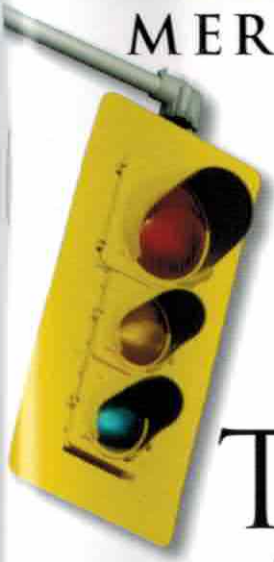
MERIT BADGE SERIES



TRAFFIC SAFETY

BOY SCOUTS OF AMERICA®

How to Use This Pamphlet

The secret to successfully earning a merit badge is for you to use both the pamphlet and the suggestions of your counselor.

Your counselor can be as important to you as a coach is to an athlete. Use all of the resources your counselor can make available to you. This may be the best chance you will have to learn about this particular subject. Make it count.

If you or your counselor feels that any information in this pamphlet is incorrect, please let us know. Please state your source of information.

Merit badge pamphlets are reprinted annually and requirements updated regularly. Your suggestions for improvement are welcome.

Who Pays for This Pamphlet?

This merit badge pamphlet is one in a series of more than 100 covering all kinds of hobby and career subjects. It is made available for you to buy as a service of the national and local councils, Boy Scouts of America. The costs of the development, writing, and editing of the merit badge pamphlets are paid for by the Boy Scouts of America in order to bring you the best book at a reasonable price.

Send comments along with a brief statement about yourself to
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BOY SCOUTS OF AMERICA
MERIT BADGE SERIES

TRAFFIC SAFETY

"Enhancing our youths' competitive edge through merit badges"

BOY SCOUTS OF AMERICA®

Requirements

1. Do the following:
   a. Describe the top 10 mistakes new drivers frequently make. Name the two items you are required by law to carry with you whenever you operate a motor vehicle.
   b. Describe how alcohol and other drugs affect the human body and why a person should never drink and drive, or drive while under the influence of any mind-altering substances including prescription drugs, cold medications, and illicit drugs. For the state where you live, find out what is the legal blood alcohol concentration and the consequences for driving while intoxicated or driving under the influence. Find out what the open-container law is in your state.
   c. Describe at least four factors to be considered in the design of a road or highway. Explain how roadside hazards and road conditions contribute to the occurrence and seriousness of traffic crashes.
   d. Explain why a driver who is fatigued or distracted should not operate a motor vehicle. List five common distractions, explain how driver distractions contribute to traffic accidents, and tell how drivers can minimize distractions. Describe how volunteer drivers can plan to be alert when transporting Scouting participants.

2. Do the following:
   a. Demonstrate how to properly wear a lap or shoulder belt. Explain why it is important for drivers and passengers to wear safety belts at all times.

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   b. List five safety features found in motor vehicles besides occupant restraint systems. Describe each safety feature, how each works, and how each contributes to safety.

3. Do the following:
   a. Using your family car or another vehicle, demonstrate that all lights and lighting systems in the vehicle are working. Describe the function and explain why each type of light is important to safe driving.
   b. Using your family car or another vehicle, demonstrate how to check tire pressure and identify the correct tire pressure for the vehicle. Explain why proper tire pressure is important to safe driving.
   c. Demonstrate a method to check for adequate tire tread. Explain why proper tire tread is important to safe driving.
   d. Demonstrate with a smear-and-clear test if the windshield wiper blades will clear the windshield completely or need to be replaced. Describe instances in good and bad weather when windshield washers are important to safe driving.

4. Do the following:
   a. In a location away from traffic hazards, measure with a tape measure—not in a car—and mark off with stakes the distance that a car will travel during the time needed for decision and reaction, and the braking distances necessary to stop a car traveling 30, 50, and 70 miles per hour on dry, level pavement. Discuss how environmental factors such as bad weather and road conditions will affect the distance.
   b. Describe the difference in nighttime visibility between a properly lit bicycle and rider (or a pedestrian) wearing reflective material and a bicycle and rider with no lights (or a pedestrian) dressed in dark clothing, without reflective material.
   c. Explain how color and shape are used to help road users recognize and understand the information presented on traffic and roadway signs. Explain the purpose of different types of signs, signals, and pavement markings.

d. Describe at least three examples of traffic laws that apply to drivers of motor vehicles and that bicyclists must also obey.

5. Do ONE of the following:
   a. Interview a traffic law enforcement officer in your community to identify what three traffic safety problems the officer is most concerned about. Discuss with your merit badge counselor possible ways to solve one of those problems.
   b. Using the internet (with your parent's permission), visit five websites that cover safe driving for teenagers. As a group, discuss what you learn with your counselor and at least three other teenagers.
   c. Initiate and organize an activity or event to demonstrate the importance of traffic safety.
   d. Accompanied by an adult and a buddy, pick a safe place to observe traffic at a controlled intersection (traffic signal or stop sign) on three separate days and at three different times of the day, for 30 minutes on each visit. At this intersection, survey (1) such violations as running a red light or stop sign; or (2) seat belt usage. Count the number of violations or number of drivers not wearing a seat belt. Record in general terms if the driver was young or old, male or female. Keep track of the total number of vehicles observed so that you can determine the percentage of compliance vs. violations. Discuss your findings with your merit badge counselor.

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Traffic Safety: So Important It Could Save Your Life

Staying safe in traffic wherever you live is getting more difficult all the time, as more and more people take to the road. This pamphlet will help you earn your Traffic Safety merit badge and will give you some crucial tools to stay safer, whether you are driving a car on a highway, riding a bike across town, or jogging across a busy street.

Whether you live in a rural area or in the cities and suburbs, traffic is a fact of life. You can be surrounded by pristine wilderness and still be in the middle of a traffic jam. Just ask the thousands of tourists who drive or bring their vehicles to Alaska via the ferry system every summer, clogging the state's few major roads and slowing traffic to a crawl.

In 2013, motor vehicle accidents in the United States killed more than 32,000 people. That is more than 1½ times the number of people who fit into the average professional basketball arena.

Accidents can happen in a split second. Even experienced drivers might take their eyes off the road a moment too long or go into a skid on an icy road. As a young driver, you should be aware that teenagers in the United States are far more likely to have a serious traffic accident in their first year operating a motor vehicle than any other age group. Why? It comes down to a combination of factors from inexperience to the sense of invincibility and exhilaration young people sometimes feel when they first get behind the wheel of a 2-ton car. Combine alcohol or drugs with driving and the results are often deadly. As a new driver it is critical that you develop a combination of defensive, proactive skills to help you stay safe on the roads.

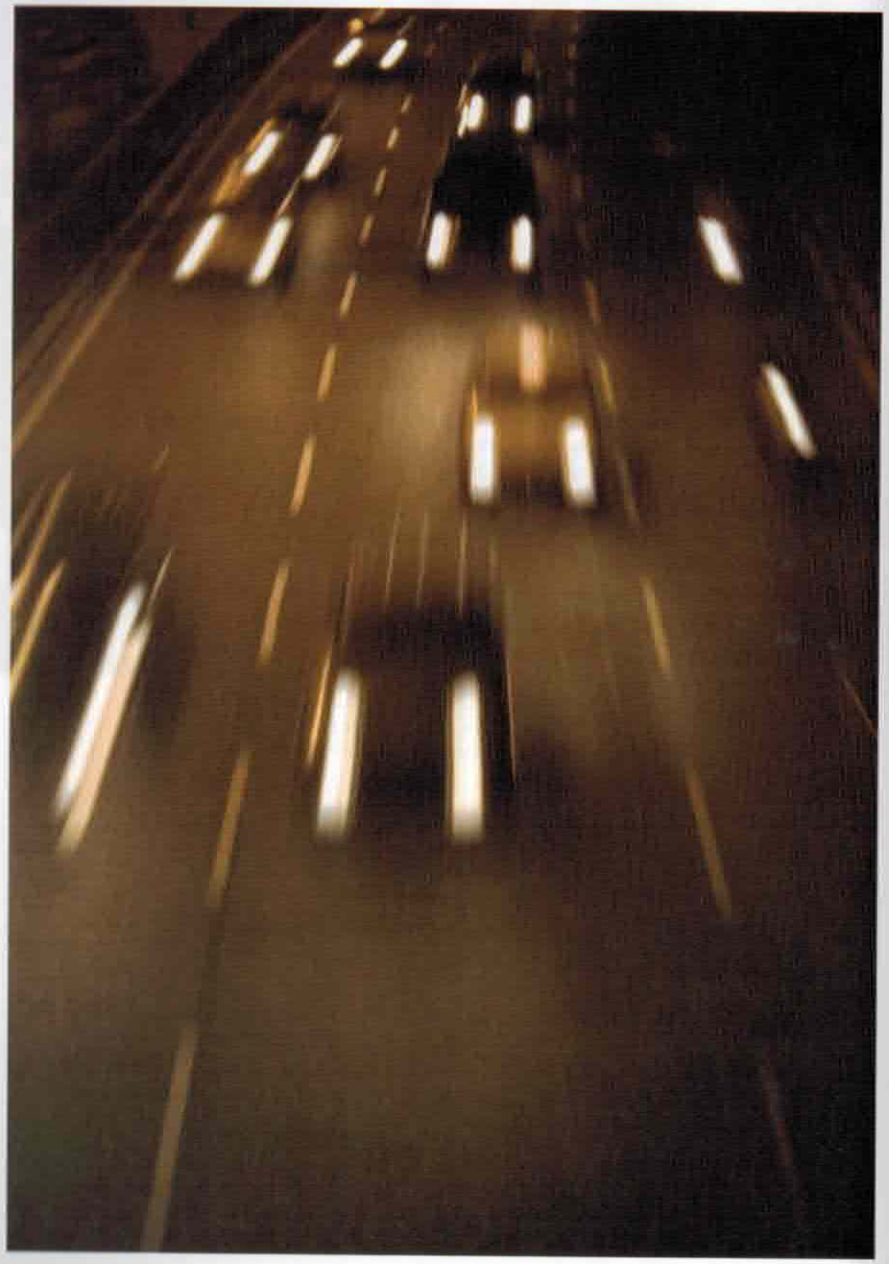
The Cost of Our Car Culture

Americans love their cars. We spend at least half as much time stuck in traffic each year as we do going on an annual vacation. Wherever you live, commutes to school or work are getting longer and more snarled with traffic.

The problem is that we rely on our vehicles for our daily needs. Trucks deliver food and other items to stores for us to buy and use. Emergency vehicles such as fire trucks and police cars respond to emergencies. Yet for all the advantages of motorized transportation, there is a big price to pay. Motor vehicle crashes are the leading cause of death among people ages 1 through 34 and the leading cause of injury for all age groups.

Vehicular accidents lead to tremendous social and economic costs. When someone is killed in a car crash, a whole range of people from family members to friends and acquaintances feel the terrible loss. Economically, in addition to lost wages, crash injuries contribute to expenses for medical care, emergency services, nursing-home care, rehabilitation, home modifications, insurance administration, and property damage that amount to billions of dollars each year.

However, the biggest price society pays for transportation accidents is personal. Lives can change in an instant. Just imagine how parents feel when they get a phone call telling them that their child has been injured or killed in a car accident.



The Perils of Impaired Driving

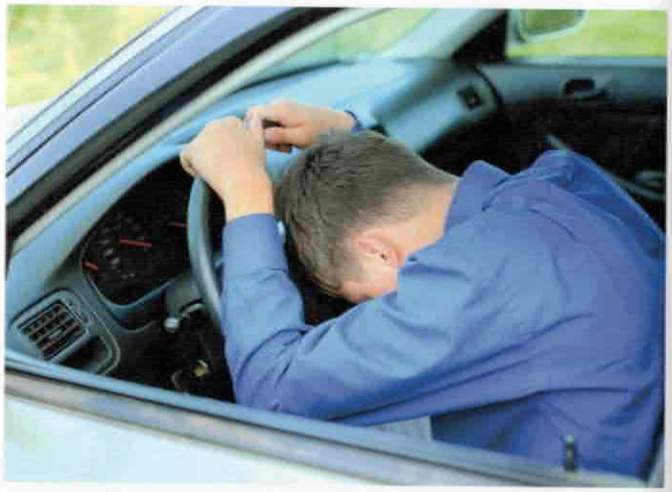
Motor vehicle crashes are the leading cause of death in the United States for young people, and an alarming number of these crashes are related to alcohol or drug abuse. Alcohol-impaired driving is highest among persons 21 to 24 years old, and the percentage of fatal crashes that are alcohol-related is highest for this age group.

However, even for the youngest drivers, alcohol-related crashes are a serious problem. Not only are drivers under age 21 more likely than older drivers to be involved in fatal crashes, but their added risk for fatal crash involvement increases more sharply at all levels of alcohol use.

Alcohol and drugs are perhaps the most publicized causes of impaired driving, but they are not the only causes. Each year a considerable number of serious crashes occur as a result of drivers who are impaired by fatigue and drowsiness.

Another serious factor in accidents is drivers using their cell phones while driving, which diverts their attention from the road. Texting while driving is extremely dangerous and is illegal in many states.

To *impair* means to weaken or damage.



Alcohol and Driving

Alcohol is a depressant. It slows down the functioning of the brain and the nervous system. The physical and mental skills needed to operate a vehicle safely, along with clear vision, are impaired when a person drinks and then gets behind the wheel.

Six Scout-age youths lose their lives in alcohol-related crashes every day. More than one-third of all traffic fatalities are alcohol-related.

Alcohol **impairs** the following skills and abilities:

- **Multitasking**—Research suggests that the most serious effect of alcohol on a driver is that it reduces the driver's ability to handle several tasks at one time.
- **Reaction time**—Alcohol slows the driver's ability to react to sudden events on the road.
- **Tracking**—Drivers under the influence of alcohol have trouble continuously observing the position of the vehicle with respect to the road and keeping the vehicle in the correct location.
- **Comprehension**—Alcohol diminishes the driver's ability to perceive hazards on the road.
- **Attention span**—Alcohol reduces the driver's alertness over an extended period of time.
- **Coordination**—A drunken driver cannot handle tasks that require high levels of precise movement.

Blood Alcohol Concentration

Blood alcohol concentration (BAC) is the amount of alcohol in the bloodstream. It is measured by the weight of the alcohol in relation to the blood. BAC can be measured by breath, blood, or urine tests within 30 to 70 minutes after someone has had a drink.

It is more accurate to refer to alcohol-impaired driving rather than intoxicated (drunken) driving because a person does not have to be legally intoxicated to be impaired. In all 50 states, the legal standard for intoxication is a BAC of 0.08. However, studies have shown that impairments first appear at BACs as low as 0.02. Driving skills, especially judgment, are impaired in most people long before they show obvious signs of drunkenness.

