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ABSTRACT

Intended for driving instruction students, this publication contains instructional materials for safety education. It contains six sections on facts and figures; defensive driving; safety devices; restraints; emergency situations; and other highway users. Each section consists of reading material followed by an activity or activities. A total of 17 activities are included. An appendix provides answer keys to the activities. (YLB)

SAFETY EDUCATION
in
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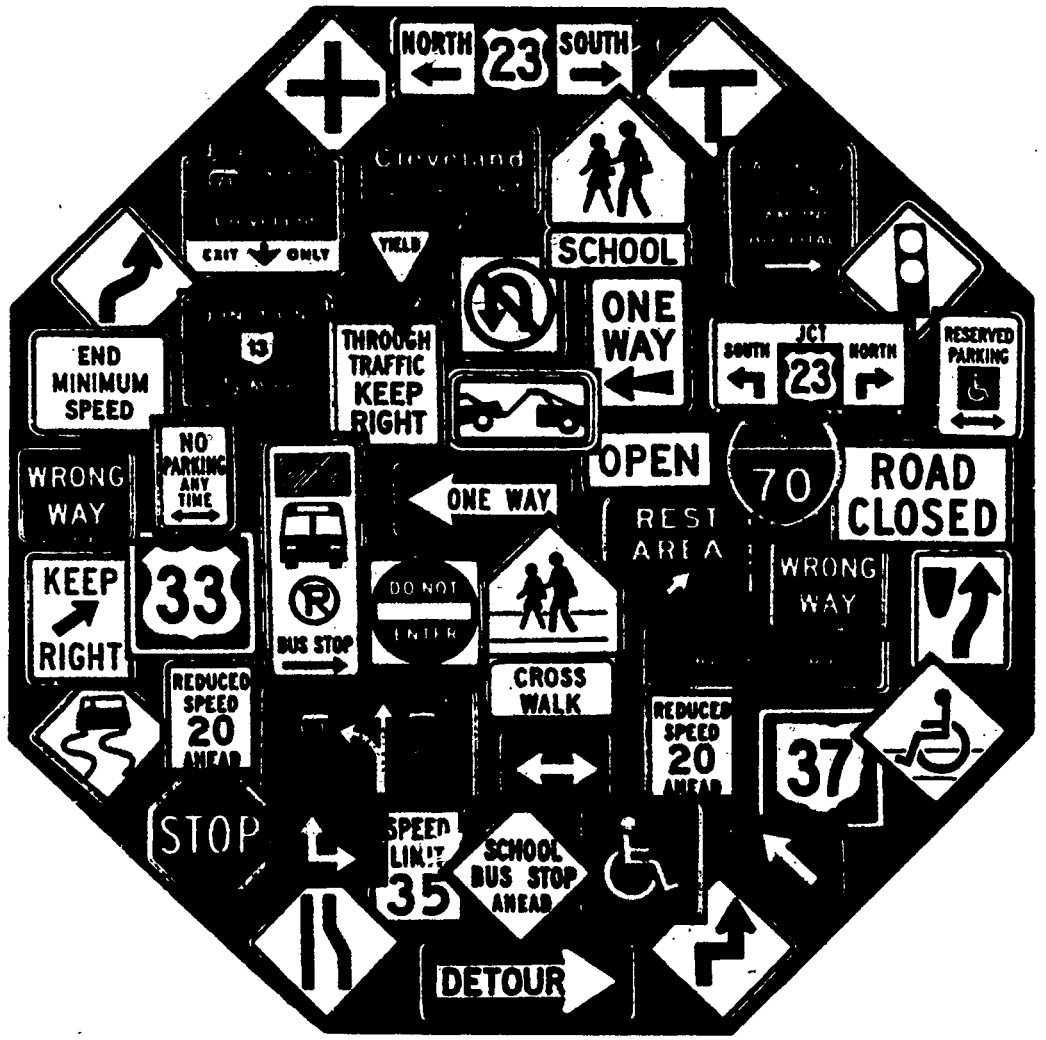

SAFETY EDUCATION
IN DRIVING

The Vocational Instructional
Materials Laboratory
The Ohio State University
Columbus, Ohio 43210
1994

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The 1994 revision of *Safety Education in Driving* is the result of the cooperative efforts of several talented people. The revision writer was **Richard N. Moore**, Instructor, Schwartz Driver Training Schools, Westerville, Ohio. Additional technical information was provided by **Ronald L. Burk**, Program Specialist with the Ohio Partnership for Traffic Safety, Ohio Department of Public Safety, Columbus, Ohio. New and revised freehand and computerized artwork inside and a new cover were created by **William M. Agnew**, free-lance artist, Columbus, Ohio. The wordfind exercise was redesigned and expanded by **T. Philip Shannon**, a student in the Columbus City Schools.

The revision project was coordinated by **Dr. Theodore P. Shannon**, Curriculum Consultant with the Vocational Instructional Materials Laboratory at The Ohio State University, Columbus, Ohio.

I. FACTS AND FIGURES

- About 50 percent of all deaths of 16 to 19 year olds are caused by automobile accidents.*
- Automobile accidents are the fourth leading cause of death for all ages.**
- Motor vehicle accidents in the United States cost billions of dollars each year. This includes insurance claims, health care, legal fees, vehicle repairs, and funerals.**
- Alcohol is involved in nearly half of all fatal automobile accidents.

Young drivers **should be** the best drivers on the nation's highways. They have the best reaction time (the time it takes a driver to react and make a correct driving response after a hazard has been perceived). Because they are eager to drive, young people often acquire an excellent knowledge of automobiles and the traffic laws before they get their driver's licenses. However, in reality, young people **are not** the best drivers, and many are injured or killed in highway accidents each year.

Becoming a good, safe driver takes more than quick reflexes and knowledge of automobiles and traffic laws. It takes **mature behavior**. Driving an automobile is an adult responsibility--a very serious responsibility--that every young driver must assume **every time** he or she gets behind the wheel. **There are no exceptions**.

*Malfetti, James L., et al. *Young Driver Attitude Scale: The Development and Field-Testing of an Instrument to Measure Young Driver Risk-Taking Attitudes*. New York: Columbia University, New York College. December 1989.

**_Traffic Safety Education Guide_. Albany: New York State Education Department, Bureau of Curriculum Development. January 1989. (ERIC Document Reproduction Service No. ED 318 728)

Activity 1

List five factors that you think may contribute to the high accident rate among young drivers.

1.

2.

3.

4.

5.

(This is a subjective activity; however, examples of possible answers are provided in the appendix.)

Activity 2

Young males pay higher insurance premiums than do young females. Many people feel this is unfair. But, consider this: traffic accident figures show that an 18-year-old male driver has a 1 in 6 chance of being involved in a highway accident, whereas an 18-year-old female's chance of becoming involved in an accident is only 1 in 12.

List some reasons why you think young male drivers are involved in more accidents than are young females.

Do you think insurance premiums should be the same for both young male and female drivers? Why or why not?

(This is a subjective activity; however, examples of possible answers are provided in the appendix.)

Discuss with the class your responses from Activities 1 and 2.

Activity 3

All drivers, it seems, consider themselves to be good drivers. However, as we drive around, we sometimes see a poor driver whose actions or behaviors upset us and make driving more difficult. List below five characteristics you think a poor driver possesses.

