pockets are often found on high bridges, mountain passes, ravines, and in hilly areas surrounded by rocks where the roadway has been cut through the hills. This buffeting effect occurs more frequently with large, top heavy vehicles such as SUV's, vehicles towing trailers, recreational vehicles, 18 wheelers, and any other vehicles with a high center of gravity. This includes sport utility vehicles with rooftop carriers for luggage and other gear. Be mindful when you are traveling that wind will affect your vehicle differently when you are carrying a load on top of your vehicle. At times and in certain areas, there may be restrictions

on the types of vehicles that may travel in a certain area. For example, areas with tall bridges may restrict certain types of vehicles on particularly windy days. In other areas where this wind effect is common, traffic safety officials having installed wind socks to alert drivers of wind conditions. These are meant to warn drivers and inform them of the direction and intensity of the wind, helping them to decide if it is safe for them to travel under these conditions. There are things you can do to help control your vehicle when driving and windy conditions. These are similar to the strategies used in all extreme weather conditions.



- Reduce your speed and grip the steering wheel firmly with both hands.
- Scan the roadway continuously checking for oncoming traffic and for vehicles that may be approaching you from the rear.
- Be proactive in your steering. Be prepared and ready to counter steer if necessary.
- Increase your following distance, and avoid traveling side-by-side with other vehicles. Pay attention to your position in the lane and try to stay to the opposite side of the lane, giving extra space between vehicles passing you and oncoming traffic.
- Avoid passing.

In addition to windy conditions caused by mother nature, large trucks, buses, and other large heavy vehicles can also generate wind or turbulence. Whenever you are passing this type of vehicle, be sure to keep both hands on the steering wheel so that you can maintain control of your vehicle. Manage your lane position to give yourself as much space as possible and reduce your speed as you pass or meet these types of large vehicles.

VIDEO: Wind & Dust Storms

Texas: All Types of Driving

When traveling in our great state, you may encounter all types of driving conditions. In Texas we have areas with mountains, areas with hills, areas with forests, swamps, and even deserts. Each of these driving environments present special challenges for roadway users.

Heat

When traveling west, you may encounter extreme heat and desert like conditions. These areas are often desolate with very few residential areas, rest areas, or gas stations and convenience stores. There will be times when you travel for many miles without seeing any signs of humanity.





When you know you will be traveling in these conditions, you must prepare your vehicle. You may decide to use a different type of engine oil, and you should definitely have your cooling system checked and maintained before you travel. Be careful when checking your radiator, never remove the cap when the engine is hot. You should also only check your engine oil and tire pressure when the vehicle is cool and has been sitting for

some time. Special attention should be given to tires when traveling in very hot conditions. High speeds and extreme heat can affect tire pressure which can create conditions for a blowout. It is always a good choice to travel at night if you must travel through desert type conditions. It is cooler then and it will be easier on your vehicle. If you cannot travel at night, plan your trip carefully and stop every chance you get to check your vehicle, especially fluid levels. Always carry extra waters in your vehicle just in case you have trouble. Be sure you have good high-quality sunglasses to help with sun glare

which is often a problem in the desert. Sandstorm and dust storms are also a common problem when driving through the desert especially on windy days. You should watch the weather and listen to the news media for changes in the weather. Depending on the conditions, you may decide to delay your travel if conditions warrant.



Winter Driving

Because of the vast size of our state, there are parts where winter is particularly harsh. Depending on where you are traveling, you will need to prepare your vehicle so that it can handle driving in cold, wintery conditions. Similarly to driving in extreme heat conditions, driving in winter weather conditions can take their toll on your vehicle. However, there are preventive, proactive, maintenance steps that you can take to keep your vehicle running in top condition.

ice scraper, snow shovel, sand or salt, de-icing fluid, booster cables, flares, flashlights, and spare fuses, bulbs, and batteries. In addition to making sure your vehicle is running safely, you will also want to carry a survival kit with you in case of an emergency or vehicle breakdown. This survival kit might include: candles, matches or lighter, nonperishable foods, water and other hot beverages, blankets, extra warm clothes, gloves, and a first aid kit. It may sound silly, but you never know when you might need these items and it is always better to be safe and prepared than sorry.