Factors that affect BAC include the following:

- **Amount of alcohol consumed.** The more a person drinks, the higher the BAC level will be.
- **Body weight.** Heavier people are not as quickly affected by alcohol as lighter people.
- **Food in the stomach.** When the stomach has food in it, the bloodstream absorbs alcohol more slowly.
- **Gender.** Women reach higher BACs faster than men. Therefore, if a man and woman, with all other factors being equal, are both drinking the same amount of alcohol, the woman will have a higher BAC level.
- **Type of alcohol consumed.** The higher the alcohol content of a drink, the more quickly it is absorbed. Distilled spirits (whisky, vodka, rum, gin) have the highest concentration of alcohol, followed by wine and then beer.
- **Speed at which a person drinks.** The liver can process and eliminate only about one drink per hour (one drink = 1.5 ounces of 80-proof distilled spirits; 5 ounces of wine; or 12 ounces of beer). If a person drinks more quickly than this rate, the excess alcohol will remain in the bloodstream and elevate the person's BAC.

Consequences of DUI/DWI

The laws regarding *driving under the influence (DUI)* or *driving while intoxicated (DWI)* in the United States are very rigid. It is illegal in all 50 states to drive with a BAC at or above 0.08 percent. In a majority of states, drivers who are found to have a BAC of 0.08 or higher will have their licenses revoked or suspended under a procedure called administrative license suspension. Drivers who refuse a BAC test will also have their licenses suspended or revoked. These administrative suspension laws, which go into effect right after an arrest, have proved to be more effective than laws that did not suspend or revoke a license until after a person was convicted of alcohol-impaired driving.

Most states have open-container laws that prohibit the driver or other occupants of a vehicle from having open containers of alcohol in the passenger compartment of the vehicle. Penalties for those convicted of violating open-container laws vary from state to state but include fines and community service. Find out what the open-container law is in your state.

The consequences of DUI/DWI vary but can include some or all of the following: fines, license suspension, license revocation, mandatory alcohol-awareness classes, community service, and jail time. Repeat offenders will likely serve time in jail, be required to participate in an alcohol-abuse program, and also may need to enroll in an Alcoholics Anonymous program.

Other circumstances can make the punishment harsher. Drivers under the influence who have a child in the car with them, who are speeding, who refuse to take a BAC test, who have prior DUI/DWI convictions, or who cause an accident or injury will receive stiffer penalties. In most states, if a drunken driver injures someone, it is considered a felony. If the person dies, the driver can be charged with manslaughter or murder.

A Tremendous Loss

By Joe, age 16

Last September, a friend, teammate, and fellow Scout in my troop was in a horrible car accident. His name was Tim Murphy. He was a senior at my school and a year older than me. He was captain of our school's varsity soccer team, the first-chair French horn player in the band, and a Life Scout working hard on Eagle Scout requirements.

One night after a senior dance, Tim was driving home very late on Interstate 55, headed south. Tim's car was hit head-on by a northbound car. Both cars were totaled, and Tim was stuck inside. We later learned that Tim died instantly, and the other driver, who had been drinking, also died. People living close to the scene of the accident heard the noise and came to see what happened. A man who witnessed the accident had trouble sleeping because he kept thinking about the two people who had died in the crash.

Tim was a great person. His soccer number, 17, is retired now. The band dedicated a concert to him. Photos of him are posted all over school. I sometimes wonder why the other driver had been drinking and driving, and I wonder if anyone had tried to stop him from getting behind the wheel.

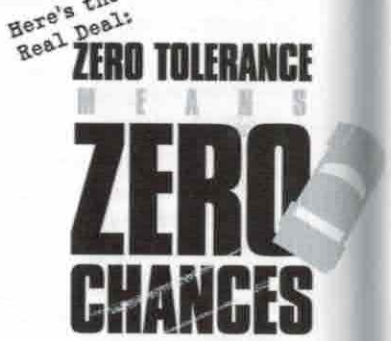
We all miss Tim, and we wish he were still with us today.

Many insurance companies automatically cancel their coverage of a driver convicted on a DUI/DWI violation.

A conviction for DUI/DWI for driving under the influence of alcohol or drugs can cost a person as much as $15,000 as a result of attorney's fees, increased insurance rates, towing fines, court costs, and bonding fees. A person's license may be suspended or revoked. A conviction can prevent a person from getting a job or a promotion, and it can even get the person fired.

Zero-Tolerance Laws

Young drivers are particularly susceptible to impairment by alcohol. During a typical weekend, one teenager dies every hour in a car crash. Nearly 50 percent of those crashes involve alcohol. Safety advocates have argued that teens should not drive if they have had any amount of alcohol, which has led to support for *zero-tolerance laws.* All 50 states have enacted zero-tolerance laws for drivers under age 21. These laws set the BAC limit of 0.00 (no detectable level) to 0.02 percent as the legal limit. Underage drivers found to be under the influence may be fined and/or have their license suspended. In addition, they may be required to attend alcohol-education classes and perform community service.



Drugs and Driving

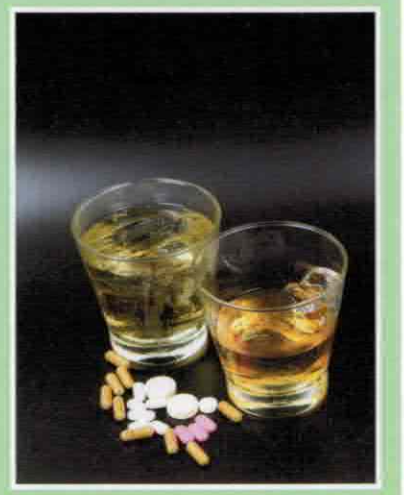
Using marijuana also impairs many of the skills needed for driving a car. Effects may include difficulty in judging distances and delayed reactions to sights and sounds that drivers absolutely need to notice, much like the effects of drinking alcohol. When users combine marijuana and alcohol, the hazards of driving become even more serious. Driving while under the influence of drugs is more common among drivers ages 16 to 20 than any other age group.

A Deadly Mix

Research shows that

- Marijuana is harmful to the brain, heart, lungs, and immune system. It limits learning, memory, perception, judgment, and complex motor skills such as those needed to drive a vehicle.
- People under the influence of cocaine become easily confused and lose the ability to think clearly for any length of time.
- Inhalants can cause damage to the heart, kidneys, liver, brain, and other organs.

Many people believe that only alcohol, marijuana, and other "hard" drugs impair their abilities. Prescription drugs and over-the-counter medicines such as antihistamines for colds and allergies can cause drowsiness and other side effects, too. Every year some crashes are caused by drivers who are not alert because of medicine they took. The danger is even greater for a person who is taking more than one medication. The interaction of two or more medicines may impair driving in ways that catch the driver by surprise. Warnings on prescription bottles—such as those advising drivers to stay off the road when on the medication—should be taken seriously.



Your Responsibilities as a Passenger

Even when you are a passenger, you should pay attention to the condition of the person who is driving the vehicle. You might think that young victims of drunken drivers are usually in a car that is hit by the intoxicated driver or that they were hit while walking or riding their bikes; however, a study of children who died in alcohol-related crashes revealed that nearly two-thirds of those children were riding with the drunken driver. Two-thirds of drunken drivers studied were parents or adult caregivers, while most of the others were young drivers.*

Even if you experience peer pressure to get in a car with a group of friends who have been drinking or you are at a family event where a parent has been drinking, your life and the lives of others may depend on your having the judgment and the courage to say, "I'm not riding with you because you've been drinking."

Asleep at the Wheel

Did you know that 58 percent of commercial vehicle accidents are estimated to be related to fatigue?

Most people know that drinking and driving is dangerous, but they may not realize that driving while drowsy can be just as fatal as driving while drunk. Fatigue or lack of sleep can cause a driver to fall asleep at the wheel or to not pay attention while driving. Fatigue slows reaction time, dulls awareness, impairs judgment, and consequently increases the risk of crashes.

Research into sleepiness focuses on the human biological clock. Everybody has a biological clock that plays a role in controlling hunger, energy levels, and body temperature. Most people's biological clocks make them especially likely to feel sleepy at three specific times during the day. One is the afternoon lull, from 2 p.m. to 5 p.m. The others are early in the morning and late at night, which is by far the most dangerous time for drivers.

When you drive, pay careful attention to the behavior of other drivers near your vehicle. If you see them weaving, drifting into another lane inexplicably, heading for a ditch, or exhibiting any other unusual behavior, actively avoid them—slow down and stay in back of them. If you yourself start feeling drowsy while driving, get off the road immediately. Get out and take a brisk walk to wake yourself up, or have someone who is well-rested take the wheel.

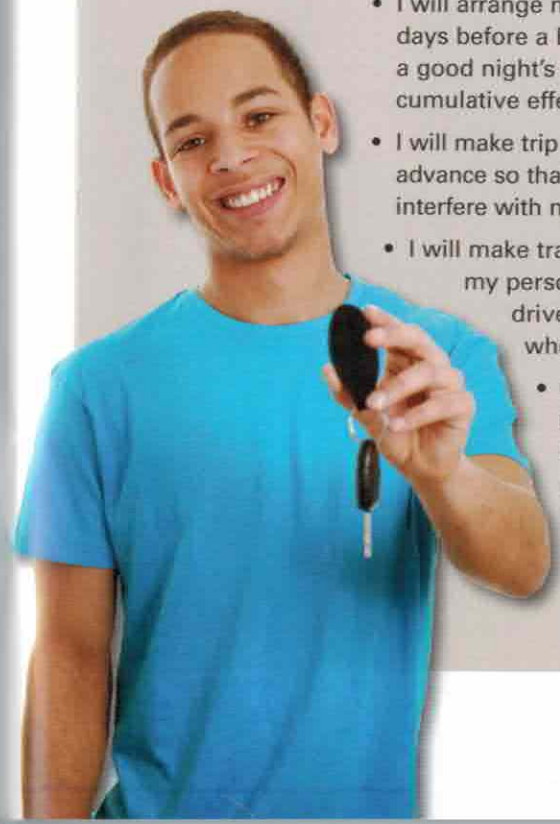
*Quinlan, Kyran, M.D., et al., "Characteristics of Child Passenger Deaths and Injuries Involving Drinking Drivers," *Journal of the American Medical Association* (May 3, 2000).

The Risk Zone

Driving while fatigued is a transportation concern being addressed by the Boy Scouts of America. The BSA hopes to raise awareness of the dangers of drowsy driving with the help of the Risk Zone campaign. The following driver's pledge is an important piece of the campaign and emphasizes that planning is the best defense against killer fatigue.

THE RISK ZONE

DRIVER'S PLEDGE



- I will not drive when I feel fatigued. I realize that when I am fatigued, I process information more slowly and less accurately, and this impairs my ability to react in time to avoid accidents.
- I will arrange my schedule so that for several days before a Boy Scout driving trip, I will get a good night's sleep every night to avoid the cumulative effects of not getting enough sleep.
- I will make trip preparations far enough in advance so that last-minute preparations don't interfere with my rest.
- I will make travel plans that take into account my personal biological clock and will drive only during the part of the day when I know I will be alert.
- I will be smart about engaging in physical activities during Scouting outings and will make sure that I will be ready to drive alert.

DO ALL THAT YOU CAN TO KEEP SCOUTS SAFE.

Keeping Us Alive Through Road Design

The need for better and safer roads is a constant challenge for engineers. In this section you will learn to look at streets and roads through the eyes of a highway engineer. Highway engineers design roads using scientific principles and standards that help keep drivers safer and cyclists and pedestrians safe. A highway engineer has much responsibility and many factors to consider when designing a road.

The Role of the Federal Highway Administration

The Federal Highway Administration (FHWA) is a federal agency that helps develop and improve the nation's transportation system. Among the chief responsibilities of the FHWA is the improvement of roadway safety. The FHWA seeks to educate the public about roadway safety and to find ways to reduce the number of pedestrian fatalities, intersection fatalities, and *road departure fatalities*—deaths that occur when a vehicle leaves its designated lane.

According to the FHWA, roadway safety is a serious, national public health issue. In 2012, 2.36 million injuries and 33,561 fatalities occurred on our nation's roads—that's an average of 98 deaths a day.

Rumble Strips

Rumble strips help keep roads safe because they increase driver attention. The textured patterns of rumble strips will not damage a vehicle and can safely be driven over at the speed limit. They may be used in the following roadway locations:

- Across a road when there is a tollbooth ahead or when there is an unexpected stop sign or traffic signal after a long stretch of uninterrupted roadway
- Along the shoulder of rural highways, especially interstates, to alert drowsy drivers that they have begun to drift onto the shoulder
- In the center of a two-lane road to warn of the danger of passing

Roadway Safety Features

Rumble strips, retroreflective signs and markings, and special roadway hardware are some of the safety features highway engineers incorporate in their roadway designs. *Rumble strips* are small indentations or raised strips on the pavement that, when driven over, make noise. Rumble strips alert drivers when they are veering off the road or heading into a different lane. *Retroreflective* signs and pavement markings help nighttime drivers. Made from a material that bounces light from headlights back to drivers' eyes, such signs and markings are quite easy to see at night. Forgiving roadside hardware (such as guardrails and breakaway poles) skid-resistant pavement, and all-weather pavement markings also help prevent or minimize the severity of accidents.

Roundabout sign

About 40 percent of all crashes occur at intersections. To make intersections safer for drivers, pedestrians, and bicyclists, traffic engineers have made improvements to the timing mechanisms of traffic signals. They also have improved signage, added exclusive turn lanes, and built *roundabouts*—circular intersections that eliminate certain intersection conflicts such as left turns.

To improve safety specifically for pedestrians, traffic engineers make improvements to lighting to enhance visibility and construct islands on medians that give pedestrians a safe place to stop when crossing a multilane street or road. For blind and low-vision pedestrians, traffic engineers add special audible signals that help them know when it is safe to cross a street and *truncated domes* that help them detect the boundary between the sidewalk and the street.

Speed

When a new road is built or an old one rebuilt, one important decision that guides the design is what the speed limit will be. Common sense dictates that if a driver can just barely negotiate a curve safely while driving 30 miles per hour, the curve will be too sharp for an interstate highway where the speed limit is 65 to 75 miles per hour. For example, if engineers know that the project is for a rural two-lane highway with a speed limit of 55 miles per hour, they can research the correct standards to find out how they should design lane and shoulder widths, curves, grades, passing zones, and intersections. When the road is built, it will be safe to drive at 55 miles per hour.