1.

2.

3.

4.

5.

List five characteristics that you think a good driver should possess.

1.

2.

3.

4.

5.

(This is a subjective activity; however, examples of possible answers are provided in the appendix.)

Discuss with your classmates the differences between the characteristics of a good driver and a poor driver.

Becoming a good driver is a **serious responsibility** that all drivers **must** accept. Good driving skills are achieved through practice, a positive attitude about driving, and knowledge about the components of the highway transportation system. The good driver understands that learning to operate an automobile takes **time** and **practice**. It is not a skill achieved overnight.

II. DEFENSIVE DRIVING

Defensive driving means more than just watching for the actions of other drivers. Defensive driving consists of developing a **awareness of all factors** that affect your actions as well as the actions of others. It includes–

- analyzing the driving environment
- assessing factors affecting driving behavior
- operating the vehicle within its capabilities and limitations
- reacting to emergency situations
- driving a vehicle which has been properly maintained

Learning to become a defensive driver will help you save time and money. Most important, however, becoming a good defensive driver can help save **lives.**

Perceptual Analysis

One of the most important factors in defensive driving concerns the correct *perceptual analysis* of the traffic environment. *Perception* is the ability of the driver to **see** and **understand** the driving environment. As you perceive circumstances in a given driving situation, you should try to follow these five guidelines:

1. **Aim high in steering**–Always look well ahead in your intended driving path. This gives you the chance to analyze the traffic pattern before you get to any potential point of difficulty.

2. **Get the big picture**–Be aware of all sights and sounds that are around your vehicle. Make every attempt to see all cars, pedestrians, and potential traffic hazards that are coming into your view.

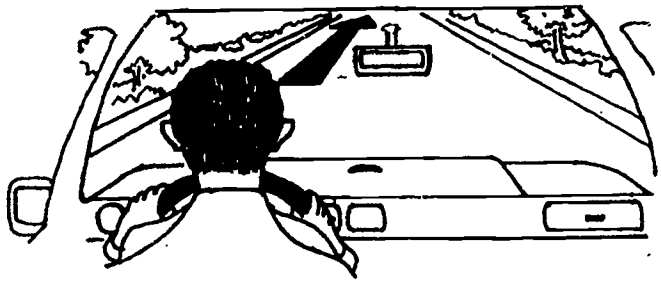
3. **Keep your eyes moving**–Move your eyes constantly. Look both far ahead and near. Look to both sides. Look in the rear and side view mirrors. Always use several quick glances to evaluate the traffic environment; never stare at one traffic situation. Remember, it takes only seconds for a collision to occur.

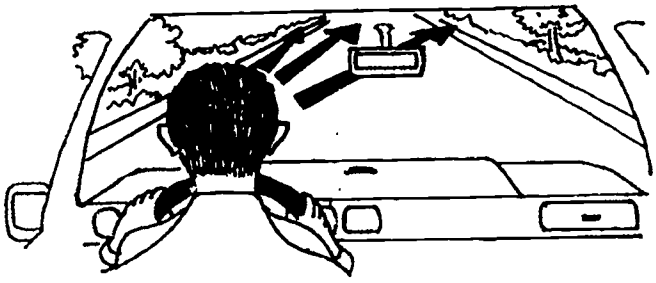
4. **Make sure other drivers see you**–Use the horn, headlights, turn signals, brake lights, or emergency flashers to alert other drivers and pedestrians to the movements and position of your vehicle.

5. **Leave yourself an "out"**–Leave yourself an escape route in case an emergency situation occurs. Never get "boxed in" by other traffic. Make sure you maintain an adequate following distance behind the automobile in front of you.

Proper Seeing Habits

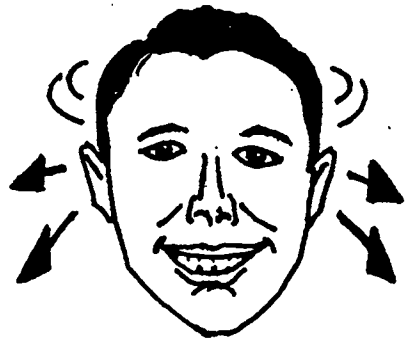
Aim high in steering.

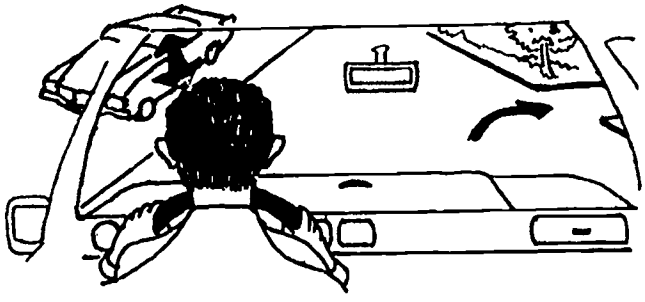




Get the big picture.

Keep your eyes moving.



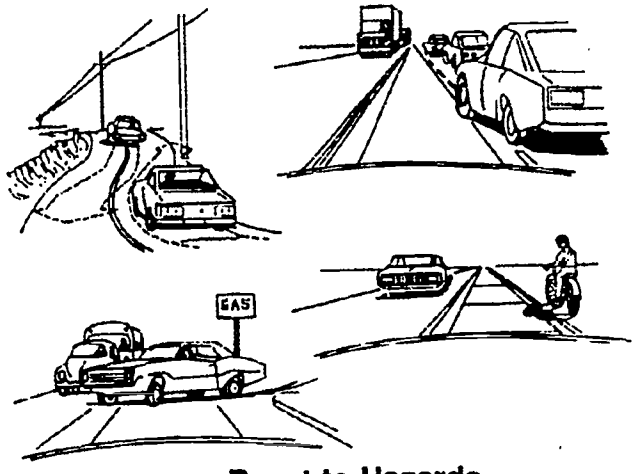


Make sure the other driver sees you. Leave yourself an "out" in case of an emergency.

A quick way to help you remember the key components of driver perception is to think I—P—D—E:

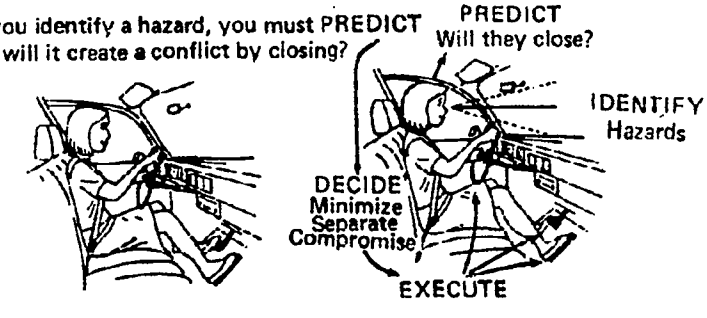
- **Identify** - Identify hazards or potential hazards in the traffic environment that may cause you to have a collision.
- **Predict** - Predict how a hazard could affect your driving behavior.
- **Decide** - Decide what actions to take to avoid traffic conflicts.
- **Execute** - Execute your decision. Logically, **perceptive** drivers probably are surprised less frequently than drivers who do not work on their perception skills. Perceptive drivers would probably not have to rely solely on last-instant, split-second **reactions** to dangerous situations.