Getting ready to drive in cold weather

Just like you first thing in the morning, your vehicle will need special care when you first begin driving in cold weather. When there is ice, frost, or snow on your vehicle you must allow extra time to prepare before you begin driving. You will need to clear the snow or ice from your vehicle's windows, roof, hood, headlights, and license plate. Your windshield wipers will most likely be stuck and you will need to free them so that they work properly once you begin driving. Start your vehicle and give it time to warm up before you begin your trip. The warmth of the engine will help melt snow or ice that has collected in around the tires and wheel wells so that your vehicle can move freely. When you do finally begin to drive, be sure to drive slowly for the first few minutes and give your engine time to warm up and work properly.

If you are faced with snowy conditions, getting your vehicle out and onto the roadway may present a special challenge. You will want to start with the normal steps you always use under normal driving conditions but understand you may get stuck in the snow. Try to avoid spinning your tires as this will only melt the snow and create ice making it even more difficult to maneuver. If you get stuck, try reversing into the path you have already made and then try to move forward again. Your traction may be hindered and the surface of the roadway may be slippery. Lightly tap your brake pedal periodically to check the brake system and traction on the roadway. Leave a greater following distance both to the front and to the rear of your vehicle. Avoid sudden or quick maneuvers in steering, breaking, and accelerating. These are the most common causes of drivers losing control of their vehicle. Plan your trip, allow extra time, and be patient when driving in wintery conditions. Reduce your speed, allow for extra space and time to maneuver your vehicle through turns and curves. Think twice before passing and pay close attention to oncoming vehicles. When the roadway is snowy, vehicles in front of you will create a path through the snow and it is always a good idea to follow in these paths. This will help your vehicle's tires maintain contact with the roadway and improve traction. The most dangerous time when driving in winter weather is when wet roadways and below freezing temperatures collide. Below freezing temperatures cause the water on the roadway to freeze especially on bridges and on elevated roadways. Be aware, and monitor temperature conditions.

Special situations

As with all extreme weather conditions, taking special precautions when driving in winter weather is extremely important. Understand that your vehicle will not react the same as it would under normal, good, driving conditions. Leave yourself extra space and time by allowing a greater following distance, a longer braking distance, and avoid sudden and abrupt changes in acceleration. Be gentle with the gas and brake pedal to avoid skidding and sliding.

Snowy Weather



When parking in heavy snow, try to park so that you can exit the parking space by driving forward. You can also try to create tracks by driving backward and then forward in your parking space. This will facilitate traction when you get ready to leave the parking space. If you do get stuck, be patient. Make sure your tires are straight and drive slowly to avoid spinning your tires which will only cause the snow to melt and create ice. Move forward and backward as much as your vehicle will allow. Your vehicle may only move inches at a time but you will eventually

“rock” your way out of the deep snow. If this procedure does not work, and you cannot get out of the heavy snow, there are driving aids that you can purchase to help. These mats or grids can be placed in and around the tires to create traction and help get you out.

If you are stuck in winter weather

Hopefully you are never faced with this problem. However, weather conditions are often unpredictable and can change very quickly. We mentioned earlier the importance of keeping a survival kit and other survival items in your vehicle during the winter. If you find yourself stuck in snow and unable to travel any farther, drive off the road way onto the shoulder or get to a safe rest area if possible. Activate your hazards and turn off the engine to conserve fuel and battery power. Keep the vehicle well ventilated and use blankets and clothing to help you stay warm. Start your vehicle for 10 minutes every hour to help warm the interior and to keep the battery charged. Use your candles and food and beverages sparingly as you can never tell how long you might be stuck. It is always better to stay in your vehicle as it provides you with shelter. Unless you are absolutely certain that you can reach help nearby, do not leave your vehicle. Try to stay awake if at all possible. If you have passengers, take turns sleeping for short periods of time. By following these precautions, you and your passengers can wait out any situation and stay safe until help arrives.

[VIDEO: Getting Stuck in Snow](#)

The Importance of Traction

Every time you get into your car, you must evaluate the conditions and driving environment. Depending on the season, weather, and road conditions, you will need to adjust how you drive and what you ask your vehicle to do. It is important to always err on the side of safety and be prepared for changes that may occur in the driving environment. It is important that you know your vehicle, understand how it reacts to braking and acceleration, and minimize driver errors. Many accidents are a result of driver error, incorrectly adjusting to road conditions, and preventable loss of vehicle control. In this section we will explore some ways that you can learn to identify, avoid, and correct these common mistakes.