Uniformity

Imagine you and your family are driving from your home in Pennsylvania to the Grand Canyon in Arizona. When you get to Indiana, the stop signs are blue circles instead of red octagons. In Colorado, all the road signs look like pine trees, and you cannot see them well at night. To keep this traffic-safety nightmare from happening, the FHWA makes sure every state adheres to its *Manual on Uniform Traffic Control Devices*, which tells traffic engineers which signs are needed, what they must look like, and where they must be installed. You will learn more about signs, signals, and pavement markings in the "Navigating the Road" section of this pamphlet.

Accommodating All Road Users

Traffic engineers must be mindful of the needs of all the people who will use the roads. With an increasing number of older drivers in our society, engineers must pay special attention to making signs more visible and intersections and interchanges less confusing. An engineer also must consider the needs of younger drivers. A teenage driver, for example, may lack the experience to anticipate hidden hazards that can cause crashes. Nor can the engineers fail to address the needs of people with disabilities. Someone who walks with a cane, for example, will take longer to cross the street than other pedestrians and, thus, traffic signal timings will need to be long enough to allow them to safely get across an intersection. Curbs must have ramps so people in wheelchairs can safely cross the street.

Intersection, Lane, and Visibility Safety Issues

Intersections are the most dangerous locations in urban areas. Based on volume of traffic and other factors, a traffic engineer needs to decide if a traffic signal is necessary and whether there ought to be separate left-turn or right-turn lanes. Parking must be prohibited near intersections so that drivers can clearly see other cars and pedestrians. Room for a bus stop may be needed. If there is a traffic signal, crosswalks and "Walk/Don't Walk" signals must be included in the design.

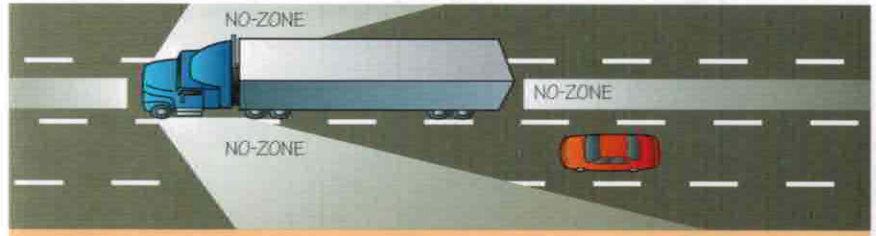
At rural intersections, sight distance is an important part of the design. Drivers on a side road must be able to see far enough to the right and to the left so that they can safely pull onto a highway where traffic may be traveling at 55 miles per hour or faster.

Lane safety is also important to road engineers. They need to figure out how many lanes are needed to prevent congestion and move traffic along smoothly. They also need to determine how wide the lane should be to permit safe travel at the speed limit. On a quiet residential street, lanes may need to be only 10 feet wide, while a high-speed freeway requires 12-foot lanes.

On high-speed, high-volume highways, it is important to separate lanes of opposing directions of traffic to prevent head-on crashes. Engineers prefer a wide grass median between lanes so oncoming cars have room to stop or recover if they leave the left side of the roadway. Also important are shoulders on suburban or rural roads where drivers can safely stop in case of an emergency. To prevent accidents that could happen as vehicles enter and exit interchanges on expressways and freeways, traffic engineers include acceleration and deceleration lanes.

Visibility is important in all road design. A driver needs to be able to see hazards ahead to have time to make a decision to stop if necessary. It is impossible to see over the crest of a hill or around a curve. Engineers try to design roads so hazards such as intersections and railroad crossings are not hidden from view. Signs and pavement markings must be visible not just in bright daylight but in dark nighttime conditions as well as in poor weather. Proper street lighting is important, especially in urban areas where pedestrians are present.

Cities across the country have added high-occupancy vehicle (HOV) lanes to help alleviate congestion during peak traffic times.



Don't Hang Out in the No-Zone

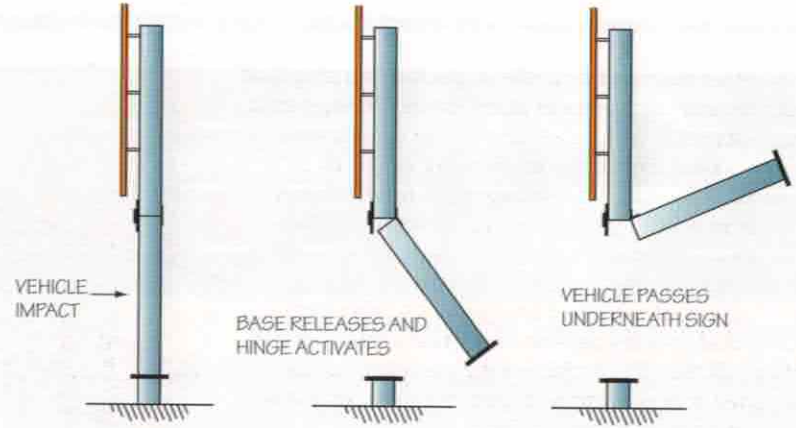
No-zones are danger areas around trucks where crashes are more likely to occur. Some of those no-zones are actual blind spots where your car "disappears" from the view of the truck or bus driver (or where another vehicle on the road "disappears" from your own view). Automobiles also have blind spots.

Terrain is another major consideration in an engineer's design of a new roadway. Sharp curves and steep hills can cause drivers to lose control and run off the road. Engineering gentle curves and grades is the desirable solution. Whenever possible, the road is designed so that it can be driven safely at the posted speed limit. Sometimes, however, the terrain makes it impossible to meet the design speed standard for curves or grades, and in that case, warning signs are posted.

Roadside Hazards

Keeping motorists alive through good road design also means paying attention to the roadside. In more than one-third of all highway fatalities, the side of the road is a factor. Various factors can cause a vehicle to leave the roadway, including distractions, vehicle malfunctions, traffic situations, and poor road conditions. Whatever the reason, once a vehicle leaves the roadway, the results are often catastrophic. Many roads are lined with "booby traps"—trees, signs, posts, guardrails, or other structures that can mean death for a motorist.

When designing a road, engineers try to leave a clear zone on the side of it, but it is not always possible to construct such forgiving roadside areas along every highway. Engineers strive to provide sides of the road that are free of hazards with enough room for the driver to regain control of the vehicle and come to a safe stop whenever possible.



Breakaway sign support

When it is not possible to create an adequate clear zone, roadside objects such as light poles and signposts can be built to yield or break away, which can greatly increase a motorist's chance of survival without serious injury. The ends of bridges and concrete median barriers can be protected by special energy-absorbing crash cushions. In some instances the best method is to eliminate the hazard. Each roadside object is evaluated and removed if it is not needed.

Road Conditions

Road conditions play a major role in the safe operation of vehicles. Good pavement conditions are important for traction and for stopping quickly. When highway surfaces are well-maintained, drivers have a better chance of staying on the road. Proper maintenance means that drivers won't have to swerve to avoid potholes or lose control if their wheel hits a rut in the road or strays onto a shoulder drop-off.

Weather plays a critical role in quickly changing road conditions and contributes to many crashes. Rain, even a drizzle, can cause a vehicle's tires to lose contact with the road. When there is too much water on the road, the vehicle's tires can start skimming on the surface of the water instead of gripping the road—a phenomenon known as *hydroplaning*. It can cause loss of control of the vehicle and a possible crash. To help eliminate this hazard, engineers design roads so that rainwater drains quickly to the edges and is carried away by storm drains or ditches. The surface of the pavement can be constructed with roughness or grooves to help tires maintain better traction and avoid skids.

In regions of the country where snow is common, design engineers try to help make winter driving safer. For example, an area beside the street or road can be designed for snow storage. When the snowplows come through, they can clear the road all the way to the curb or the edge of the shoulder. In addition, some cities are experimenting with a special type of concrete that slowly releases ice-melting chemicals as vehicles drive over a bridge in freezing temperatures, thus helping keep the bridge safe for travel. Another fairly recent innovation is electronic signs that post warnings about hazardous conditions such as fog, high winds, or severe snow and ice storms. Sometimes these signs are connected to sensors so that they automatically turn on if visibility or conditions drop below an acceptable limit.

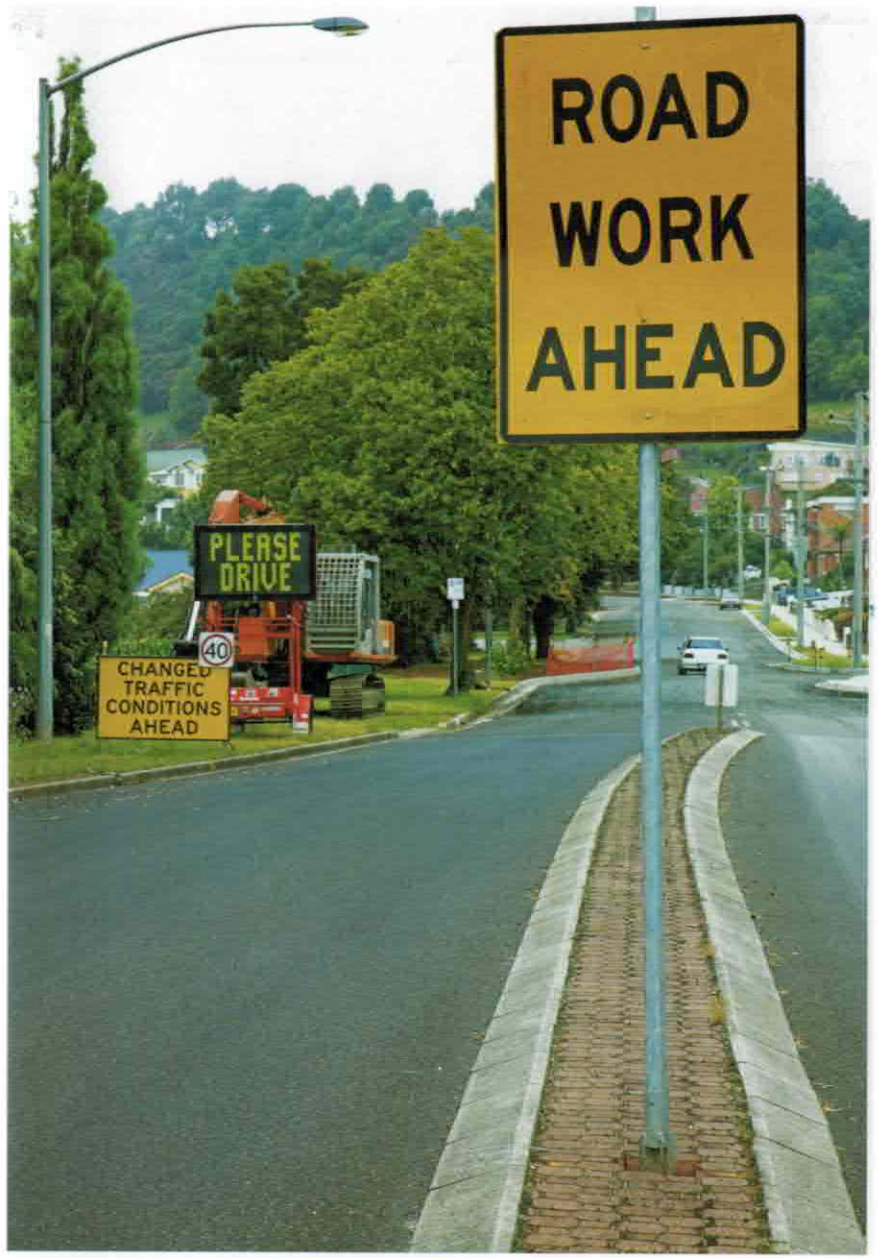
You have probably seen signs at bridges reading "Bridge Freezes Before Pavement." Because the undersides of bridges are exposed to cold air, the bridge deck will freeze first and become icy and slick.

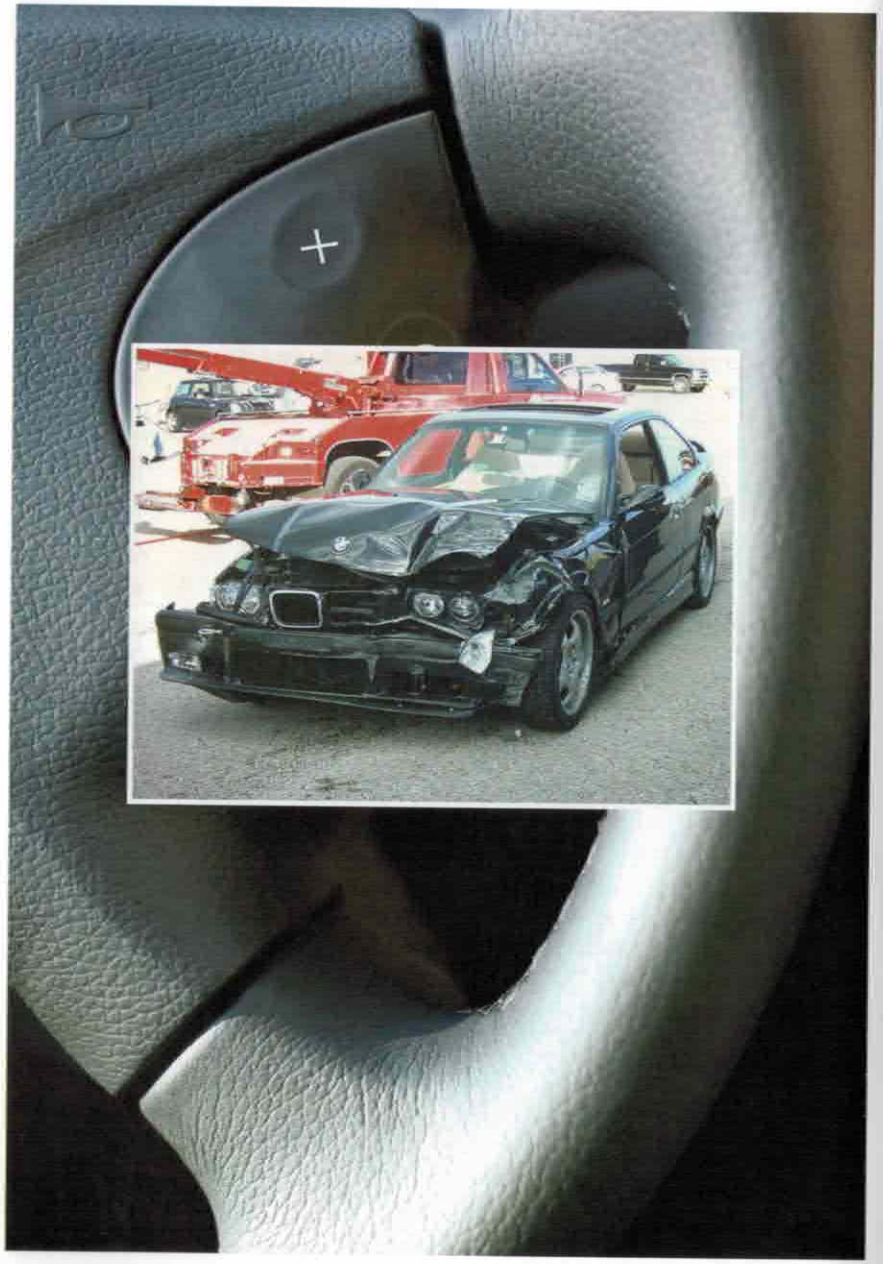
Road construction is a daily inconvenience for most drivers, but it is important to maintain and upgrade our roads and bridges. Repairing them before they deteriorate too much helps prevent accidents and saves taxpayers' money.