Identify Potential Hazards

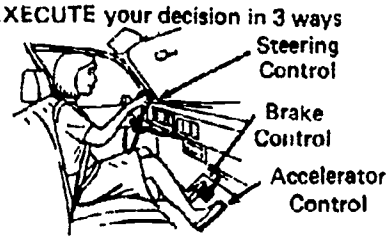


React to Hazards

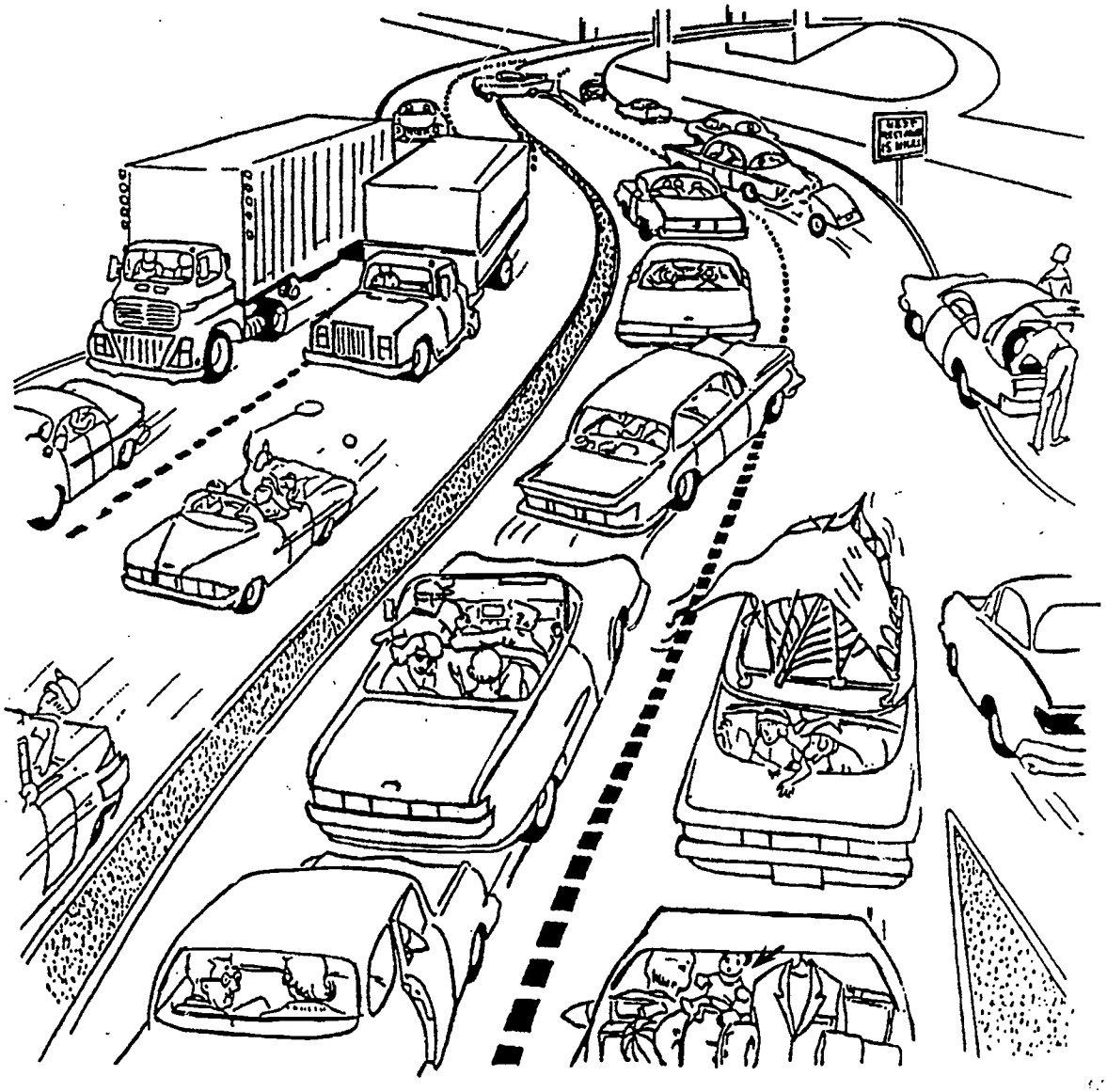
After you identify a hazard, you must PREDICT will it create a conflict by closing?



You can EXECUTE your decision in 3 ways



Hazardous Traffic Situations
(Activity 4 Illustration)



Activity 4

Examine the Illustration titled "Hazardous Traffic Situations." Circle the **hazardous situations**. (there are at least 14). Then, briefly describe each hazard, including what could happen and what you would do if the situation occurred.

1.

2.

3.

4.

5.

6.

7.

8.

9

10.

11.

12

13.

14.

(See the appendix for a listing of the hazardous situations.)

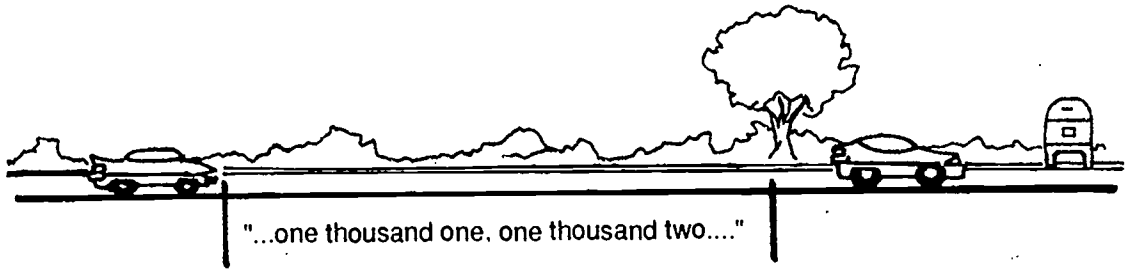
Discuss your answers with the class.

Maintaining a Safe Distance

Drivers must maintain an adequate *following distance* or "space cushion" between their vehicles and the vehicles in front of them. Maintaining a safe following distance can you help avoid hitting the other vehicle if it should stop suddenly. Some safety experts advise drivers to allow one car length ahead for each 10 mph of speed. Others suggest using the "2-Second Rule" to help maintain an adequate space cushion between you vehicle and the vehicles surrounding it. The 2-Second Rule describes the time/distance interval between your car and the car in front of you under ideal driving conditions. When environmental conditions become worse (for example during rain or snow), you must increase your following distance by a few seconds.

To use the 2-Second Rule while driving, pick out a stationary object (e.g., a tree or telephone pole) in your path ahead. When the vehicle ahead of you passes this stationary object, slowly count, "one thousand and one, one thousand and two." If you arrive at the object before you have finished saying, "one thousand and two," you are following the vehicle in front of you too closely, and you need to increase your following distance at once by slowing down.

The "2-Second" Rule



If you are following another vehicle too closely, you may not be able to stop quickly enough to avoid a collision.

Stopping an automobile involves more than just stepping on the brakes. Other factors involved in stopping an automobile include perception time, reaction time, reaction distance, and braking distance.

Perception Time

Perception time deals with the driver's ability to recognize a potentially dangerous situation. Specifically, it is the time that passes between the point at which a driver first sees a danger and the point at which the driver identifies it

Perception time varies from individual to individual. One factor that influences perception time is the driver's mental alertness.