The Physics of Driving

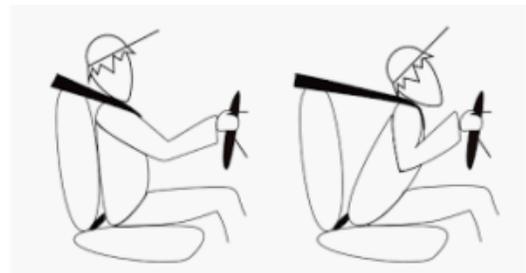
Let's have a little science lesson. You have probably heard of Sir Isaac Newton. He developed the three laws of motion. The first law in particular applies to driving a vehicle and is important to help you understand how your vehicle reacts to sudden changes in motion.

Law of Inertia

This law has two parts:

1. An object at rest, tends to remain at rest.
2. An object in motion will continue in a straight line unless a force acts upon it.

The amount of control you have over your vehicle is affected by inertia. You have probably felt inertia when driving or riding in the car. You can feel it when you accelerate or decelerate or drive around the corner or in the curve. Your vehicle tends to move in relation to the force being exerted on it. For example, when you accelerate the weight of your vehicle shifts to the rear and you are pushed back into your seat. When you decelerate or apply the brakes, the weight of the vehicle shifts to the front and you tend to lean forward. Likewise, when you go around a curve or corner, the weight of your vehicle shifts from side to side in the direction of the curve or turn.



If you were to take a curve or turn with too much speed, your vehicle would have to adjust abruptly and sharply to the change in direction. This causes problems for your tires and diminishes the amount of traction. If you are traveling at the correct rate of speed, your vehicle will follow your intended path of travel. If you are traveling too quickly, your vehicle may not be able to adjust and you may skid off the roadway or even have a blowout if your tires are faced with too much force. Depending on the type of vehicle you own, this type of unsafe driving may result in a rollover as the amount of force is too great.

Skidding occurs when your vehicle loses traction with the roadway. Traction is created when your tires rub against the pavement. When objects rub against each other, like tires and pavement

do, they create what we call friction. Friction is the resistance to slipping and is important for proper vehicle control. When you press on the accelerator, your wheels turn, rub against the pavement, and cause your vehicle to move forward or backward. Similarly, when you want your vehicle to change directions, you turn the steering wheel, and the tires rub against the roadway causing your vehicle to move in the direction you desire. Finally, when you apply the brake pedal, the brakes slow the rotation of the tires which react against the pavement and slow the vehicle. When everything works as it should and your maneuvers are done safely, traction will be maintained and you will be able to control your vehicle.

Factors that Affect Traction

Tires



Tires are specifically designed with surfaces called treads. These treads are designed to form channels that push away water and snow to help tires maintain contact with the roadway surface. It is important to check and monitor the tread on your tires to make sure your tires are operating properly. Be on the lookout for thinning areas or smoothness which results in diminished traction.

Proper tire inflation is also very important. When tires are properly inflated, they offer the highest amount of contact with the pavement and give you the best traction. Overinflation causes the tire to become overly rounded and the outside part of the tire no longer touches the roadway. Conversely, if your tires are not inflated enough the tire may bow in the middle losing contact with the pavement. Improper inflation can also cause your tires to wear more quickly, and overheat, possibly resulting in a blowout.

Roadway Surface

Ideally, it would be dry and sunny every time you got into your vehicle. However, we all know that this is not the case. Clearly the best traction comes on a smooth dry pavement. When the weather changes, when road conditions are less than ideal, traction is often lost. You must adjust your driving techniques to the conditions of the driving environment. You will drive one way on smooth dry pavement and perhaps a completely different way on wet gravel that is oily, muddy, or frozen.

Speed

The faster your car is traveling, the less traction your tires will have with the pavement. As your speed increases, the shape of your tire become somewhat distorted reducing the amount of tire touching the roadway. Additionally, as your speed increases, more air passes under your vehicle changing and reducing how the weight of your vehicle interacts with the tires and pavement. These two factors decrease the amount of traction your tires have as the speed of your vehicle increases.