Highway Work Zones

At construction sites, design engineers must ensure that the work zone is safe for both the workers and the travelers. Every road construction job includes a maintenance and protection of traffic plan. The engineer must decide how to safely handle traffic along the construction route, which requires planning the layout of warning signs, barricades, drums, or cones. Sometimes all traffic is detoured around the site or the construction is staged to keep one or more lanes open at all times. Engineers impose a reduced speed limit, because drivers sometimes become confused even in a well-designed work zone. At slower speeds, drivers have more time to make good decisions.

Every year hundreds of road-construction workers are killed or injured on the job by inattentive drivers who crash through work zones. Always remember to slow down and pay careful attention to safety in traffic construction zones.





Engineering Safety Into Vehicles

Vehicle accidents cause damage, injuries, and deaths because the crashes impose force on people and property beyond their breaking points. By managing the *force*—the sudden transfer of energy in a crash—and by controlling the time and the areas it affects, damage and injuries can be reduced. A person can withstand a great deal of force when properly "packaged" for it.

For more than 50 years, manufacturers have been engineering automobiles with increasingly sophisticated safety features. Guiding manufacturers to produce safe vehicles is one of the responsibilities of the Department of Transportation's National Highway Traffic Safety Administration (NHTSA). The NHTSA works to reduce deaths, injuries, and economic losses from traffic accidents. It establishes and enforces safety performance standards. It also develops programs to prevent crashes and reduce losses before a crash happens, to protect people and property in a crash, and to help reduce the amount of damage after crashes occur.

One way the NHTSA accomplishes its goal of providing safety information is by putting cars and trucks through crash-testing procedures using crash-test dummies. The NHTSA tests include running vehicles head-on into a fixed barrier at 35 miles per hour. Afterward, researchers evaluate the impact on the dummies' heads, chests, and legs and the reliability of occupant restraint systems such as seat belts and air bags. Due in large part to this testing, today's passenger vehicles are far more crashworthy than cars and trucks used to be.

All cars must meet the federal Department of Transportation's safety standards for crashworthiness.

Larger, heavier cars tend to be safer in a collision than smaller vehicles. If a smaller car collides with a heavier, larger vehicle, the smaller car and its occupants will suffer much more damage.

Occupant Restraint Systems

Safety belts are the most effective device for preventing serious injuries and reducing fatalities in motor vehicle crashes. Studies have shown that people who wear seat belts reduce their risk of serious injury by 50 percent and reduce the risk of fatal injury by 45 percent. Safety belts also keep passengers properly positioned to fully benefit from the protection provided by air bags. Research has shown that the chances of being killed are five times greater when the occupant is thrown from a vehicle. Properly worn safety belts help prevent passengers from being ejected. Crash victims who wear safety belts are more likely to be unhurt, alert, and able to escape quickly. Always wear a safety belt and make sure that all other passengers are properly restrained.

The NHTSA says that growing up safe is a four-step process. As children grow, the way they are restrained in a vehicle should grow with them.

Rear-facing infant seats (back seat). From birth to at least 1 year old and at least 20 pounds.

Forward-facing toddler seats (back seat). From age 1 and 20 pounds to about age 4 and 40 pounds.

Booster seats (back seat). From about age 4 to at least age 8, unless the child is at least 4 feet, 9 inches tall.

Safety belts (back seat). From when a child reaches age 8 or is taller than 4 feet, 9 inches.

Proper Use of Safety Belts

Fasten the seat belt low on the hips and as snugly as possible. This ensures that crash forces will be spread out by the safety belt at the strong hipbone structure rather than across the soft abdominal area, which can easily be injured. The shoulder belt should go over the shoulder and across the chest. Check the manufacturer's instructions to properly adjust safety belts in your vehicle. Only one person should use each safety belt at a time. An adult cannot safely hold and protect a child in a vehicle. A crash impact would pull a child or infant from an adult's arms.

When transporting pets, always confine them to a carrier. This will prevent them from distracting or interfering with the driver and causing an accident. It also will keep them safer in the event of a collision.

Transporting Young Children Safely

Each year, thousands of children are injured or killed in traffic accidents. The proper use of child safety seats, booster seats, and seat belts can help keep infants, toddlers, and small children safe in a crash.

All children 12 years old and under should always ride properly restrained in the backseat. Children who sit in the front passenger seat, even if they are properly secured in a safety seat, risk injury or death should the vehicle be in a collision that causes the air bag to deploy.

Infants who weigh less than 20 pounds and are under 1 year of age should always ride in a rear-facing child-safety seat. Once a child is more than 1 year old and weighs at least 20 pounds, he or she can use a forward-facing safety seat. There are many different brands of safety seats on the market, so always read the manufacturers' installation instructions very carefully to be certain that the seat is properly installed and will properly protect the child. Children should continue to ride in safety seats until they weigh at least 40 pounds.

Children who weigh 40 to 80 pounds should use a booster seat, which will raise the child up high enough so that the lap and shoulder belts in the backseat will fit correctly. Because seat belts are designed to fit adults, a child should continue to use a booster seat until he or she is at least 4 feet 9 inches tall.

Booster seat

Air Bags

Side and front air bags have been proven to be effective safety devices. An *air bag* is a flexible membrane or envelope. When a head-on or nearly head-on collision occurs, air bags inflate rapidly with air or another gas to cushion the vehicle's passengers. The bag has small vent holes that allow the propellant gas to be (relatively) slowly expelled from the bag as the occupant pushes against it.

Children should never ride in the back of a pickup truck, even if the back is covered.

Air bags should always be used with a safety belt. Air bags supplement the safety belt by reducing the chance that the occupant's head and upper body will strike some part of the vehicle's interior. They also help reduce the risk of serious injury by distributing crash forces more evenly across the occupant's body.

In 1984, the federal government required all newly manufactured cars to have driver's side air bags by 1989. More than 15,000 lives have been saved by air bags in the years since. Initially, most vehicles featured a single air bag, mounted in the steering wheel to protect the driver of the car (who is most at risk for injury). During the 1990s, air bags for front-seat passengers and separate side-impact air bags, placed between the door and occupants, became common. In 1991, Congress mandated that all new passenger vehicles be equipped with driver and passenger air bags by 1998.

Once deployed, the air bag must be replaced by an authorized service department.

Statistics show that passengers in cars equipped with air bags have approximately 30 percent less chance of dying in an accident than in comparable cars without air bags. Despite this, air bags have caused some controversy, as the initial expansion of the bag is a violent event. Air bags deploy and inflate in about 1/20th of a second and have on rare occasions caused serious and sometimes fatal injuries. For example, if unrestrained occupants slide forward in their seats during braking prior to the crash, they may come into direct contact with the air bag module when it deploys.

Even properly restrained drivers who sit very close to the steering wheel can be injured or killed in an airbag deployment. Although manufacturers are always working on ways to improve the effectiveness and lessen the risks of air bags, the NHTSA recommends that drivers allow at least 10 inches of space between the center of their sternum and the center of the steering wheel.

Other Vehicle Safety Features

Other protective devices typically found in vehicles include a steering column that absorbs the energy of a driver thrown against it rather than remaining rigid. Side-guard beams provide side-impact protection. Headrests protect against whiplash by helping keep the head and neck erect during an impact. Penetration-resistant windshields help keep objects from breaking through glass. Antilaceration glass breaks into fragments without forming sharp edges, helping to reduce cuts.

Air bags are a risk to children seated in the front seat. The force of the air bag deploying can injure or kill a child, which is one of the reasons children under 12 should always be seated in the backseat, properly restrained in a child safety seat or a booster seat.

Still more vehicle safety features include recessed door handles, nonprojecting knobs on the dash panel, breakaway rearview mirrors, padded dashboards, padding on the back of front seats (for backseat passengers), crushable front ends of cars that absorb crash energy, and passenger compartments that resist being crushed. Some vehicles have inflatable rollover curtains that protect occupants against the series of impacts that happen during a rollover.

What to Look for When Buying a Car

Today's cars offer many safety features either included as standard equipment or available as additional options. Many insurance companies offer discounts if these features are in your car. Here are some important safety features to look for in a vehicle.

If your family is considering buying a sports utility vehicle (SUV), you should know that smaller SUVs are more likely to roll over than cars. Also, these vehicles do not have to comply with the same federal safety standards as cars.

Traction and Stability Control. Traction control systems help keep a vehicle's tires from losing contact with the road during acceleration. Stability control systems help prevent a vehicle from skidding sideways. Both are very helpful for keeping a vehicle on course in emergencies or in foul weather.

Antilock Brakes. When used properly, antilock brakes allow a driver to stop straighter and faster, especially on slick or wet surfaces.

Safety Belt Tensioners. Automatic safety belt tensioners instantly make the belt snug in a crash to better protect occupants from being thrown from the car.

Head Restraints. Head restraints are designed to prevent front-seat occupants' heads from being snapped back if a vehicle is rear-ended. Some new vehicles also have head restraints for backseat passengers.

Advanced Front Air Bags. Vehicles that are equipped with advanced front air bags adjust their inflation force to a passenger's weight and the crash conditions.

Side-Impact Air Bags. Side-impact air bags give additional protection to the head and torso during a crash.

Auto Maintenance and Safety Checkups

A motor vehicle is a complex machine that requires frequent checkups and adjustments to continue to operate safely. Miles of driving gradually wear down all the parts of a vehicle. As parts wear out, unsafe operating conditions develop. Regular vehicle checkups and repairs will help prevent the car's parts from failing because of normal wear and tear. The owner's manual that comes with a vehicle provides valuable information about the maintenance schedule and the proper use of the vehicle's equipment.

You can make the following simple safety-related checks. Have your parent or merit badge counselor observe and supervise your work as you go through the list. These simple checks, along with proper preventive maintenance, will help ensure that the vehicle is in safe operating condition.

Safety Belts

- Check the belts, buckles, and belt retractors periodically, and make sure that the belts are not twisted or excessively frayed. Check the mounts that hold lap and shoulder belts to the floor and the roof. Inspect them for damage and looseness, and replace any damaged equipment.
- If the belts in the vehicle were worn during a crash, have them inspected and replaced if necessary. The crash may have weakened them and reduced their ability to protect passengers during another crash.
- When belts become dirty, use only mild soap and lukewarm water to clean them.
- Never bleach or dye a belt. This can reduce the belt's overall strength.

Lights

Properly functioning lights help make a vehicle visible to others at night or during poor weather conditions. They also allow the driver to see other vehicles, pedestrians, and hazards in or near the roadway. You can make the following simple checks on the front lights. First be sure the engine is off, the vehicle is in park, and the parking brake is on. Make sure an adult is present, because you will be using the ignition switch and you will need help checking the lights.

- Turn on the parking lights and check that both front parking lights are lighted.
- Turn the headlights on, and check that they are working. Cars have both low-beam and high-beam lights. The high-beam light allows the driver to see farther down the road at night when other cars are not oncoming. Alternate between the low- and high-beam lights. Be sure that the lights work in each position.
- Move to the front of the car and check that all light lenses are free of dirt. Dirty lenses can greatly decrease the headlights' ability to light the road.
- Check to be sure all dashboard lights are working and all instruments are properly lighted.
- Operate the turn signals to make sure each front and rear directional signal light works. This step may require that the ignition switch be turned on. This should be done by an adult or under close adult supervision. The directional-signal indicators on the dashboard will flash if the turn signals are operating.
- Check the emergency flashing system. Turning the system on will cause all turn-signal lights to flash at the same time. Emergency flashers should not be used during normal driving conditions.
- Using the manual switch, turn on the dome light (interior light). Then turn the manual switch off and open each of the doors (one at a time) to be sure that the interior lights come on automatically.
- If the vehicle has any special lights, such as fog lights, check them also.

Now inspect the rear of the vehicle.

- Move the light switch to the parking light position. Tail lights and the rear license plate light should be lighted.
- Move the light switch for the headlights to the "on" position. Again, all rear lights should be lighted.
- Have an adult push the brake pedal. All brake lights should be lighted for as long as the brake pedal is pushed. The ignition switch may again have to be turned on, and this should be done only with adult supervision.
- Now ask the adult to press the brake, start the car, and put the gearshift lever into reverse. Stand safely clear of the rear of the vehicle while you check that both backup lights are working.
- Be sure all switches and controls are returned to the proper "off" positions after your check.

Windshields and Windows

Both sides of the windshield and windows should be kept clear and clean at all times. If the glass is cracked or broken, the window or windshield should be replaced. Be sure stickers or heavily tinted windows do not block the driver's vision. In most states, all required stickers should be in the lower right-hand or left-hand corner of the windshield. Under adult supervision, use the following procedure to check that windshield wipers are operating properly:

1. Wet the windshield with plenty of water so that dry, hard dirt will not scratch it.
2. Put the vehicle in park and engage the parking brake. Turn on the vehicle's ignition and switch on the windshield wipers. If the wipers operate at variable speeds, check each speed. Each wiper arm and blade should sweep across the windshield with a smooth, even motion without hitting the other blade or any part of the frame. Turn the wipers off.
3. Check the rubber wiper blades. They will need to be replaced from time to time, because summer heat and winter ice damage them. Many drivers give little thought to the blades until they need to use them. Check the blades with a simple "smear-and-clear" test. Mix soap powder or liquid soap with a small amount of water and whip the suds until they are thick and heavy. Smear or spray the solution onto the windshield and turn on the wipers. If the rubber blades do not clear the glass completely in about three wipes, they should be replaced. Try the same test with the new wiper blades and notice how quickly they clean the glass.

The windshield washer is also necessary for good vision in bad weather or when your windshield becomes dirty. Every time you open the hood for an oil check, check the fluid in the washer container. In cold winter months, be sure to use winterized washer fluid, which has additives to prevent it from freezing.