Vision is an important component of perception. To perceive a dangerous situation, one must have good vision. Having your eyes examined before you begin to drive is important. Regular eye examinations as you get older are essential.

Reaction Time

Reaction time is the time it takes a driver to react and make the needed action to any situation that has been identified. The average reaction time for most people is approximately 3/4 of a second. However, this varies from person to person.

Total Stopping Distance

Related to reaction time is reaction distance. *Reaction distance* is the distance traveled while the driver is deciding on the appropriate driving action to take.

Reaction distance is the distance a vehicle travels from the time the brakes are applied until the car comes to a complete stop. Braking distance increases dramatically as the speed of the vehicle increases. A car traveling 50 mph is moving **twice** as fast as a car traveling 25 mph. Yet the car traveling 50 mph requires **four times** the braking distance.

The **total stopping distance** of an automobile is equal to the reaction distance plus the braking distance. The chart below indicates the reaction and braking distances (in feet) for various vehicle speeds. Using the chart, determine the total stopping distances for an automobile on dry roads.

Activity 5

Total Stopping Distance

SPEED MPH	REACTION DISTANCE	+	BRAKING DISTANCE	=	TOTAL STOPPING DISTANCE
20	22'	+	20'		___
25	28'	+	28'		___
30	33'	+	40'		___
35	39'	+	53'		___
40	44'	+	73'		___
45	50'	+	83'		___
50	55'	+	119'		___
55	61'	+	150'		___
60	66'	+	184'		___

(See the appendix for correct answers.)

In class, discuss how these distances increase on wet or icy roads, and what can happen if you get too close to the vehicle in front of you. Discuss how the condition of the brakes also may have an effect on the total stopping distance.

Activity 6

Gone are the days when many people owned and drove full-sized automobiles with rear-wheel drive. Today, many of the cars on the highway are compact or subcompact in size. Small cars are an economical means of transportation. However, small cars are different from full-sized cars in their driving and handling characteristics.

Below are ten statements about cars. If you think the statement refers to the characteristics of a small automobile, place an "S" in the blank next to it; if you think the statement refers to the characteristics of a full-sized automobile, place an "F" in the blank next to it.

_____1. Usually accelerates slowly when entering a freeway

_____2. May not be very maneuverable and may be difficult to park

_____3. Usually has front-wheel drive, which changes the dynamics of cornering and steering

_____4. Is closer to the ground

_____5. Is very spacious inside and has plush, comfortable seats

_____6. Can be easily affected by wind and turbulence from passing trucks or buses

_____7. Can be vulnerable to skidding

_____8. Can be hard for other drivers to see; could get caught in the other drivers' "blind spot"

_____9. Could be physically and mentally tiring on long trips

_____10. May provide a driver with a rather limited field of vision

(See the appendix for correct answers.)

Discuss some of the particular characteristics of small cars,. They require different knowledge and skills than those required by large cars.

Activity 7

A safe, defensive driver should know all the traffic laws, signs, signals, and pavement markings that affect the highway transportation system. Stop and imagine for a moment that roads and highways were completely free of speed limits, road markings, signs, and lights–just open roads. Drivers could drive as fast as they wanted! What do you think that would be like? Do you think it would be fun?

Actually, roads and highways with no traffic laws at all would be extremely dangerous, even lethal. Without traffic laws, the highways would be unsafe and in complete chaos. Traffic laws are necessary guidelines based upon **common sense.**

How well do you know the traffic laws? Review your state's motor vehicle laws and then read the following statements about traffic laws. Decide whether a statement is true or false and indicate your answer with a "T" or "F."

_____1. It is always illegal to make a **left** turn on red after stopping at a red traffic signal.

_____2. If a school bus is stopped with its red lights flashing on a street that has four lanes (two lanes traveling in each direction), all traffic approaching the bus from either direction must stop.

_____3. It is possible to get a ticket for driving too slow.

_____4. An empty school bus is required to stop at all railroad crossings.

_____5. It is not wise to pass left of center within 100 feet of an intersection.

_____6. To avoid a traffic citation, your driver's license must be renewed before it expires.

_____7. The minimum recommended distance for activating turn signals to indicate a planned change of direction is 100'.

_____8. Automobile tires must have a minimum tread depth of 1/16".

(See the appendix for the correct answers)

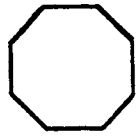
Discuss your answers to the above statements with the class. Think about why highway laws were written and the consequences that may occur when the law is violated.

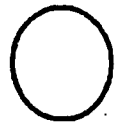
Activity 8

Look at the symbols and colors in the following illustration. Below the illustration is a list of nine types of traffic signs or markings. Place the letter of the symbol or color in the blank of the sign/marking it is used for.

Symbols and Colors

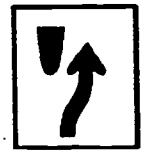
A. 

B. 

C. 

D. 

E. 

F. 

G. ORANGE

H. GREEN

I. BLUE

_____1. Stop and regulatory signs

_____2. Railroad crossing sign

_____3. Divided highway ends

_____4. Keep right

_____5. Stop sign

_____6. Motorist service guidance (rest area)

_____7. Pedestrian crosswalk

_____8. School crosswalk

_____9. Construction and maintenance warning

(See the appendix for correct answers.)

III. SUBSTANCE ABUSE

Driving under the influence of alcohol is against the law. Mixing alcohol, drugs, and driving is one of the most deadly combinations that confronts **all** users of the highway transportation system. Nearly half (about 45%) of all traffic deaths involve the use of alcohol and/or drugs. What this means is that more than 17,000 of the 39,000 traffic fatalities each year are caused by a driver who has been drinking or using drugs.

A drug is any substance that changes one's perceptions, feelings, and behavior. The more common illegal drugs include marijuana, stimulants (cocaine and speed), sedatives (tranquilizers), and alcohol. Yes, alcohol, too, is considered a drug. Not all drugs are illegal; an endless variety of legal medications are sold over-the-counter. Some common cold medicines and antihistamines, if taken in excess, can begin to impair a person's judgment and reaction time. When drugs are combined in any way, a *synergistic effect* results. This means that the effect of the combined drugs is multiplied to a point that far exceeds the effect any one of the combined drugs would produce individually. This creates an extremely dangerous situation. Impairment and the inability to function can quickly reach a point at which the abuser's life is not the only one seriously endangered. Unfortunately, the lives of many others are put at serious risk as well. Tragically, the others always seem to be innocent people who happen to be in the wrong place at the wrong time–a child crossing a street, a young mother on her way to work, a father on his way home from the supermarket, a happy teenager about to graduate from high school....

Activity 9

You and your best friend go to a party where there is free beer and lots of it. You really do not like beer, but you drink only a few cans. Your friend, however, has had far too much to drink, and you know it. It's getting late and the party is about over. You tell your friend you will drive her or him home. Your friend says "no way," and fumbles and drops the car keys. List three appropriate actions you might take to prevent your friend from driving home while drunk.

1.

2.

3.

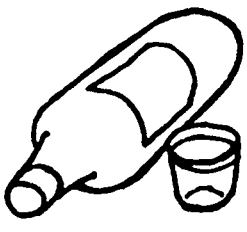
(See appendix for possible correct answers.)