Condition of Your Vehicle

Proper maintenance and care of your vehicle are important to keeping it running effectively and safely. You should have your tires inspected, alignment checked, and suspension monitored regularly. Problems with tires and alignment can reduce traction and cause problems for your vehicle.

Maintaining proper vehicle balance

We mentioned earlier how the weight of your vehicle shifts when you steer, accelerate, and break. Each of these maneuvers change where the weight of your vehicle is concentrated. Let's explore this a little bit more.

Accelerating

When you press on the gas pedal causing your vehicle to accelerate, the bulk of the weight of your vehicle shifts to the front making the front of your vehicle a little bit lighter and thereby reducing the amount of traction your front wheels have with the pavement.

Braking

When you press on the brake pedal causing your vehicle to slow down, the bulk of the weight of your vehicle shifts to the front causing the back end of your vehicle to be lighter and thereby reducing the amount of traction your rear tires have with the pavement.

Steering

When you make a left or a right turn or travel through a left or right curve, the weight of your vehicle shifts in the opposite direction you are traveling. For example, when steering to the left, the weight of your vehicle transfers to the right side lessening the traction on the left side. Conversely, when you steer to the right, the weight of your vehicle transfers to the left side lessening the traction on the right side. As the driver of a very heavy vehicle, you must minimize the effects of this weight transfer in order to maintain maximum vehicle control.

Other factors

It is important to keep your vehicle properly maintained in order to minimize vehicle balance problems. Maintaining and checking you're braking system often is important to assure that your brake pedal is interacting with your wheels consistently and properly. If your brake pedal is applying different amounts of pressure on different wheels, this will cause an imbalance and may result in loss of control of your vehicle. It is also important to monitor tire inflation and

inspect the tread on your tires regularly. Uneven tire wear may cause unexpected and variable traction on your wheels which could cause your vehicle to be out of balance. Be sure to follow your vehicles user manual and only install tires appropriate for your vehicle. Changing the size of a tire and using a size inappropriate for your specific vehicle creates a dangerous situation and may result in an accident.

AVOID / MINIMIZE / RESPONSIBILITIES

You should avoid a head-on collision at all costs. These types of accidents are the most dangerous because of the forces at play at impact, even at relatively slow speeds. If you are faced with an impending crash, there are some choices and possibilities that will help you minimize the consequences of a collision.

1. If at all possible, try to drive off the road rather than scared off the road in order to help you better maintain directional control of your vehicle and it will help you to select your path of travel. This deliberate maneuver may help you avoid an accident.
2. Just because you can drive off the road does not mean you will be able to avoid hitting something. Try to steer so that your vehicle hits something soft rather than something hard. For example, if you have a choice between running into a section of bushes versus a tree trunk, steer toward the bushes. These objects will help to absorb some of the energy from your vehicle and less than the risk of injury.
3. Try to steer towards something moving in the same direction as you rather than a stationary object. For example, if you must choose whether to hit a vehicle coming toward you or veering to the side and hitting a vehicle traveling in the same direction as you it would be better to sideswiped the vehicle traveling in the same direction.
4. Similarly, if you have no other choice, it is better to hit a stationary object then one coming directly toward you. Stationary objects have no kinetic energy and will help to absorb some of your vehicles energy and decrease your chance of injury.

No matter what, try to reduce your speed regardless of which evasive maneuver you can make. The less speed your vehicle has the less kinetic energy it will transfer and this will help to diminish the consequences.

If you are involved in a collision, do you best not to panic. Try to reduce your speed as much as possible, check for traffic flow and if possible, move off the roadway. This will help to avoid blocking the flow of traffic and protect it and you from further loss or damage. Depending on the severity of the accident, you will need to call the police, especially if there are injuries, vehicles that are too severely damaged to move, the other driver leaves the scene of the accident, or if any of the drivers do not have motor vehicle insurance. In these cases, the police must be called. If possible, help anyone that is injured and call 911 for help as soon as possible. If the accident is minor, exchange and record the required information with the other driver such as: the name of the insurance company, the insurance policy number, the name, address and telephone number of the other driver and any other witnesses.

In the event you damaged and unattended vehicle such as a parked car in a parking lot, it is your responsibility to either locate the owner or leave your information in a place where the owner will find it. Be sure to leave your name, address, a phone number, and the statement of how the damage happened.