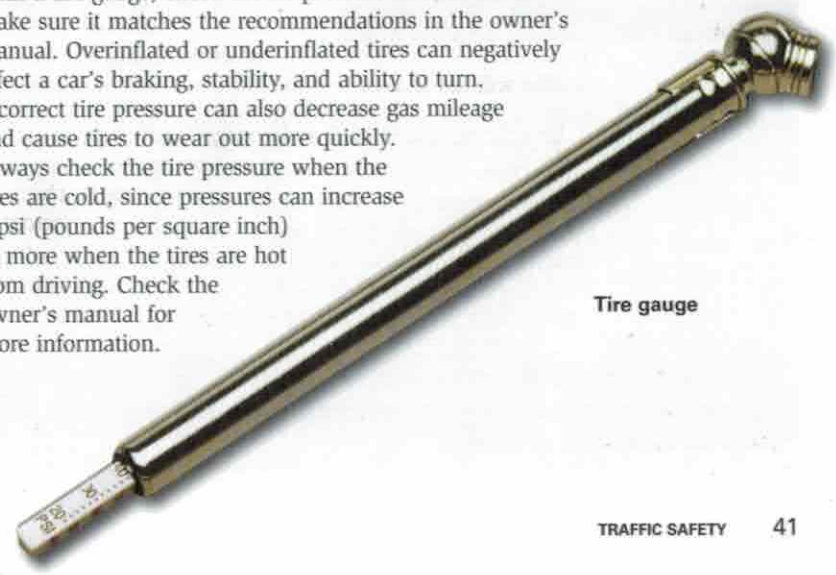
If your vehicle has a rear windshield wiper, use the same smear-and-clear procedure to find out if the rear wiper needs to be replaced.

Tires

The condition of the tires dramatically affects a driver's ability to control his or her vehicle. The design, tread, and inflation of the tires and the condition of the road—wet, icy, or dry—are important factors. When tires do not hold to the road during acceleration or braking, a vehicle can go into an uncontrollable skid. It is important to check a vehicle's tires to determine conditions that may cause poor traction or skidding.

Follow this simple procedure to check your vehicle's tires, including the spare.

1. With a tire gauge, check the air pressure in each tire to make sure it matches the recommendations in the owner's manual. Overinflated or underinflated tires can negatively affect a car's braking, stability, and ability to turn. Incorrect tire pressure can also decrease gas mileage and cause tires to wear out more quickly. Always check the tire pressure when the tires are cold, since pressures can increase 6 psi (pounds per square inch) or more when the tires are hot from driving. Check the owner's manual for more information.



Tire gauge

The tire pressure stamped on the sidewall of a tire is the maximum allowable pressure—not the recommended pressure. Always check the owner's manual to find out how much air to put in your tires.

2. Check the sidewalls and treads for cracks, cuts, bulges, blisters, and embedded nails, glass, or other foreign objects. (Do not rub your hand over the tire because you could cut yourself if something is embedded in the rubber.)

3. Check the tread carefully. Badly worn or bald tires can cause skidding, particularly when it is raining. A tire needs replacing when the tread is worn down to 1/16 of an inch. Some tires have wear indicator bars built into the tread. When the tread is worn down to the solid bar of rubber across the width of the tread, it is time to replace the tire. A simple test to measure tread depth on a tire is to place a penny with Lincoln's head upside down and facing you into a tread groove. If the top of Lincoln's head is visible, then it is time to replace the tire.

When replacing tires on a vehicle, follow the vehicle manufacturer's recommendation for tire type and size. When your family buys new tires, be sure to get good-quality tires, and make sure all four tires match. New tires should be professionally balanced. Your tires will wear unevenly if your tires are not balanced and aligned properly. If the vehicle pulls to one side when it is driven on a straight, level road, the car is probably out of alignment. This will cause uneven wear to the tires, which can ultimately cause a blowout. A mechanic should check for this problem.

Never mix tire construction types—bias-ply, bias-belted, and radial—on the same vehicle or use the wrong size tires, because doing so can cause dangerous handling conditions.

Motor Vehicle Inspection and Registration

The goal of state inspection and registration programs is to ensure that vehicles are properly equipped and maintained for safe use. They also help ensure that vehicles are driven safely by making sure the vehicle and the responsibility for driving the vehicle is registered to a specific person.

Depending on the state, inspections may be required once or twice a year. Some states make inspections at random by stopping cars on the road, and some require an inspection when a car is sold. Find out how often inspections are required in your state.

All states require that automotive vehicles be registered and licensed with the state. Keeping records of vehicles in this way helps make highways safer by giving officials ready information about who owns the vehicle and is responsible for its safe operation; reducing the chances of the theft of a vehicle; and aiding in inspections and recalls for repairs of manufacturing defects.

Two Items You Must Carry With You When You Drive

In the United States, any time you drive a vehicle, you must carry the following items with you:

- A current driver's license from the state where you live
- Proof of insurance on your vehicle

Failure to comply carries steep penalties, including the loss of your driver's license. If you drive without insurance and you have an accident, you and your family will be personally responsible for all costs associated with replacing or repairing your vehicle, the vehicles you hit, and for all medical costs associated with injuries, which could amount to hundreds of thousands of dollars. You may also be subject to lawsuits by the injured parties and their insurance companies.

Sharing the Road

As a Scout, you understand the importance of sharing and working together to make sure things go smoothly. Scouts always have backup plans in case of emergencies. The same should hold true for Scouts on the road. Safe driving means sharing the road with other drivers and being aware of those who are using the road with you. Sometimes it means putting your defensive driving skills to use by avoiding people who are driving recklessly or noticing a child on a side street and braking in time to avoid hitting the youngster as he or she darts out into the street after a ball. Safe driving also means sharing the road with everybody who uses it, including pedestrians, bicycles, motorcycles, trucks, buses, and stray or wild animals.

Bicycle Safety

Riding a bike in traffic with bigger, faster, heavier four-wheeled vehicles is often dangerous and scary. The number of bicycles and vehicles sharing the road continues to grow every year and so, too, do accidents involving both.

In traffic, bicycles are considered vehicles and traffic laws that apply to cars also apply to bicyclists. Rules of the road to help ensure bicycle safety include the following:

- Always ride on the right side of the road, with traffic, just as cars travel. It's the law. Never ride against traffic. Drivers do not expect to meet a bicyclist when they round a corner or go over a hill.
- Obey traffic signals and signs. Be extra careful at crosswalks. Walk the bicycle across busy intersections. Watch for turning vehicles, and make eye contact with drivers to make sure they see you.
- Always check behind you when changing lanes, and use hand signals to indicate turns, lane changes, and stops.

More than 25 percent of all bicyclists killed in traffic crashes every year are between the ages of 5 and 15 years old. Many more are treated at hospital emergency rooms annually.

If bicycle lanes are provided, stay in the designated lane.

- Keep yourself a safe distance from cars and be prepared to stop. Keep your hands on or close to the brakes and allow yourself enough room to stop under the conditions in which you are riding. Ride at least 3 feet away from parked cars.
- Be predictable and ride in a straight line. Do not swerve or make sudden turns. Drivers may not be able to react fast enough to avoid colliding with you.
- Never carry a passenger on your handlebars.

Using Hand Signals

Left-turn signal

Right-turn signal

Stop or slow-down signal

Bicycles do not have automatic turn signals as cars do. Nevertheless, you must signal when you plan to turn. Hand signals tell motorists what you intend to do. To make a left turn, look behind you, hold your left arm straight out and proceed carefully. For a right turn, hold your left arm out and up in an L shape. When you plan to slow down or come to a stop, hold your left arm down and away from your body, with the fingers pointing down and your palm facing the traffic behind you. Proper signaling is a matter of the law, courtesy, and self-protection.

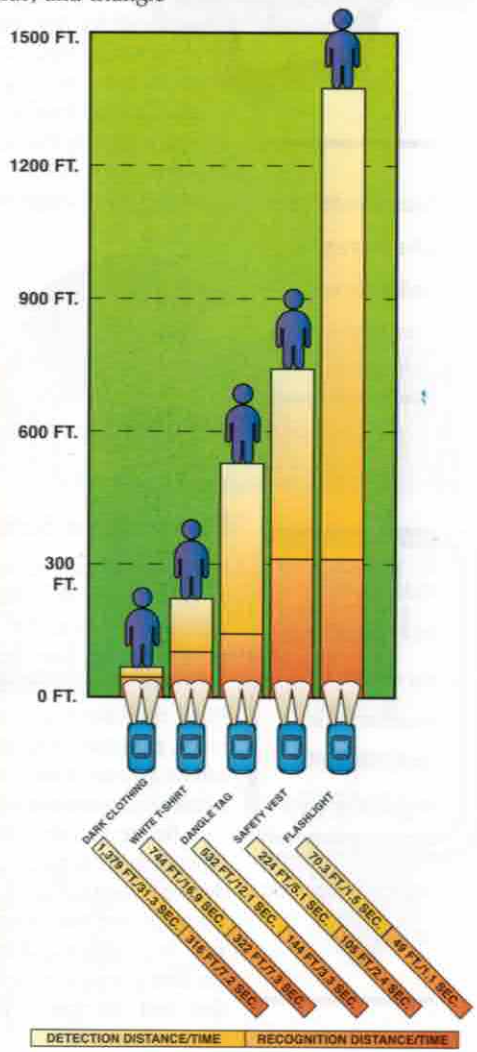
The *Cycling* merit badge pamphlet can provide more details on bicycling safety. See also the BSA Bike Safety Guidelines, found in the BSA's *Guide to Safe Scouting*.

Be Highly Visible

Cyclists must make themselves highly visible on the road to motorists, pedestrians, and other cyclists. During the day, you should wear light-colored clothing. Even better are fluorescent-yellow and safety-orange clothing. Try not to ride at night, but if you must, wear special clothing made from reflective materials. Retroreflective vests, jackets, wristbands, and triangle patches are designed to bounce back motorists' headlight beams and will increase your visibility. Use at least one light source, such as a bright headlight supplemented by bicycle reflectors. A red taillight also is highly recommended. Many states have specific rules regarding lighting and nighttime bike riding. Find out what your state requirements are for nighttime bike riding.

Inside the Black Box

To see the difference in nighttime visibility between a bicyclist or a pedestrian wearing reflective clothing and a rider or pedestrian without lights or reflective clothing, make a black box. Paint a box inside and outside with black paint. Inside, on the back of the box, place reflective material, fluorescent fabric, white fabric, yellow fabric, and black (or other dark-colored) fabric. Cut a small hole in the side of the box for a small flashlight to fit into. Make another hole in the front of the box and look through it. You will see the difference between the dark cloth and the brighter materials.



Always Wear a Helmet

A bicycle helmet is a rider's most important piece of safety equipment. Helmets are designed to help prevent injuries to the skull and brain. They are highly effective—a bicycle helmet reduces the risk of serious head and brain injury by nearly 90 percent.

A bicycle helmet that has passed mandatory safety tests for how well it protects will have stickers inside the shell stating that, according to its manufacturer, it meets the specifications of the American National Standards Institute (ANSI) or the Snell Memorial Foundation, or both. You should use only helmets that carry one or both of these stickers. In order to protect your head if you have a fall or collision, the helmet must fit you correctly and securely, as shown in the diagram.

Most deaths from bike falls and collisions are from head injuries.

Too far back | Too far forward | Correctly positioned

Motorcycle Safety

Riders who have fewer than six months of experience on their bikes are involved in more than half of all vehicle-motorcycle accidents.

Motorcycles use the same roads as cars and trucks and travel at similar speeds. A motorcycle, however, has two significant differences: instability and vulnerability. A motorcycle's two wheels cannot provide the same stability as a car's four wheels and thus requires more physical coordination than driving a car. Road conditions such as potholes, gravel, wet or slippery surfaces, pavement seams, railroad crossings, and grooved pavements that are minor annoyances to motorists can be major hazards to a motorcycle rider.

Before you get out on the open road on a motorcycle, take a nationally recognized course in motorcycle safety and defensive driving. Then get a lot of practice on rural roads and quiet side streets before you venture out in traffic. Because motorcycles vary in handling and responsiveness, you should ride a new or unfamiliar machine only in a controlled area until you are confident you can operate it safely.

Always wear a helmet when you are on a motorcycle, regardless of whether your state requires them. A helmet will help protect you from serious, often fatal, head injuries.

On a motorcycle, a person does not have the protection that a car's metal body structure affords, so a motorcyclist is much more vulnerable to injury. For this reason, motorcyclists must drive extremely defensively. In collisions between motorcycles and other vehicles, drivers often report that they "just didn't see the motorcycle." Riders can enhance their visibility by applying reflective materials to the motorcycle, wearing bright-colored clothing, keeping the motorcycle headlights on at all times, and weaving slightly within the lane when they are behind a motorist so that the motorist will become aware of the presence of the motorcycle.

These safety guidelines also apply to street-legal scooters and mopeds. Vehicles that are not street legal, such as go-carts and all-terrain vehicles (ATVs), should not be used for transportation on any public road or thoroughfare.

Pedestrian Safety

Pedestrian safety is a serious issue because people who are walking across a roadway lose in any accident with a vehicle. Each year, nearly 5,000 pedestrians die in traffic crashes. Greater caution and courtesy by both drivers and pedestrians could prevent many of these fatalities.

Pedestrian safety means much more than just getting out of the way. Pedestrians must follow the rules and messages conveyed by roadside signs and markings. Here are specific safety guidelines for pedestrians.

- Always try to cross the street at a crosswalk or an intersection with a traffic signal. Even with traffic controls, intersections are dangerous for pedestrians. A significant percentage of pedestrian accidents occur at intersections. Be sure you look behind you and all around you for approaching cars before stepping off the curb.

- When crossing a street, stop and look left, then right, then left again, before stepping out. If you see a car, wait until it goes by and then look left, right, and left again until no cars are coming.
- Dress to be seen. Brightly colored clothing makes it easier for drivers to see you during the day. At night, wear white or light-colored clothing and reflective material on your shoes, cap, or jacket to reflect the headlights of cars coming toward you.
- Walk on sidewalks whenever they are available. If there are no sidewalks, walk facing traffic so that you can see any car that might go out of control. Walk as far off the roadway as possible.

Steps to Take After an Accident

Accidents can be extremely scary experiences, so it is important to "be prepared" beforehand as to what steps you should take if you are ever involved in a car collision.

1. Stop your vehicle as soon as it is safely possible. If you cannot stop quickly, stop as soon as you can.
2. If there is only minor damage and you can safely do so, move the vehicle off the road. If it is too badly damaged to move, turn on the hazard lights to make your vehicle visible to other drivers behind you.
3. Turn off the ignition and check for gas leaks. If you see any fluid leaking from underneath the car, get away and stay clear of the immediate area. Make sure you and any passengers, or occupants of other vehicles involved, are out of the way of traffic.
4. Stay calm. Adrenaline may be pulsing through your body right now, but don't lose your cool. Check yourself and others for any injuries. If a person is seriously injured, do not attempt to move him or her unless there is immediate danger.