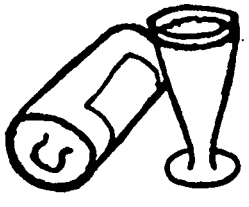
Discuss your answers with the class.

And what about **you**? Sure, you have a legal and moral responsibility to keep your intoxicated friend from driving, but didn't **you** have a few beers, too? What makes you think **you're** in any better shape than your friend? You'd better think **again** before **you** get behind the wheel. Just having had a few beers probably affected you far more than you realized. The odds are that you're "over the line" and would be considered legally intoxicated yourself. Also, your reaction time and motor skills will be much more affected than you realize.

Beer contains alcohol. Some people believe that beer contains less alcohol or a weaker type of alcohol and cannot make a person drunk as easily or quickly as wine or liquor. This is **not true**. Beer, liquor, and wine, when consumed in excess, can all impair your ability to function and make you falling-down drunk.

Alcohol Equivalents





Alcohol affects everyone differently. Your weight, how fast and how much you drink at one time, and whether you have eaten food will influence how soon you will become legally intoxicated (drunk). *Legally intoxicated* means that a person's blood-alcohol concentration (BAC) level has reached 0.10 percent or higher (in some states) or just 0.08 percent or higher (in other states). A BAC level as low as 0.02 percent can carry severe penalties for drivers under age 21 in most states. Legal intoxication is determined through a chemical test of the blood, breath, or urine. Remember, there is **no quick way** to become sober. **Time** is the **only** remedy (cure). Giving an intoxicated person coffee, a cold shower, or some fresh air will only make for a more wide-awake drunk.

The **smartest** move is to **not do it at all. If you're going to drive, stay off alcohol and any other type of drug.**

Activity 10

Use the KNOW YOUR LIMIT chart to answer the following questions.

KNOW YOUR LIMIT

NUMBER OF DRINKS IN ONE HOUR

APPROXIMATE BLOOD ALCOHOL CONTENT (BAC)

DRINKS	BODY WEIGHT IN POUNDS								
	100	120	140	160	180	200	220	240	
1	.04	.03	.03	.02	.02	.02	.02	.02	Reasonable
2	.08	.06	.05	.05	.04	.04	.03	.03	
3	.11	.09	.08	.07	.06	.06	.05	.05	Unsafe
4	.15	.12	.11	.09	.08	.08	.07	.06	
5	.19	.15	.13	.12	.10	.09	.09	.08	
6	.23	.18	.16	.14	.13	.11	.10	.09	
7	.26	.21	.18	.16	.15	.13	.12	.11	Illegal
8	.30	.24	.21	.19	.17	.15	.14	.13	
9	.34	.27	.24	.21	.19	.17	.16	.14	
10	.38	.31	.27	.24	.21	.19	.17	.16	

One drink = 1 oz. of 100 proof liquor or one 12 oz. beer.

Subtract .01% for each hour of drinking • In Ohio, the legal BAC limit is .10%

The Ohio Department of Health

1. What is your weight? _____

2. How many beers would it take for you to reach a BAC level that is considered illegal for you to drive? _____

3. How many 4 ounce glasses of wine would it take for you to reach a BAC level that makes it illegal for you to drive? Remember that 4 ounces of wine equals one drink. _____

4. Alcohol **never** leaves your system as fast as it enters. According to the chart, what percentage of BAC would you subtract for each hour you have been drinking? _____

Remember, a person just over the legal limit may not talk with slurred speech or even walk unsteadily. Yet that person's reaction time and motor skills may be impaired to the point that driving would be a serious risk–both to the intoxicated person and to **everyone** else unfortunate enough to be on the same street as the drunk person.

You may not realize it, but when you received a driver's license, you automatically gave advance consent to being required to submit to a chemical test. If you are stopped by a police officer and are suspected of being drunk, you **will** be given a chemical test. If your BAC exceeds the limit, you will be arrested for driving under the influence (DUI) or driving while intoxicated (DWI). Of particular interest, DUI/DWI laws do **not** apply only to alcohol--they cover **all** controlled substances. This includes both illegal drugs **and** prescription medications. Also, the term *"driving"* is not limited to operating cars or trucks. It can include operating a two-wheeled conveyance or a boat. It can even include operating farm machinery.

If you **refuse** to take a test offered by a law enforcement officer, your license could be seized **on the spot** and so could your vehicle. Then, of course, comes the court time, the possibility of jail time, and legal expenses. Think of the embarrassment. And all of these terrible feelings are **nothing** compared to how you would feel if you were the cause of an accident in which innocent people were injured or killed....

The states continue to adopt even tougher DUI/DWI laws. One state empowers a police officer to confiscate a driver's license at the time of arrest, and an "administrative license suspension" (usually 90 days) begins immediately. This is **in addition** to penalties which may be imposed later in court.

Activity 11

A law enforcement officer must have reasonable grounds for suspecting that a person is driving under the influence of alcohol or drugs before he or she can stop the vehicle. List three driving behaviors or actions that may suggest to a law enforcement officer that a person could be driving under the influence of a controlled substance.

1.

2.

3.

(See appendix for possible correct answers.)

Discuss your answers with the class.

IV. Safety Devices

Car manufacturers are trying to make cars safer. Safety belts and child restraints, air bags, and anti-lock braking systems are three major common safety devices.

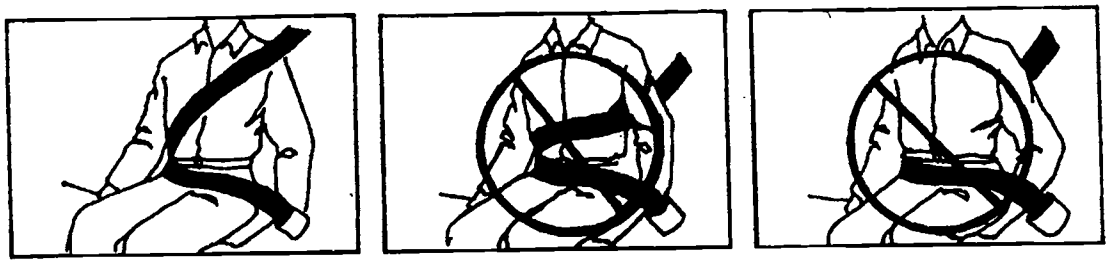
Safety Belts and Child Restraints

If you knew you were going to be in a car crash today, would you buckle your safety belts? **Of course you would!** But no one knows **when** an accident will occur. Many people apparently believe that accidents happen only to others, not to them. This kind of thinking is extremely naive and can be **deadly**. Hundreds of thousands of injuries would be prevented and thousands of lives saved **if** all drivers and passengers wore their seat belts and **if** young children rode in proper child restraint seats.

Most people will likely be involved in a collision at some time, and you cannot predict when. Maybe it will happen in 10 years, maybe tonight, hopefully never. But when you **need** the belts, you're either wearing them or you're not. When/if it happens to you, will you be **wearing** your safety belt or **sitting** on it?

Safety belts must be worn properly. The lap belt must be positioned snugly around the hip bones where the thighs meet the abdomen. It should never be worn across the abdomen or stomach. In a crash, wearing the lap belt across the abdomen can result in a bruised liver or spleen. If you wear the belt cinched too loosely, you can slide **under** the belt in an accident. Then the belt ends up back on the abdomen where you **don't** want it. This is also why a reclining passenger seat must not be reclined more than part way back while the vehicle is in motion.