Road Conditions

Unlike proper steering, acceleration, and braking which you as the driver can control, road conditions are a factor that is largely out of your control when driving. In a perfect world, our roads would always be smooth, clear of debris, and always in excellent condition. However, we all know that this is rarely the case. Roads are dirty, roads are bumpy, roads have debris or water on them. You must adapt your driving and take into account these less than perfect roadway conditions.

Mother Nature



Nature makes our roads messy. Dirt, sand, gravel, fallen leaves, and mud all cause problems for drivers. Your vehicle will have less traction when the roadway is covered with these materials. These materials often make the roadway slippery and you will need to deliberately monitor your traction. It is important to reduce your speed before you encounter one of these hazards and then simply coast through the debris trying to avoid turning, braking or

accelerating as you travel over the hazard. Once the hazard has passed then you can resume your speed.

Less than Perfect

No matter where you travel, on city streets or even on expressways, potholes are a common problem for drivers. These holes in the pavement occur especially during wet, rainy seasons and can be as little as a few inches deep or even as much as a foot in depth. As the driver of the vehicle, you must always be on the lookout for these dangerous conditions. Potholes can be disastrous to your tires, your rims, your suspension, and to all parts of your vehicle that control steering. It is always advisable that you go around these potholes and try to avoid them whenever possible. There will be times however when it is not safe or advisable to avoid the hazard. If you encounter a situation where you cannot avoid the hazard, try to reduce your speed as much as possible after checking your rearview mirror. Slowing your vehicle as much as possible will help to minimize the damage as you roll over or into the hazard. If you feel like the impact with the hazard was severe,



activate your hazard lights and pull over to the side of the road to inspect any damage that may have occurred.



When encountering an unpaved road way, it is extremely important to reduce your speed as gravel on roads or dirt roads significantly reduce traction. You must adapt you're driving to this type of road condition. Be careful not to follow other vehicles too closely as dust, flying rocks, and other debris may fly off of the tires of the vehicle in front of you causing damage to your windshield or headlights. Increase your following distance significantly reduce your speed.

Bad weather

Driving in the rain is always more dangerous than driving on a dry, sunny day. You must adapt your driving to road conditions to maintain your safety and the safety of other roadway users. Water on the road reduces traction and increases the possibility of your vehicle sliding or skidding. The most dangerous time is after a long period of dry weather. Oil and dust collects on the roadway and then mixes with the rain causing the particles to float. This film covers the roadway and creates an extremely dangerous slippery driving environment. The first few minutes of rain are the most dangerous time and it is important that you recognize this danger and reduce your speed. As the rain continues to fall, this dangerous film will eventually wash away and improve driving conditions and traction. Unfortunately, as rain continues, puddles, sheets of water, and sometimes even flooding create additional hazards for you as the driver. Here are some tips to help reduce your risk when driving on wet roads ways:

- ** slow down, slow down, slow down!
- ** gently apply your brakes to test the traction
- ** increase your following distance and create space around your vehicle
- ** follow in the tracks vehicles ahead of you. Their tires will have cleared some of the water away helping to improve your attraction
- ** Control your vehicle by steering, accelerating, and braking smoothly and gently avoiding abrupt movements
- ** use your low beam headlights, windshield wipers, defrost, air-conditioning, or heating, as conditions warrant
- ** activate your hazard lights only in extreme conditions

Control Through a Curve

When you drive, there are certain things you have control over and other things you do not control. For example, you usually cannot control road conditions, the weather, the sharpness of a curve, or the weight of your vehicle. However, how fast you choose to go is something you do have control over. During the driving task, you are always in control of how fast your vehicle is traveling under the given road conditions. Curves present a particular type of road condition that

must be dealt with carefully in order to maintain your safety and the safety of others on the roadway.