5. Call the police and ask for an ambulance if needed. Alert the police to any injuries and make sure you let them know if the accident is blocking the roadway. Get your bearings first so you can tell them where the accident is located.
6. Exchange information with the other driver. All drivers involved should exchange their name, telephone number, address, driver's license number, the name of their insurance company, the insurance policy number, and insurance company's phone number. Write down the make, model, year, and license plate number of the vehicle or vehicles involved and the names of any passengers that were in vehicles at the time of the accident.
7. If it is a serious accident and people stop to help, ask them to write down what they saw along with their name and telephone number. This is called a witness statement. If it is a serious accident and the witness cannot stay until police arrive to help, ask them to sign their statement and leave it with you to give the police. If you can, draw a diagram of the scene, showing where the cars were located and in which lanes the vehicles were traveling at the time of impact. Write down the date, time, and any contributing weather or road conditions.
8. Many law enforcement officers and insurance companies suggest that drivers utilize their cell phone camera or carry a disposable camera with film in their glove compartment so if they are involved in an accident they can take pictures of the damaged vehicles, the roadway where the accident happened, and any skid marks.
9. When you speak with police, remember to answer their questions politely and say "sir" or "ma'am" when you speak to any adults or law enforcement personnel. Give your account of what happened as calmly as possible. Have your insurance information and your driver's license ready to show them.
10. So that you will know where to get a copy of the police report, find out the specific police department, sheriff's department, or highway patrol that responded to the accident.
11. Don't leave the accident until police release you to do so. If your vehicle is too badly damaged to drive it safely, call a tow truck to take it to your home or a repair shop.
12. Once you are cleared from the scene and able to, contact your insurance company. Give them the information about the accident and the contact information for the other person's insurance company.

If an intersection does not have pedestrian signals but has traffic signals, use them. Watch the traffic signal that controls traffic going in the desired direction. Wait until you have a green light before crossing.

Before you cross the street, always check to make sure no vehicles are turning in to your pedestrian lane.

Pedestrian Crossing Signals

Pedestrians need to understand crossing signals. Some signals at pedestrian crossings use "Walk," or the symbol of a pedestrian, which means pedestrians may cross the street after making certain it is safe. A flashing "Don't Walk" message or the flashing orange symbol of a hand is a warning that the permitted time period for crossing is ending. Pedestrians already in the street should continue across to the other side or to a safety island. Pedestrians still on the curb should remain there until the next "Walk" signal. A steady (nonflashing) orange "Don't Walk" or a steady orange hand symbol means that pedestrians are not permitted to leave the curb because the light is about to change or has changed.

School Bus Safety

More than 20 million students ride the bus to school on weekdays. School buses are one of the safest forms of transportation around. The greatest potential danger is not in riding the bus but in getting on and off or in moving around the bus.

Here are some safety guidelines for boarding and getting off of school buses.

- Be at the bus stop at least five minutes before the bus is due to arrive. If you are late for the bus, do not run recklessly across a street or down a road to catch it.
- When the bus approaches, step back and stand at least five long steps (10 feet) from the curb. That way the bus driver can pull up to the curb so you won't have to walk out into the street to board.
- Wait until the bus comes to a complete stop, the door opens, and the driver says it is OK to board before stepping onto the bus.
- If you drop something near or under the bus while getting on or off, tell the driver. Make sure the driver sees you, knows you are there, and won't begin to drive away as you are trying to pick up what you dropped.
- Use the handrail when you get off the bus. It will help you keep your balance if you stumble.
- Make sure that key chains, clothing, or your backpack does not snag on the handrail or get caught in the door. You could be dragged along beside the bus if the bus driver does not notice you and drives off.
- When getting off a school bus, walk three steps away from the door. Stay away from the bus's wheels and watch out for moving cars.

Danger Zones

It is never safe to walk too close to the front of a school bus. The bus driver may be sitting up too high to see you. Always walk five long steps ahead of the bus before crossing in front of it, and make eye contact with the driver. Other danger zones include the sides and rear of the bus. Never walk close to the side of a school bus. Stay at least three long strides away from the side to stay out of the bus driver's *blind spot* (the spot where the driver cannot see you in the bus's mirrors). Also, avoid walking behind a school bus. The driver will not be able to see you back there.

School Bus Safety for Motorists

Motorists driving in school zones must watch for students traveling to and from school. Children can be unpredictable, and it is the driver's responsibility to anticipate and be ready to react to what they may do. Following these guidelines will help you be aware when you drive near schools or on routes shared by school buses.

- Drive slowly. Watch for children walking in the street, especially if there are no sidewalks in the neighborhood.
- Watch for children playing and gathering near school bus stops.
- Be alert. Children arriving late for the bus might dash into the street or out from between parked cars without looking for traffic.
- Learn and obey the school bus laws in your state.
- Learn the system of flashing lights that the school bus drivers use to alert motorists about stopping.
- At dawn and twilight, the semi-darkness can hinder the ability to see children going to or from bus stops. Extreme care must be taken at these times of the day.

What's So Special About a School Bus?

School buses have a number of safety features.

- Yellow flashing lights mean the bus is about to stop and load or unload riders. Cars must slow down and get ready to stop.
- Red flashing lights and an extended stop signal arm mean the bus has stopped and passengers are getting on or off. When the lights are flashing and the stop signal arm is extended, motorists traveling in all directions must come to a complete stop at a safe distance from the bus and resume driving only when the red lights have stopped flashing, the arm is retracted, and the bus has begun moving again.
- Side and rearview mirrors let the driver see what is going on around the bus—the cars approaching, the children walking up to the bus, and the bikes that might be close by.
- Emergency exits in the bus allow for passengers' quick escape and should be used only in an emergency. In any emergency the riders should listen to their driver for instructions.
- A crossing control arm is mounted on the front bumper and swings out when the door is opened. The arm is designed to keep children from walking close to the front of the bus.

Navigating the Road

Becoming skilled in reading road signs, signals, and markings is important to your safety on the roads and highways. Equally important is learning and practicing safe, defensive driving skills and learning to anticipate and avoid potentially unsafe situations.

Traffic Signals

A traffic signal is a traffic-control device that is designed so that everyone should instantly understand the message. Traffic signal design is standardized internationally for that reason.

Red Light—STOP. A red light always means stop. All states permit a right turn on a red light—after a stop—unless a sign prohibits it.

Green Light—GO. A green light means go, when and if it is safe to go. You may have the right-of-way, but always be sure the intersection is clear before proceeding. Many accidents are caused by drivers running red lights.

Yellow Light—CAUTION. A yellow light means that you should enter the intersection only if you can do so safely.

Red Arrow—STOP. A red arrow light means that no turn is permitted in the direction of the arrow.

Green Arrow—GO. A green arrow light means to go, only in the direction of the arrow, when it is safe to proceed.

Yellow Arrow—CAUTION. A yellow arrow light means that if you can do so safely, enter the intersection with caution and yield to oncoming traffic.

Flashing Yellow—SLOW DOWN. Proceed with caution.

Flashing Red—STOP. A flashing red light is the same as a stop sign. After stopping, proceed with caution when it is safe.

Highway traffic signs communicate their meaning with shape, color, symbols, and pictorial silhouettes.

Traffic Signs

The shapes and colors of traffic signs have meaning. Some signs, such as "Stop" and "Yield," are so important that each has its own distinctive standardized shape and color. Other signs are grouped by color and shape. Most signs fit into six groups.

Types of Traffic Signs

Regulatory Signs. Regulatory signs are typically rectangular, with black words or pictures on a white background. The "Stop" and "Yield" signs are exceptions. Symbol signs often include a red circle with a crossbar to indicate a prohibition. Motorists are required to obey regulatory signs. A police officer can give a driver a ticket for ignoring the message. A speed-limit sign is a good example of a regulatory sign.

STOP

YIELD

DO NOT ENTER

NO PEDESTRIANS

NO PARKING

TOW-AWAY ZONE

ONE-WAY TRAFFIC

Warning Signs. Warning signs are typically diamond-shaped and yellow with black words or pictures and a black edge. They are used to warn drivers of a condition ahead that may not be expected. Exceptions to the shape rule are the round "Railroad Crossing" symbol sign, the pennant-shaped "No Passing Zone" sign, and the pentagon-shaped "School Zone" and "School Crossing" symbol signs, which are fluorescent yellow-green to enhance their visibility.

NO PASSING ZONE

RAILROAD CROSSING

SLIPPERY WHEN WET

SIGNAL AHEAD

Guide Signs. Guide signs are the most variable in shape and color. Guide signs include the large, rectangular, green signs used on interstate highways and many freeways to give drivers route and

destination information. Guide signs also include street signs and route shields such as the distinctive interstate and U.S. highway shields. Each state has its own standard marker for state and local routes.

INTERSTATE ROUTE MARKERS

BIKE ROUTE

INTERCHANGE EXIT

Service Signs. Service signs are typically rectangular with white symbols on a blue background. The symbols indicate the availability of services such as gas, food, and lodging as well as phones and hospitals.

HOSPITAL

DIESEL

ACCESS FOR HANDICAPPED

Recreation Signs. Recreation signs indicate that the road user is approaching some type of public recreation area such as a camping area, picnic area, or scenic overlook. These signs are rectangular with white symbols on a brown background.

FLAGGER AHEAD

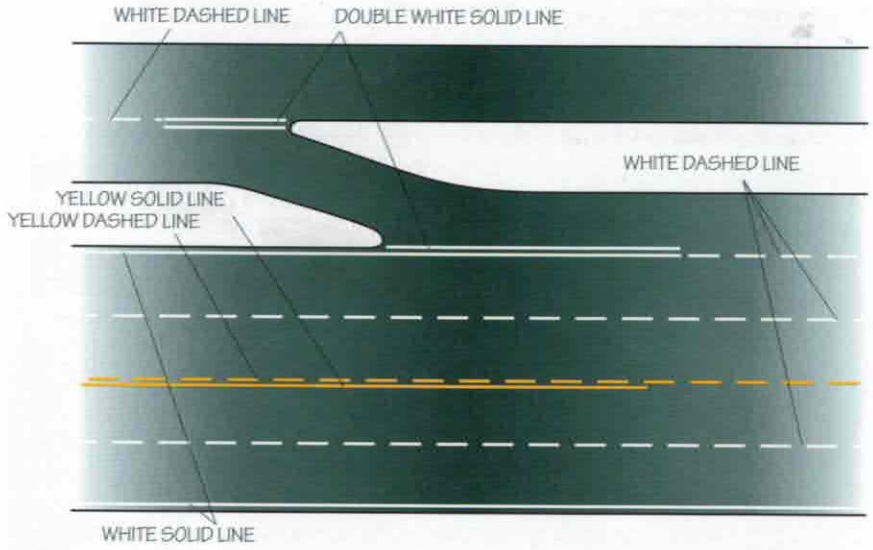
Work Zone Signs. Work zones, such as for highway construction or utility work, are marked with orange signs. These signs have information particular to work zones such as "Flagger Ahead" on a diamond or an ordinary symbol such as the curve warning. Work zones present a special situation that demands that drivers be alert and expect the unexpected. Men and women working on the roads risk injury and death just by being near traffic. Machinery and unfinished roads can pose hazards to drivers. Fines issued in a work zone can be doubled.

Pavement Markings

Pavement markings, which are painted stripes on the road, mark lanes on highways and provide information regarding passing and changing lanes. These markings are typically either white or yellow solid lines or white or yellow dashed lines.

White Lines. Solid white lines mark the right edge of the road and are sometimes called "fog lines." Solid white lines also serve as a visual barrier to discourage lane changing in certain situations, such as in turn lanes at an intersection and where vehicles are entering or leaving a freeway. Dashed white lines separate traffic in the same direction on roads with multiple lanes.

Yellow Lines. Yellow lines mark the left edges of divided highways and separate traffic traveling in opposite directions. Double, solid yellow center lines mean no passing is allowed in either direction. A single, dashed yellow center line means that passing is allowed if the road ahead is clear.



School Zone and Railroad Crossings

Distinctive fluorescent yellow-green signs tell drivers that they are approaching school zones. Drivers should slow down and pay careful attention to warning signs and speed limits that appear along with these markings. Be familiar with signals or markings for railroad crossings as well. A roadway–rail grade crossing presents an unusual traffic situation for motorists. Many drivers do not cross railroad tracks often enough to be familiar with the warning devices designed for their safety. Some ignore all warning signals and markings because they are in a hurry and would rather beat the train than wait for it to pass. Driver inattention and impatience are the most common factors contributing to collisions between motor vehicles and trains at roadway–rail grade crossings. Remember, motor vehicles *always* lose in these kinds of collisions.

Safety Tips for Railroad Crossings

- Never drive around lowered gates at a railroad crossing. It is illegal and deadly.
- Never race a train to a crossing. Even if you tie, you lose.
- If your vehicle stalls on a crossing, immediately get everyone out of the vehicle and far away from the tracks. Call the local law-enforcement agency for assistance.
- If you are at a multiple-track crossing waiting for a train to pass, watch out for a second train on the other tracks that could be approaching from either direction.

A 17-year-old male drinking driver and his 16-year-old passenger attempted to pass a roadway–rail grade crossing despite the approaching train. The train hit the right side of the vehicle, killing both occupants.

- Always expect a train. Freight trains do not follow set schedules.
- Be aware that trains cannot stop quickly. A freight train moving at 55 miles per hour can take a mile or more to stop once the emergency brakes are applied. That's the length of 18 football fields!

Interstate Highways

Interstate highways are a system of interconnecting highways that crisscross the United States. They are numbered in a pattern to help aid navigation. One- or two-digit even-numbered interstate routes are east–west highways. (Even though locally they might not run east and west, overall they are intended to serve east–west travel.) Route numbers increase from south (I-10) to north (I-94). One- or two-digit odd-numbered interstates are north–south highways. Numbers increase from west (I-5) to east (I-95).

Three-digit interstate highway numbers connect to other major highways. If the first digit is an even number, the highway usually connects to another interstate at both ends, forming a beltway or loop. If the first digit is an odd number, the highway usually connects to another interstate highway at only one end, sometimes going into a city center.

Interstate highways show the distance between points with mile markers placed along the road shoulder. Mile markers show the number of miles from where the route entered the state, or from the beginning of the route if it starts within the state. The count starts at the state line in the south (for north–south routes) or in the west (for east–west routes). Knowing how to read mile markers can help you. Know where you are and determine how far it is to your destination. You can give an exact location if you need to report an emergency or need assistance.

Common Driver Distractions

Road signs help you know what to expect as you drive, but as a driver you also must always remain alert and be ready to deal with the unexpected. It is essential to give driving your full attention and keep all distractions to a minimum.

The next time you head out in the car, whether it is down the street or for a weekend campout, think about the types of distractions you could face that might result in an accident. Here are five of the most common distractions.