Proper Belt Usage

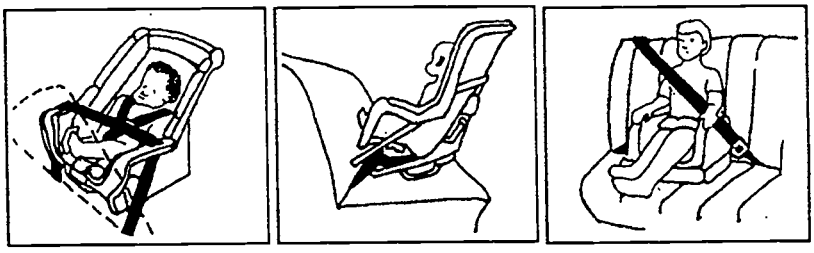


The shoulder belt can be left **slightly** loose for comfort. It will lock and hold you when collision impact forces trigger its lock-up mechanism. This will prevent your upper body from abruptly slamming forward into the steering wheel or dashboard.

Some cars come equipped with automatic placement of the shoulder belt. When you close the door, the shoulder belt is automatically positioned over your shoulder. At this point, most people think they're buckled in. **This is not so.** You must also **manually** connect your lap belt.

In terms of restraints for small children, all fifty states have passed their own very specific laws regarding restraints for small children. In general, children who are under four years of age or weigh less than 40 pounds must be secured in approved child seats any time they are passengers in a motor vehicle. The child seats must also be secured with a safety belt while the vehicle is in motion. There are specific seat and safety belting requirements for different ages and weights of infants and very small children. The illustration below shows three different child restraints.

Examples of Child Restraints



Activity 12

Do **you** wear a safety belt? _____YES _____NO

List three reasons why you wear safety belts. Or, list three reasons why you do not.

1.

2.

3.

(See the appendix for examples of correct answers.)

Discuss your answers with the class.

If you drive, you always run the risk of having an accident. If you do have an accident–a bad one–the chance of surviving will be **greatly** improved if you are wearing safety belts at the moment if impact. People give many reasons why they do not wear safety belts. None of these reasons can be supported by facts.

Some people believe that safety belts are needed only at highway speeds and not for short local trips.

> Fact: Most serious automobile accidents happen on a city street or country road within 25 miles of a person's home. Eighty percent of all accidents and more than half of all accidents that include a fatality happen at speeds under 40 mph.

Some people believe that safety belts will trap them inside the car if it catches fire in an accident

> Fact: A vehicle catches fire in less than 1 percent of all serious accidents.

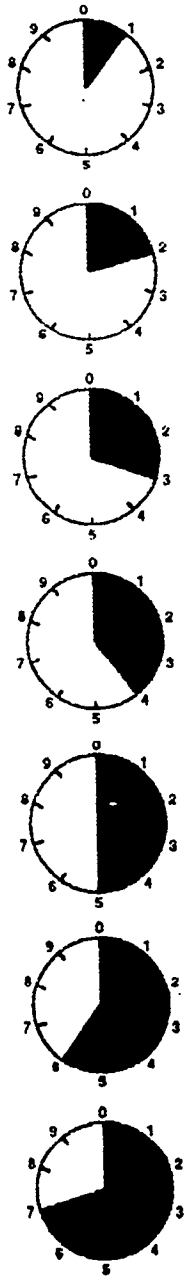
Some people believe that if they are in a serious accident, it is safer to be thrown out of the automobile than to remain inside.

> Fact: Accident victims who are thrown out of an automobile during an accident are about 25 times more likely to be killed or seriously injured than those who remain safety-belted inside.

Some people believe that safety belts are uncomfortable and too much of a hassle to fasten every time they get into the car.

> Fact: The safety belts in today's vehicles have been designed to offer comfort and convenience. It takes only a few seconds to fasten the safety belts. On the other hand, you can **die** in just 7/10 of 1 second. If your head were to hit the dash or windshield, you risk gashes, bruises, skull fracture, and even brain damage. The following illustration shows how an unsecured driver slams forward at the moment of impact and then slams backward just as hard.

Read this scenario and pretend you are listening to a stopwatch ticking–except that all of the action in the scenario would be **over** before the second tick. It's not a pleasant sequence to read, but for many unfortunate people it is quite real–**dead** real. As you read, try to imagine **yourself** in the horrific situation of losing control of your car at high speed. It's racing full speed toward a big tree. You have no control, but you can **see** what's coming. You **know** what's coming in a instant, and **you can't stop it**. All at once, WHAM! The impact is like nothing you've ever felt before. Now, in slow motion, this is what is happening to you and your car:



1/10th of a second:
The front bumper and the grillwork collapse. Slivers of steel penetrate the tree to a depth of 1 1/2 inches.

2/10ths of a second:
The hood rises, crumples, smashes into the windshield. Spinning rear wheels leave the ground. The fenders come into contact with the tree, forcing the rear parts out over the front doors. Your body continues to move forward at the vehicle's original speed (20 times the normal force of gravity, the body weighs 3,200 pounds). The legs, ramrod straight, snap at the knee joints.

3/10ths of a second:
Your body is now off the seat, torso upright, broken knees pressing against the dashboard. The plastic and steel frame of the steering wheel begins to bend under your terrible death grip. Your head is now near the sun visor and the chest above the steering column.

4/10ths of a second:
The car's front 24 inches have been demolished, but the rear end is still traveling at about 35 miles per hour. Your body is still traveling 55 miles per hour. The engine crunches into the tree.

5/10ths of a second:
Your fear-frozen hands bend the steering column into an almost vertical position. The force of gravity impales your on the steering shaft. Jagged steel punctures lungs and intercostal arteries. Blood spurts into the lungs.

6/10ths of a second:
Your feet are ripped from their tightly-laced shoes. The brake pedal shears off at the floor board. The chassis bends in the middle, shearing body bolts. Your head smashes into the windshield. The rear of the car begins its downward fall spinning wheels digging into the ground.

7/10ths of a second:
The entire, writhing body of the car is forced out of shape. Hinges tear, doors spring open. In one last convulsion, the seat rams forward, pinning you against the twisted steel of the steering shaft. Blood erupts from your mouth; shock has stopped your heart. You are now dead. Time elapsed: seven-tenths of one second *

*This scenario is adapted from an information sheet distributed by the Ohio Department of Public Safety

That's not at all a pretty thought. Most people who have been killed in automobile accidents have had to face that last horrifying moment the instant before dying....

You have to wonder if maybe one of their last thoughts, or maybe their very last thought, might have been, "I'M NOT WEARING MY SAFETY BELT!!"

Safety belts **can** and **do** save lives--but **only** if they're worn properly and **all** of the time.

Air Bags

Another restraint device that is becoming more common on newer cars is the air bag. Not all cars have air bags and some have only a driver's side air bag while others have an air bag for front seat passengers. Autos equipped with air bags have sensors in their front ends to detect impact forces in a head-on or front-angle collision. In a frontal-impact collision, air bags inflate almost instantly into the driver's and front-seat passenger's faces and chests. This provides an immediate cushion at the moment of impact. Instead of slamming into the steering wheel or the windshield, the driver pitches forward into the soft cushion of the air bag. The same is true if there is a passenger and a passenger-side air bag. In that split second, the air bags have done their job and then begin to deflate to allow the driver to resume control of the steering wheel. This is especially important in accidents in which veering could lead to a possible secondary crash.