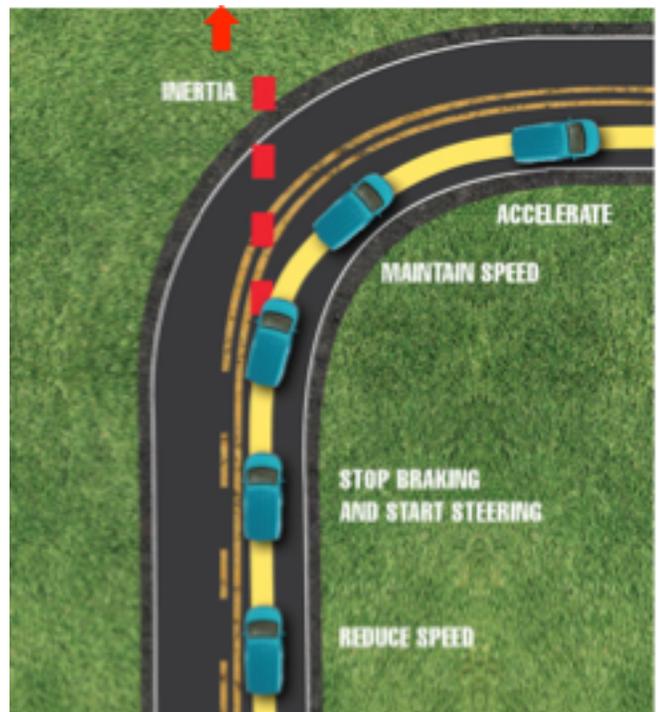
Using your brake in the incorrect part of a curve can lead to problems in traction and vehicle balance. Here are some tips to help you maneuver a curve safely.

Approaching the curve

As you near a curve it is important to reduce your speed while your vehicle is still traveling in a straight line. Most curves will have a suggested speed limit posted which should be respected as making changes in speed in the middle of the curve is dangerous. Check the sharpness of the curve and also the slant of the roadway as this will impact the effects of inertia on your vehicle.

In the curve

As you reach the beginning of the curve, ease off the brake and then steer smoothly and carefully while maintaining a visual well into the curve ahead. As you reach the middle or sharpest part of the curve press gently on the accelerator to maintain vehicle speed. By accelerating you also help your tires create traction on the roadway and at the same time minimize the weight transfer in your vehicle. As you reach the middle or sharpest part of the curve press gently on the accelerator to maintain vehicle speed. Inertia will want to pull your vehicle away from the curve continuing in a straight line. Your smooth steering must overpower this effect. When roadways are built, engineers slope the road in a curve to facilitate handling. Similarly, to when you ride a bike or a motorcycle and you must lean into the curve in order to maintain balance. The slope of the road helps your vehicle do this. If this curve is on a flat road, there will be no slope and there will be more force on your vehicle. In this situation it is even more important to slow down, steer smoothly, and maintain control of your vehicle. Occasionally you may encounter a curve that is banked which means the roadway is higher on the outside of the curve and slopes down towards the inside. Your vehicle will lean into the curve which helps push the tires into the pavement increasing traction. A roadway that is higher in the center and slopes down to both sides is called a crowned road. When this phenomenon is encountered in a curve, it presents a very dangerous driving situation. You will not encounter these often as engineers have worked hard to remove and repair roadways that were once built in this fashion.



Exiting the curve

As you begin to exit the curve and your path of travel is straight again, begin to straighten the steering wheel and accelerate smoothly back to your original speed.

These tips are considered safe in normal, good weather driving conditions. Whenever road conditions are less than ideal, for example if it is raining, curves always present a greater risk and you must adapt your driving appropriately. Reducing your speed, entering the curve more slowly, and accelerating smoothly and gradually will help you maintain control of your vehicle in less-than-ideal conditions. A little knowledge of physics can go a long way in helping you stay safe in your vehicle. Understand that natural forces are stronger than your vehicle or any laws enforced to maintain your safety. *Speed is the number one contributor to accidents. It should not take the fear of a ticket to encourage you to slow down.*

Skidding

When less than ideal driving conditions occur, any sudden or aggressive maneuver made by the driver could possibly result in loss of control of the vehicle. One example of this occurs when you are steering your vehicle. When the surface you are traveling on already has reduced traction, say from gravel on the road, if you make a sudden change in steering, the vehicle will not respond as you desired and may result in skidding or sliding. The same may occur even under ideal driving conditions when speed is combined with inappropriate steering.

Along with steering, any sudden and forceful pressure applied to the brake pedal on less-than-ideal road conditions also causes problems for vehicle control. Sudden weight shift to the front of the vehicle may cause your front brakes to lock resulting in sliding or skidding due to loss of traction. Excessive speed combined with sudden and forceful braking could result in the same loss of traction. Your vehicle is a very heavy machine. You cannot apply excessive force and expect your vehicle to perform properly and safely. You as the driver must control the vehicle by understanding the effects of excessive steering, braking or acceleration and how these excessive maneuvers will affect traction and vehicle performance.