1. **"Rubbernecking."** Drivers taking their eyes off the road to gawk at an accident or to look at the people in another vehicle cause a considerable number of traffic accidents.
2. **Mobile Phones and Other Portable Devices.** Mobile phones and other electronic devices contribute to many collisions on the road. Phones also cause drivers to take their eyes off the road as they retrieve a ringing phone or search for a phone number.

If your mobile phone rings or you desperately need to make a call, pull off the road safely first before answering or dialing.

3. **Music.** A study conducted by the University of North Carolina Highway Research Center found that drivers are six times more likely to have an accident while searching for a radio station or inserting a CD than while glancing at the speedometer or the fuel gauge.
4. **Passengers.** A driver's passengers can be just as much of a distraction as a mobile phone conversation. The more passengers there are in a car, the greater the risk of having an accident. Minimize conversation with passengers.
5. **Eating and Drinking.** Drivers need to keep both hands on the wheel while driving. Eating or drinking while driving can lead to accidents.

If you want to change a CD or the radio station, ask a friend for help with the music or wait until you get to a red light in traffic. Keep the volume low enough that you can always hear sirens and emergency vehicles coming.

If passengers start to rough-house or goof around while you are driving, firmly tell them to calm down so you can concentrate on driving.

Distracted Driving—What Is That?

Distracted driving is any activity that could divert a person's attention away from the primary task of driving. *All* distractions threaten the safety of the driver, passengers, and bystanders. Distractions include:

- Texting—Because text messaging requires visual, manual, and cognitive attention from the driver, it is *by far* the most alarming distraction.
- Using a cell phone or smartphone
- Eating and drinking
- Talking to passengers
- Grooming
- Reading, including maps
- Using a navigation system
- Watching a video
- Adjusting the radio or any electronic device

This lifesaving information comes from the U.S. Department of Transportation.

23X

What's 23X, you ask? According to the National Highway Traffic Safety Administration, those who text while driving are 23 times more likely to crash than nontexters. Join the BSA and AT&T in quashing this dangerous and often fatal practice through "Texting & Driving: It Can Wait." To take the pledge never to text and drive and to learn more about this lifesaving initiative, visit www.itcanwait.com.

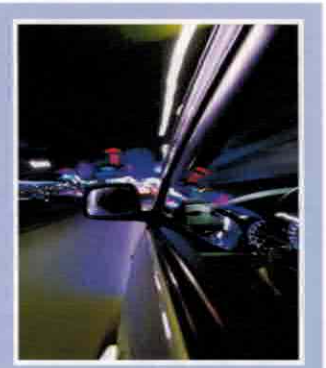
Gauging Braking Distances

An alert and experienced driver knows that a car cannot stop on a dime. Suppose you are traveling down the highway at 60 miles per hour when you notice a small child in the road. Your vehicle will need approximately 150 feet to 172 feet to stop depending on the road surface and the condition of the brakes and tires. This distances is known as *braking distance.*

Being able to judge braking distance is very important, but be aware that it is not the only factor that affects how far a car will travel before it stops. Drivers also need time to apply the brakes after they have decided to stop. The average time that elapses between making the decision to stop and actually applying the brakes—reaction time—is three-quarters of a second. In this time, with the car going 60 miles per hour, it will have traveled another 66 feet. If it takes the driver a whole second to react, the car travels 88 feet. If a second and a half pass, the vehicle travels 132 feet. This is known as *reaction-time distance* (or *driver-reaction distance*). The table shows approximate braking distances and reaction-time distances on dry, level pavement for well-maintained cars traveling at typical city and highway speeds.

Speed (mph)	Braking Distance (feet)	Average Reaction-Time Distance (feet)
30	43	33
40	76	44
50	119	55
60	172	66
70	234	77

Braking Distances at Night



Visibility decreases at night, impairing a driver's ability to see and react to unexpected situations. At night, when a driver can see only as far as the headlights allow, the difficulty of stopping in time to avoid an accident increases. Low-beam headlights allow the driver to spot an object on the road about 160 feet ahead of the vehicle, but headlights cannot follow curves, hills, or dips in the road.

Time and a considerable amount of distance elapse between the time you decide to apply the brakes and the time your vehicle actually slows to a stop.

One more time factor must be considered. This is the period between the moment the driver recognizes there is a dangerous problem and the instant the driver decides to take action and apply the brakes This *perception-time distance* varies widely, depending on the circumstances and the attentiveness of the driver. The driver could be sleepy or distracted, have poor eyesight, or be under the influence of alcohol or drugs. This factor and the reaction time are highly variable, but they are always present and will lengthen all braking distances.

Weather conditions such as rain, snow, sleet, and ice also can affect stopping distances. On a wet road, stopping requires up to four times the distance normally needed on a dry road. When driving at about 50 miles per hour during a heavy rain, the water can literally lift the vehicle's tires off the road. To prevent hydroplaning, you will need to slow down. Heavy rain is not the only factor that can cause a spin or slide. During a light drizzle, a little water combined with the oil that has accumulated on the road produces a slick, greasy film that can decrease traction.

Glare recovery is another problem that may affect stopping distances at night. The glare from the headlights of oncoming traffic causes the pupil of the eye to constrict. Once past the bright light, the pupil needs time to readjust to less light. During the adjustment time, a driver could be blinded, greatly increasing his or her chances of having an accident.

Driving at Safe Speeds

When traffic engineers design roadways, they determine safe speed limits for the road. Many crashes are caused by traveling at excessive speed, which requires more time and distance to stop. There is less time to react, and the impact or striking power of the vehicle greatly increases. If the vehicle's speed doubles from 20 to 40 miles per hour, the impact is actually four times greater. Triple the speed from 20 to 60 miles per hour, and the impact and the braking distance are nine times greater. Drivers should be fully aware of the potential destructive power of a speeding vehicle.

When conditions are less than ideal, a person operating a motor vehicle is required by law to drive at a careful and prudent speed. You will need to decrease your speed, probably below the posted speed limit, for any of the following conditions:

- Heavy, congested, or slow-moving traffic
- Rough, icy, or wet road surfaces, or other circumstances in which traction is poor
- Narrow roadways that reduce the margin of safety
- Weather conditions (rain, snow, fog, dust, smoke) that affect sight distance and traction

Aggressive Drivers: Avoiding Road Rage

Despite the legal and safety ramifications of speeding and driving recklessly, you will undoubtedly encounter aggressive drivers on the road and it is best to be prepared. Aggressive drivers are those who run stop signs and red lights, drive too fast, tailgate (follow too closely), weave in and out of traffic, pass on the right instead of the left, make rude gestures, or scream, honk, and flash their lights at motorists who are unlucky enough to be in front of them. Also known as road rage, aggressive driving puts everyone in the vicinity of the aggressive driver in danger.

Here is what to do if you are confronted by an aggressive driver.

- Try to get out of the person's way. Do not further anger the aggressive driver by speeding up or attempting to keep him or her from passing.
- Avoid making eye contact with the enraged driver.
- Do not respond to rude gestures, screaming, or incessant honking. Doing so will likely escalate the situation.
- If you have a mobile phone, find a safe place to pull over and call the police (911 or the emergency number for your local area). Report the aggressive driver and provide the police with details about the driver's location, direction of travel, license number, and vehicle make and model.

If you find yourself riding with a driver who is driving aggressively and dangerously, do not grab the steering wheel. Such a move can instantly cause a crash. Try to find a believable excuse for the driver to stop the car. Saying that you are going to be sick probably would work. Then leave and call home for a ride or make other arrangements for safe transportation.

Road rage can be contagious. If you find that a driver's aggressive behavior is making you angry, take a deep breath and try to relax and let your anger dissipate.

Ten Deadly Teen Driver Mistakes—and How to Avoid Them

This list comes from AAA, the American Automobile Association.

1. **Overconfidence.** Expect the unexpected. Inexperience and overconfidence can lead to crashes when new drivers encounter unfamiliar or unexpected situations. Practice driving with an experienced adult driver, and gradually take on more challenging driving conditions.
2. **Not buckling up.** Use a safety belt and insist that all your passengers do so as well. About two-thirds of teens killed in vehicle crashes were not wearing safety belts. Wearing a safety belt reduces your chances of being hurt or killed in a crash by as much as 45 percent.
3. **Speeding.** Stick to the speed limit. One-third of teen fatalities involve speeding. Driving the speed limit increases your chance to avoid a crash and reduces the severity of a crash.
4. **Rowdy passengers.** Don't load up your car with friends. Teenage passengers can be a major distraction for novice drivers. Adding one teen passenger to a vehicle increases a 16- or 17-year-old driver's crash risk by about 50 percent. With two or more teen passengers, the crash risk increases fivefold.
5. **Talking on a cell phone.** Focus on driving; save the phone calls, text messaging, and other gadgets for after the driving is done. Talking on a cell phone while driving slows any driver's reaction time considerably, regardless of age.

6. **Fiddling with the CD player or radio.** Driving and channel-surfing don't mix. Research shows that adjusting the radio is the most common distraction for drivers ages 16 to 20. Wait until you are safely parked before changing a CD or adjusting the radio, or have the front passenger take care of that task.
7. **Late-night cruising.** Don't drive late at night. Teen crash rates at night (9 P.M. to 6 A.M.) are twice as high as daytime rates. Nighttime driving is more dangerous for everyone, and young drivers are even more likely to be involved in crashes caused by drowsy driving.
8. **Drinking and driving.** Stay sober. Of 16- and 17-year-old drivers killed in crashes, 16 percent would have been considered legally intoxicated by adult standards. Drinking and driving is never a good idea, especially when you are underage and still learning to drive.
9. **Getting into a bad situation.** Make good choices. Teen driver crashes kill nearly as many passengers of teen drivers as they do teen drivers themselves. Before you get in a car with a friend, assess the situation: *Is this a person you would trust? Is he in the right frame of mind to drive safely? Is he sober and alert? Are the other passengers likely to influence him to drive recklessly?*
10. **Taking risks.** Know that it *can* happen to you. Car crashes are the leading cause of injury and death for people ages 15 to 20. And it's not just about you: Crashes affect pedestrians, passengers, and other drivers, as well as their families. You don't want to do something you will regret for the rest of your life.

Don't fiddle with the CD player or radio while you are driving. If there is a front passenger, that person can help you.

Traffic, Your Community, and You

To complete requirement 5, you have four options. If you decide to complete requirement 5a, you will need to interview a traffic law enforcement officer in your community to find out which three traffic safety problems are of most concern to that officer. Discuss these concerns and possible solutions with your merit badge counselor.

If you elect to do requirement 5b, you will use the internet (with your parent's permission) to visit five websites that cover safe driving for teenagers. The resources section at the back of this pamphlet lists sites you might visit. Take notes as you read the information on the sites, or print out pages that contain information you feel is especially important for teens to understand. Discuss your findings with your merit badge counselor and at least three teenagers.

If you decide to do requirement 5c, you will initiate and organize an activity to demonstrate the importance of traffic safety. The remainder of this chapter has a variety of ideas that can be adapted for your merit badge project. These suggestions may help get your creativity flowing and provide the spark needed to create your own project.

If you plan to do requirement 5d, work with your merit badge counselor to choose a controlled intersection that has a safe spot from which you can observe the flow of traffic on three separate days and at three different times for 30 minutes on each visit. Take a notebook and a pen or pencil so that you can record your observations. You might want to draw up your chart in advance (with columns for the number of vehicles observed, specific traffic violations, and the approximate age of the driver). After you have compiled your observations, calculate the percentages of violations and discuss your findings with your merit badge counselor.

Organizing Traffic Safety Programs and Activities

The following are examples of traffic safety programs and activities that young people have successfully developed in their schools and communities.

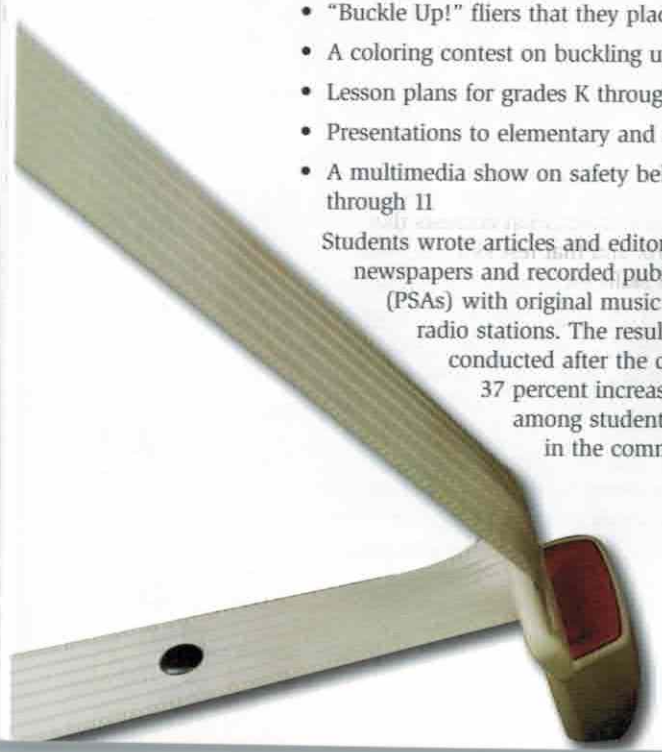
Buckle Up!

When a high school student in Frederic, Wisconsin, was killed in a crash because he was not wearing a safety belt, fellow classmates launched a "Buckle Up, Frederic!" campaign to educate the community on the importance of using safety belts. The students developed a safety belt survey, which they conducted at the school and at a major intersection in town. The surveys found that only 43 percent of students and 37 percent of other residents were wearing safety belts.

They published the results in a brochure that contained other safety belt information and distributed the brochure and other literature to the school and community. Other materials they developed and activities they organized included the following:

- Displays on safety belt use for a local bank
- "Buckle Up!" fliers that they placed on car windshields
- A coloring contest on buckling up for grades 1 through 5
- Lesson plans for grades K through 8
- Presentations to elementary and middle school children
- A multimedia show on safety belt use for grades 9 through 11

Students wrote articles and editorials for local newspapers and recorded public service announcements (PSAs) with original music that aired on local radio stations. The result? A second survey, conducted after the campaign, showed a 37 percent increase in safety belt use among students and a 33 percent increase in the community overall.



Bicycle Rodeo

Teaching biking safety to younger children by organizing a bicycle rodeo promotes safe cycling in a fun way. A bike event takes lots of planning. Here's a checklist to help you get started.

- ❑ Identify where the bike rodeo will be held and get permission to use the location.
- ❑ Develop event and staffing schedules. Plan contests that challenge balance and control and that test skills needed for safe street riding. Suggested skills include the following:
  - Riding slowly in a straight line for 60 feet. At about 30 feet, the rider should look over his or her left shoulder to check for traffic behind while maintaining a straight line.
  - Maneuvering through an obstacle course to test the rider's ability to change directions quickly.
  - Turning in a limited space to test the bicyclist's ability to turn around smoothly and easily.
  - Signaling with the proper hand signals.
  - Making a controlled stop.