Air bags work. However, they are only a **part** of the total restraint system. Air bags are a system to use in conjunction with safety belts. For **complete protection**, the driver and front-seat passenger must also wear properly fastened safety belts.

Activity 13

Do you think safety belt laws and air bags in automobiles are good ideas? What about child restraint laws? Jot down some of your thoughts.

(This is a subjective activity; example correct answers are contained in the appendix.)

Discuss your opinion with the class.

Anti-lock Braking Systems

Auto designers and engineers have, over the decades, improved auto crash safety. New developments over the years have included padded instrument panels and steering wheels, safety belts, and, in more recent years, collapsible front ends, disc brakes, side beams, and other innovations.

Besides restraints that prevent many injuries in crashes, another important safety innovation for drivers, especially newer drivers, has been **anti-lock braking systems** (ABS).

Expert drivers have learned to modulate their brakes when slowing or stopping in slick conditions, either by on-off pumping of the brakes or by partially applying the brakes. On ice, snow, gravel, mud, or wet blacktop, holding the brake pedal down partially (instead of hard on-off pumping), will slow and stop the car. This is best for average drivers. Too many drivers who must slow or stop in slick conditions have not allowed sufficient space between themselves and a car ahead. In a quick-stop situation, they jam on the brakes as in normal, "dry" road surface conditions. Then their wheels lock up (stop rolling). They have no control over steering or slowing and they are **skidding**. At that moment they become just frightened passengers; they are no longer drivers **in control**.

With an ABS in your car, you have a choice. Pushing the pedal half way down stops the car gradually. The car stops **under control** because the wheels don't lock up. If you push on the brake pedal hard, as in normal, dry braking, the ABS hard-pumps the brakes for you. Wheels do lock up and stop rolling, but only for an instant. Then the brakes release and wheels roll again.

So, with standard brakes you have three options: lightly pressing the brake pedal, pumping the brake pedal, or pushing hard (or slamming) on the brake pedal. In an anti-lock braking system, you learn to make just two basic responses to emergency-braking situations: pushing halfway on the brake pedal or pushing it all the way down.

In any slick or slippery road situation, though, you must allow for much longer stopping distances compared to dry conditions. Thus, even with ABS, you still must drive slower on the hazardous surface and begin coasting and braking much sooner.

V. EMERGENCY DRIVING SITUATIONS

Driving an automobile does not always take place in light traffic on a warm, sunny day. Obviously, there will be times when the weather conditions, other drivers' actions, or failure of one of your automobile's components will warrant that you take immediate action to ensure the safety of yourself and others. Handling emergency driving situations requires one main ingredient: **knowing** what to do when that particular situation occurs. Let's take a look at some emergency driving situations and find out how you would react.

Activity 14

For each of the following emergency driving situations, circle the answer you think is most logical.

Situation 1. You are driving on a two-lane city street at 35 mph and the front right tire has a blow out. What is the safest driver reaction?

A. Ease up on the steering wheel to avoid oversteer and slam on the brakes to get the car slowed down as quickly as possible and off to the side of the road.

B. Remove your foot from the accelerator. Grip the steering wheel securely and try to keep the car going straight ahead. Begin to pump the brakes so the car can be eased to a stop.

C. Since the tire is already ruined, keep driving on it until a service station is in sight.

Situation 2. You are driving on a snow-covered country road and your car begins to skid. What should you do?

A. Slam on the brakes. This will help you regain steering control and will shorten the skidding distance.

B. Do not slam on the brakes. Brake gently to slow down. Turn the steering wheel in the opposite direction from that in which the rear end of the car is skidding.

C. Pump the brake gently to slow down. Turn the steering wheel in the direction in which the rear end of the car is skidding.

Situation 3. You are driving in rain that is falling so hard you are having trouble seeing ahead, even with your windshield wipers on high speed. What should you do in this situation?

A. Turn on the headlights, increase your following distance, and slow down your vehicle. You should slow down because your car's tires may start to hydroplane (i.e., ride on **top** of the film of water) and you could lose control of the car.

B. Stop. If it is raining so hard that you cannot see, it is a good idea to find a safe place off the street or road and wait until the rain lightens.

C. Keep driving as you normally would. You realize that rain causes the road to become slippery and may cause the brakes to fade, but you do not have to worry because you are a good driver.

Situation 4. You are driving on a two-lane road when suddenly a car on the other side of the road crosses the center line and heads directly toward your car. What would be the safest response from you?

A. Blow your horn and drive over as far as possible to the right edge of the road.

B. Go left of center and try to make it to the other side of the road so the driver can pass you on the right side of your automobile.

C. Stay where you are because, as soon as the other driver sees you, he or she will surely return to their own side of the road.

(See the appendix for correct answers.)

Discuss the likely outcomes of all possible responses to each scenario.

Activity 15

Emergency driving situations are often caused by other people on the highway or by poor weather conditions. Explain below what you might do in the following driving situations.

1. If the person behind your car is tailgating (following your car too closely), you should...

2. If one or more of your car's wheels suddenly drops off the side of the road, you should...

3. If you are driving through the mountains at night and it suddenly becomes very foggy, you should...

4. If a car is driving toward your car at night with its bright headlights shining in your eyes, you should...

5. If you are driving on a crowded freeway with the correct following distance in relation to the car in front of you and suddenly a driver cuts in front of your car, you should...

(See the appendix for a listing of appropriate responses.)

REMEMBER: In any emergency driving situation, the best thing to do is remain calm and take the correct driving action to eliminate the possibility of becoming involved in an accident.

VI. OTHER HIGHWAY USERS

You may encounter a wide variety of conveyances when using the highway transportation system. Examples of some of the more common types of vehicles found include motorcycles (on-road and off-road types), farm tractors and machinery, snowmobiles, bicycles, mopeds, motor homes, and horse-drawn buggies in several areas of the country.

All highway users other than the automobile driver require special attention and consideration when encountered. Other highway users have the same right to use the highway transportation system as the automobile driver. Without respect for the rights of other highway users, the highways become dangerous for us all. Remember, in virtually all instances, the operators of other vehicles using the highway must follow all motor vehicle traffic laws and regulations, as well as specific laws that pertain to the safe operation of the specific vehicle.

Two-wheeled conveyances–bicycles, mopeds, and motorcycles–will be the types of "other" highway users you will encounter most frequently in just about all parts of the country. Drivers of cars must be extra cautious when they encounter any of the two-wheeled vehicles. Bicycles and, sometimes, mopeds are usually ridden at the very edge of the road. Great care must be exercised when passing them. Also, because they present a very narrow profile when seen from the rear, they are not always easily seen. Motorcycles, though as fast as cars, present the same problem: they are not always easy to see. Sometimes riders may make quick turns or quick lane changes; the automobile driver must be constantly watching for--even anticipating--both kinds of moves.

Activity 16

Within the Wordfind below are 41 words (see below) that are associated with drivers, vehicles, and driving. You may find these words written forward, backward, vertically, horizontally, or diagonally. Circle the words on the Wordfind as you locate them.