Skidding occurs when either the front tires or the rear tires lose traction with the roadway typically caused by driver error. There are two types of skids each with its own techniques for recovery.

Front tire skids (under-steer)

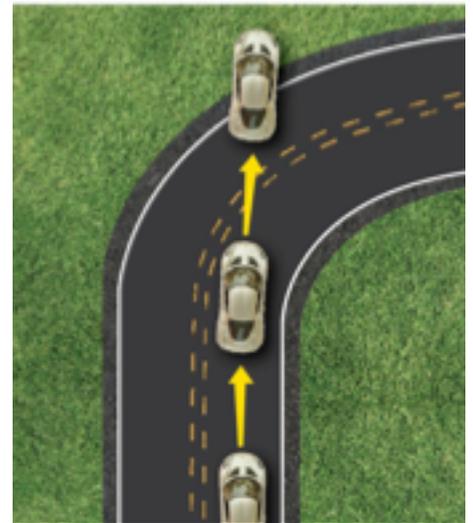
This particular kind of skid occurs when the driver applies too much pressure on the brake pedal causing the front tires to slide making it difficult to steer the vehicle. In this situation you will try to steer your vehicle but it will continue to go straight. In this situation you will need to release the brake pedal and steer in the direction you wish to travel until you can re-establish traction with the roadway.

Rear tire skids (over-steer)

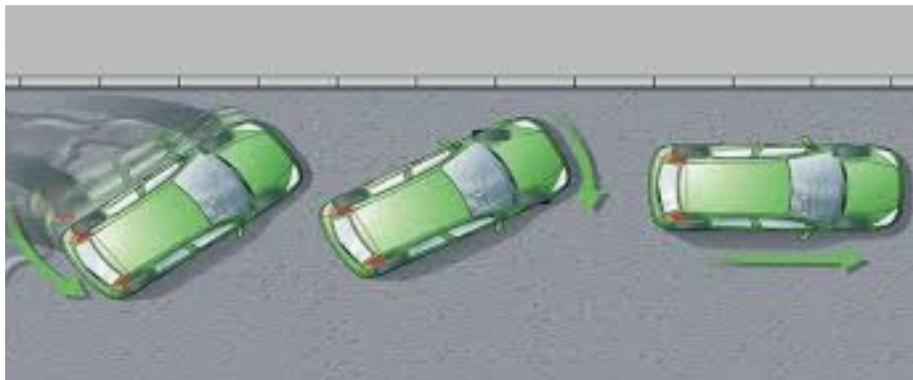
This type of skid occurs when your rear tires lose traction on the pavement and the rear of your vehicle tends to move to the right or the left. Sometimes this happens when turning or if you use the accelerator or brake pedal inappropriately or too sharply. If this type of skid occurs you need to ease off the brake pedal and press the accelerator slightly to transfer weight to the rear tires. Try to steer in the direction you wish to travel until you regain traction with your rear tires.

If your vehicle's rear tires begin sliding to the right, steer to the right. If the vehicle's rear tires skid to the left, steer to the left. Often called counter steering, it means you must steer in the direction you want your front tires to go, toward your intended path of travel. Straighten your steering wheel as soon as you feel the rear of your car begin to gain traction again with the roadway. If you do not succeed the first try keep steering in the direction you want your car to go. Do not stop until you regain traction with the roadway.

Front-tire Skid (Understeer)



Rear-tire Skid (Oversteer)



You as the driver of the vehicle has the responsibility of making sure you drive safely and proactively try to prevent skids. Maintaining traction is an important part of preventing skids and there are techniques you can use to help:

**Apply brakes and accelerator smoothly and in a progressive manner rather than making sharp, sudden moves.

**Steer precisely, deliberately, and smoothly without jerking or overreacting

**Drive to the conditions...slow down when conditions are less than ideal. It's not worth the risk.

[VIDEO: Skidding & Sliding](#)

DAY 13 MAKE UP QUIZ

You must submit the quiz and pass with a 70% or better to receive credit for the day.