- ❑ Have educational materials on helmets, proper clothing for biking, and other bike safety issues available to hand out to participants at registration.
- ❑ Make a display of helmets to show contestants and their parents the different types available. Be prepared to discuss national safety standards, fit, pricing, and helmet replacement.
- ❑ Invite a uniformed police officer or a member of a bike advocacy organization to be at your event to provide information on bike riding rules.
- ❑ Invite someone from a local bike shop to provide bike inspections.
- ❑ Provide engraving against theft. Engraving a parent's license plate number on the frame of the bike is the easiest way to trace ownership if the bike is stolen.
- ❑ Arrange for refreshments. At the least, have water available. Politely ask local stores and businesses if they would be willing to donate snacks and beverages.
- ❑ Publicize your event. Post fliers, and write press releases to distribute to newspapers, radio stations, and television stations.

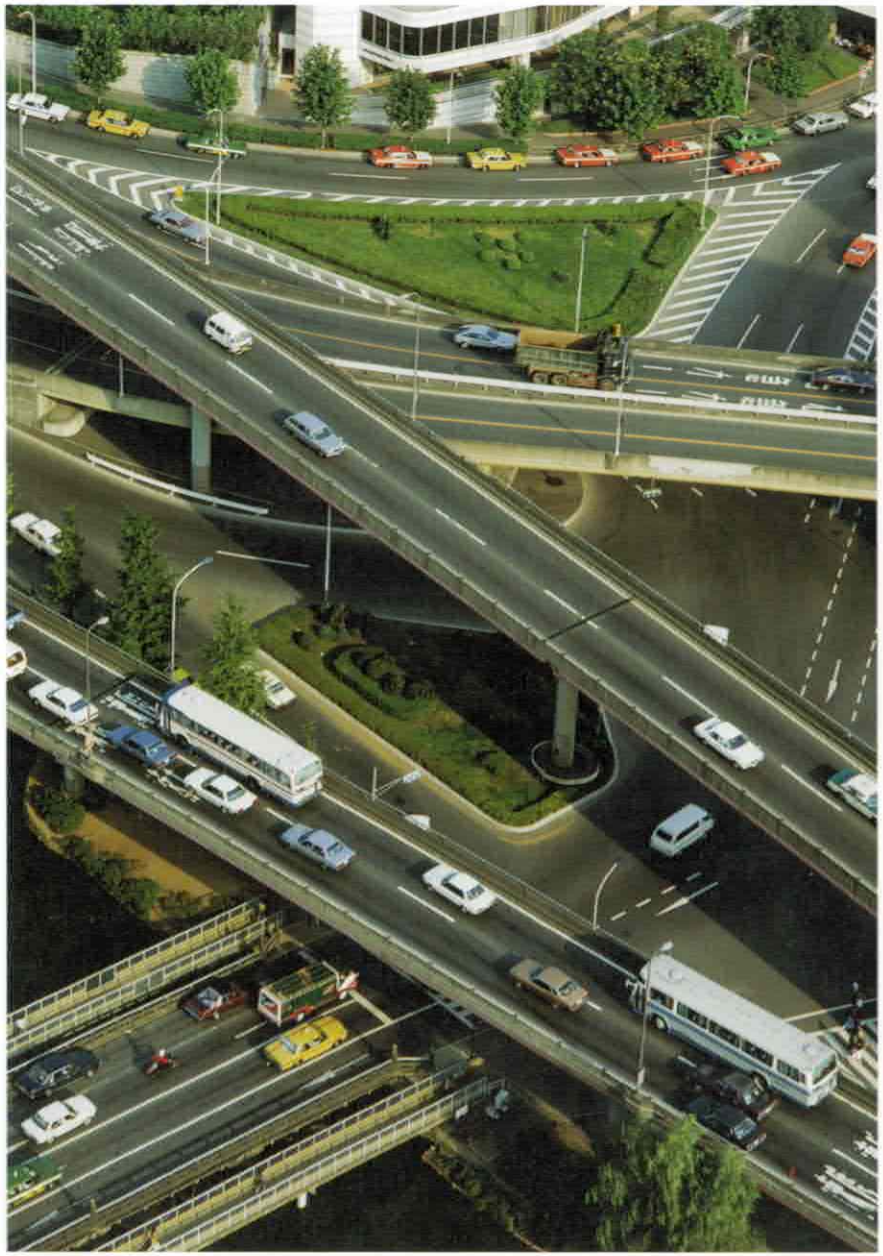
BAAM (Bicycles, ATVs, Alcohol, Motorcycles) Program

To help instill a responsible attitude toward driving in teens who have not reached the legal driving age, work with law enforcement agencies and school groups to present a week of traffic safety activities for middle school students. Have students make daily safety tip announcements for bicycles, all-terrain vehicles (ATVs), and motorcycles. Distribute printed materials about the consequences of underage drinking.

More Ideas

Here are some other ideas for traffic safety awareness activities.

- Organize a mock trial to show the legal consequences of driving while impaired.
- Have an expert on traffic safety speak at a school assembly.
- Hold a schoolwide trivia quiz based on traffic safety facts and statistics.
- Organize a "Save our Seniors" (SOS) program at a local high school. Seniors who sign the SOS pledge will agree to stay alcohol- and drug-free, always wear safety belts, and maintain a clean driving record during their senior year.
- Organize a program for elementary school students on pedestrian safety.
- Get involved with an existing group, such as SADD or your student council, to promote traffic safety and the prevention of alcohol and drug abuse.



Traffic Safety Resources

Scouting Literature

Automotive Maintenance, Citizenship in the Community, Cycling, Emergency Preparedness, Engineering, First Aid, Railroading, Safety, and *Truck Transportation* merit badge pamphlets

With your parent's permission, visit the Boy Scouts of America's official retail website, www.scoutshop.org, for a complete listing of all merit badge pamphlets and other helpful Scouting materials and supplies.

Books

Aaseng, Nathan. *Teens and Drunk Driving.* Lucent Books, 2000.

Alliance for Safe Driving. *License to Drive,* 2nd ed. Cengage Learning, 2005.

Berardelli, Phil. *Safe Young Drivers: A Guide for Parents and Teens,* 4th ed. Mountain Lake Press, 2008.

Booley, Theresa Anne. *Alcohol and Your Liver: The Incredibly Disgusting Story.* Rosen, 2000.

Burke, Edmund R. *Serious Cycling,* 2nd ed. Human Kinetics, 2002.

Drive Right, 11th ed. Prentice Hall, 2008.

Elkins, Brett, and Bruce Elkins. *Teach Your Teen to Drive … and Stay Alive.* CreateSpace Independent Publishing Platform, 2012.

Goodman, Karen, and Kirk Simon. *Safe Road Home: Stop Your Teen From Drinking and Driving.* Sterling, 2005.

Hewitt, Ben, ed. *New Cyclist Handbook.* Rodale Inc., 2005.

James, Leon, and Diane Nahl. *Road Rage and Aggressive Driving: Steering Clear of Highway Warfare.* Prometheus Books, 2000.

Pavelka, Ed, and Editors of Bicycling Magazine. *Bicycling Magazine's Complete Book of Road Cycling Skills.* Rodale Inc., 1998.

Pease, Robert A. *How to Drive Into Accidents and How Not To.* Pease Publishing, 1998.

Scotti, Anthony J. *Professional Driving Techniques: The Essential Guide to Operating a Motor Vehicle With Confidence and Skill,* 4th ed. PhotoGraphics Publishing, 2007.

Smith, Timothy C. *Crash-Proof Your Kids: Make Your Teen a Safer, Smarter Driver.* Touchstone, 2006.

Wallack, Roy M., and Bill Katovsky. *Bike for Life.* Da Capo Press, 2014.

Organizations and Websites

Information is also available from your local police department (traffic division), sheriff's department (traffic division), state police or highway patrol, city or county prosecutor's office, traffic court, emergency medical services (EMS), and state highway safety office. Check your local telephone directory for nonemergency phone numbers and addresses.

American Automobile Association Foundation for Traffic Safety
607 14th St. NW, Suite 201
Washington, DC 20005
Telephone: 202-638-5944
Website: www.aaafoundation.org

National Highway Traffic Safety Administration
1200 New Jersey Ave. SE
Washington, DC 20590
Toll-free telephone: 888-327-4236
Website: www.nhtsa.gov

National Safety Council
1121 Spring Lake Drive
Itasca, IL 60143-3201
Telephone: 630-285-1121
Website:
www.nsc.org/safety_road

Online Study Guide for Student Drivers
Website:
www.golocalnet.net/drive/

Road Ready Teens
Website: www.roadreadyteens.org

Safe Kids Worldwide
1255 23rd St., NW, Suite 400
Washington, DC 20037-1151
Telephone: 202-662-0600
Website: www.safekids.org

Teendriving.com
Website: www.teendriving.com

Texting & Driving: It Can Wait
Website: www.itcanwait.com

Your state department of motor vehicles will also be a good resource. Look in the telephone book or, with your parent's permission, search the internet.

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MERIT BADGE LIBRARY

Though intended as an aid to Boy Scouts, and qualified Venturers and Sea Scouts in meeting merit badge requirements, these pamphlets are of general interest and are made available by many schools and public libraries. The latest revision date of each pamphlet might not correspond with the copyright date shown below, because this list is corrected only once a year, in January. Any number of merit badge pamphlets may be revised throughout the year; others are simply reprinted until a revision becomes necessary.

If a Scout has already started working on a merit badge when a new edition for that pamphlet is introduced, *they may continue to use the same merit badge pamphlet to earn the badge and fulfill the requirements therein.* In other words, the Scout need not start over again with the new pamphlet and possibly revised requirements.

Merit Badge Pamphlet	Year
American Business	2013
American Cultures	2013
American Heritage	2013
American Labor	2018
Animal Science	2014
Animation	2015
Archaeology	2017
Archery	2015
Architecture and Landscape Architecture	2014
Art	2013
Astronomy	2016
Athletics	2016
Automotive Maintenance	2017
Aviation	2014
Backpacking	2016
Basketry	2017
Bird Study	2017
Bugling (see Music)	
Camping	2018
Canoeing	2014
Chemistry	2018
Chess	2016
Citizenship in the Community	2015
Citizenship in the Nation	2014
Citizenship in the World	2015
Climbing	2011
Coin Collecting	2017
Collections	2013
Communication	2013
Composite Materials	2012
Cooking	2014
Crime Prevention	2012
Cycling	2017
Dentistry	2016
Digital Technology	2014
Disabilities Awareness	2016
Dog Care	2016
Drafting	2013
Electricity	2013
Electronics	2014
Emergency Preparedness	2015
Energy	2014
Engineering	2016
Entrepreneurship	2013
Environmental Science	2015
Exploration	2016
Family Life	2016
Farm Mechanics	2017
Fingerprinting	2014
Fire Safety	2016
First Aid	2015
Fish and Wildlife Management	2014
Fishing	2013
Fly-Fishing	2014
Forestry	2015
Game Design	2013
Gardening	2013
Genealogy	2013
Geocaching	2016
Geology	2016
Golf	2012
Graphic Arts	2013
Hiking	2016
Home Repairs	2012
Horsemanship	2013
Indian Lore	2008
Insect Study	2018
Inventing	2016
Journalism	2017
Kayaking	2016
Landscape Architecture (see Architecture)	
Law	2011
Leatherwork	2017
Lifesaving	2017
Mammal Study	2014
Medicine	2012
Metalwork	2012
Mining in Society	2014
Model Design and Building	2010
Motorboating	2015
Moviemaking	2013
Music and Bugling	2013
Nature	2014
Nuclear Science	2017
Oceanography	2012
Orienteering	2016
Painting	2016
Personal Fitness	2016
Personal Management	2015
Pets	2013
Photography	2016
Pioneering	2017
Plant Science	2018
Plumbing	2012
Pottery	2008
Programming	2013
Public Health	2017
Public Speaking	2013
Pulp and Paper	2013
Radio	2017
Railroading	2015
Reading	2013
Reptile and Amphibian Study	2018
Rifle Shooting	2012
Robotics	2016
Rowing	2014
Safety	2016
Salesmanship	2013
Scholarship	2014
Scouting Heritage	2017
Scuba Diving	2009
Sculpture	2014
Search and Rescue	2018
Shotgun Shooting	2013
Signs, Signals, and Codes	2015
Skating	2015
Small-Boat Sailing	2016
Snow Sports	2017
Soil and Water Conservation	2016
Space Exploration	2016
Sports	2012
Stamp Collecting	2013
Surveying	2004
Sustainability	2013
Swimming	2014
Textile	2014
Theater	2014
Traffic Safety	2016
Truck Transportation	2013
Veterinary Medicine	2015
Water Sports	2015
Weather	2013
Welding	2016
Whitewater	2005
Wilderness Survival	2012
Wood Carving	2016
Woodwork	2011

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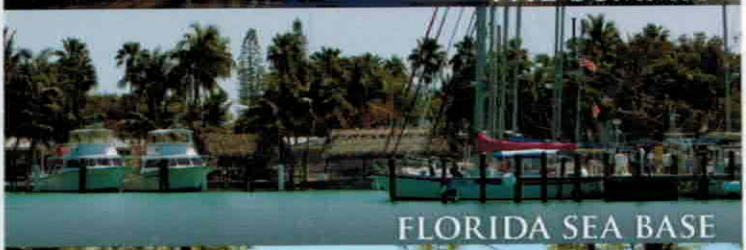

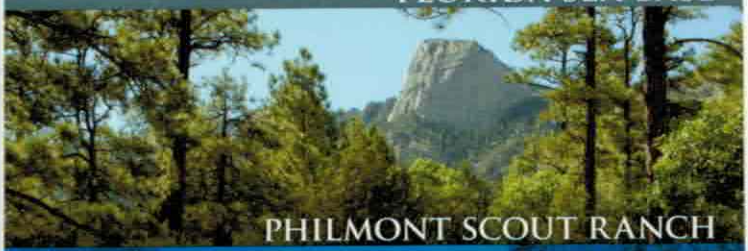

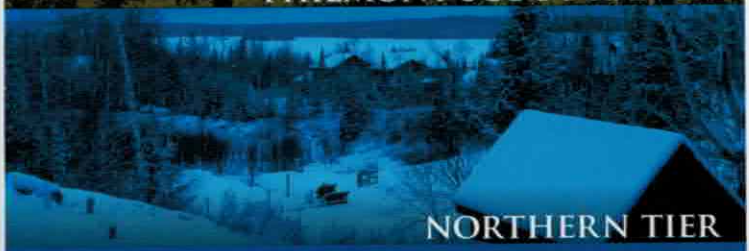

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