Wordfind

A	B	I	N	J	U	R	Y	B	E	R	M	S	S	A	P
N	E	R	U	J	N	I	D	E	A	T	H	H	T	E	D
T	L	W	Y	N	R	U	T	C	U	R	V	E	R	T	X
I	T	A	I	S	A	F	E	T	Y	O	L	I	G	H	T
L	S	R	E	B	R	A	K	E	S	C	A	U	T	O	M
O	A	N	L	A	N	Z	D	M	Y	B	N	L	P	P	S
C	I	I	D	E	T	O	U	C	Z	P	C	O	O	T	Z
K	R	N	B	I	K	E	R	A	M	P	I	T	C	X	T
A	B	G	O	D	A	O	R	N	G	I	S	L	O	W	N
I	A	R	R	D	T	R	A	C	S	S	T	J	S	S	E
R	G	E	I	O	T	L	U	A	F	A	E	A	E	P	D
B	S	V	M	M	X	T	G	A	Z	F	M	Y	L	E	I
R	A	I	D	E	T	O	U	R	K	T	L	W	I	E	C
O	D	R	S	I	G	N	A	L	G	H	E	L	M	E	C
R	E	D	M	E	O	S	P	E	E	D	H	K	B	D	A
R	P	W	A	I	L	A	N	E	W	H	E	E	L	S	O
I	O	A	L	I	C	E	N	S	E	B	S	K	I	D	S
M	M	L	E	K	A	R	B	E	T	A	G	L	I	A	T

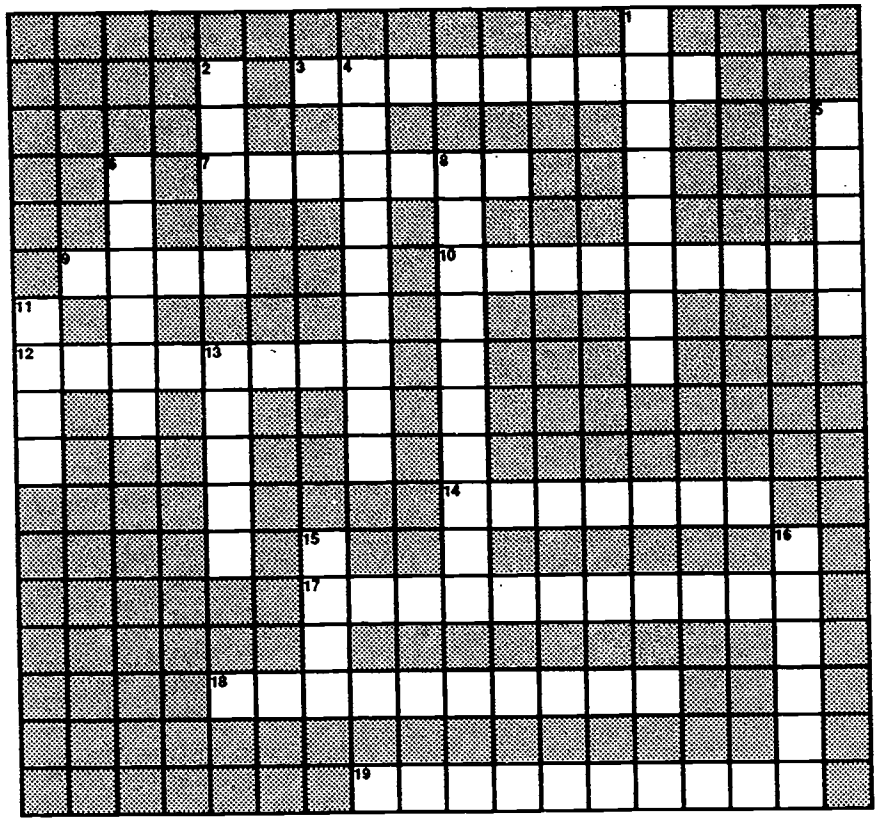
GAS	YIELD	LANE	SAFETY	TAILGATE
TURN	SIGNAL	DETOUR	DRIVER	BELTS
OIL	SLOW	MILES	LIGHT	RAMP
HELMET	STOP	SPEED	SKIDS	DEATH
ACCIDENT	ROAD	WARNING	WHEELS	INJURY
FAULT	AUTO	BIKE	CURVE	PASS
MOTORCYCLE	LICENSE	BRAKES	LAW	MIRROR
ANTILOCK	SIGN	AIRBAGS	CAR	BERM
		MOPED		

(See the appendix for location of words in each column.)

33

Activity 17

Crossword Puzzle



ACROSS CLUES

3. Keeps drivers "strapped in"
7. Against the law
9. What to do at a red traffic light
10. Act of coming together with a solid impact
12. The time it takes a driver to respond to a hazardous condition is called _____ time
14. A cause in about half of all fatal accidents
17. Something that can be chosen instead of something else
18. To skid when the tires are riding on a "film" of water
19. A very small, economical car

DOWN CLUES

1. Reaction distance plus braking distance equals total _____ distance
2. Driving under the influence
4. A situation that demands immediate action
5. Legally intoxicated
6. Deadly
8. To increase in speed
11. A substance that can change your feelings, perceptions, and behavior
13. Large highway vehicle
15. Condition of tires offering little traction
16. Protects the motorcycle operator

(See appendix for answer key.)

APPENDIX

Activity 1 Answers

Your list of five that may contribute to the high accident rate among young drivers could have included the following:

1. Inexperience with diverse driving conditions
2. Being distracted by events occurring in the car
3. Showing off (speeding, driving recklessly)
4. Driving while angry
5. Peer pressure
6. Playing games (i.e. Chinese Fire Drill, Chicken)
7. Use of alcohol and other drugs
8. Fatigue
9. Illness
10. Inexperience in dealing with hazardous situations

Activity 2 Answers

Some reasons you might have included for why you think young male drivers are involved in more accidents than are young females are–

1. Live up to a "macho" image
2. Get the attention of girls–impress them
3. Risk-taking behavior of young males is greater than that of young females
4. Males are more aggressive drivers than females
5. Expectations of peer group are different for males than for females
6. Competitive spirit–do not want to be outdone by another driver
7. Males tend to identify differently with their cars than do females; males **tend** to prefer expensive, fast, and sporty cars and females **tend** to prefer economical, reliable cars

In response to the question "Do you think insurance premiums should be the same for both young male and female drivers?", you could have offered the following arguments.

No, premiums should not be the same for young male and female drivers. Insurance premiums should be higher for males for at least the first two years because they are involved in more accidents than females.

Yes, premiums should be the same for young male and female drivers, at least until an accident occurs.

Activity 3 Answers

You could have included the following in your list of five characteristics you think a poor driver possesses.

1. Does not use turn signals
2. Does not keep enough distance from the car ahead
3. Drives too fast
4. Drives too fast for conditions (is within the posted speed limit but should be driving slower because of wet, snowy, or icy roads or because of poor visibility)
5. Weaves in and out of traffic
6. Does not slow down in anticipation of having to stop for a red light but pushes on through the intersection
7. Does not stop at railroad crossings when warning lights are flashing or slow down to make sure the tracks are clear if there are no signal lights at the crossing
8. Does not wear safety belt
9. Does not require passengers to wear safety belts
10. Does not pay attention to what other drivers and pedestrians are doing ahead, beside, and behind his/her vehicle

You could have included the following in your list of five characteristics you think a good driver possesses.

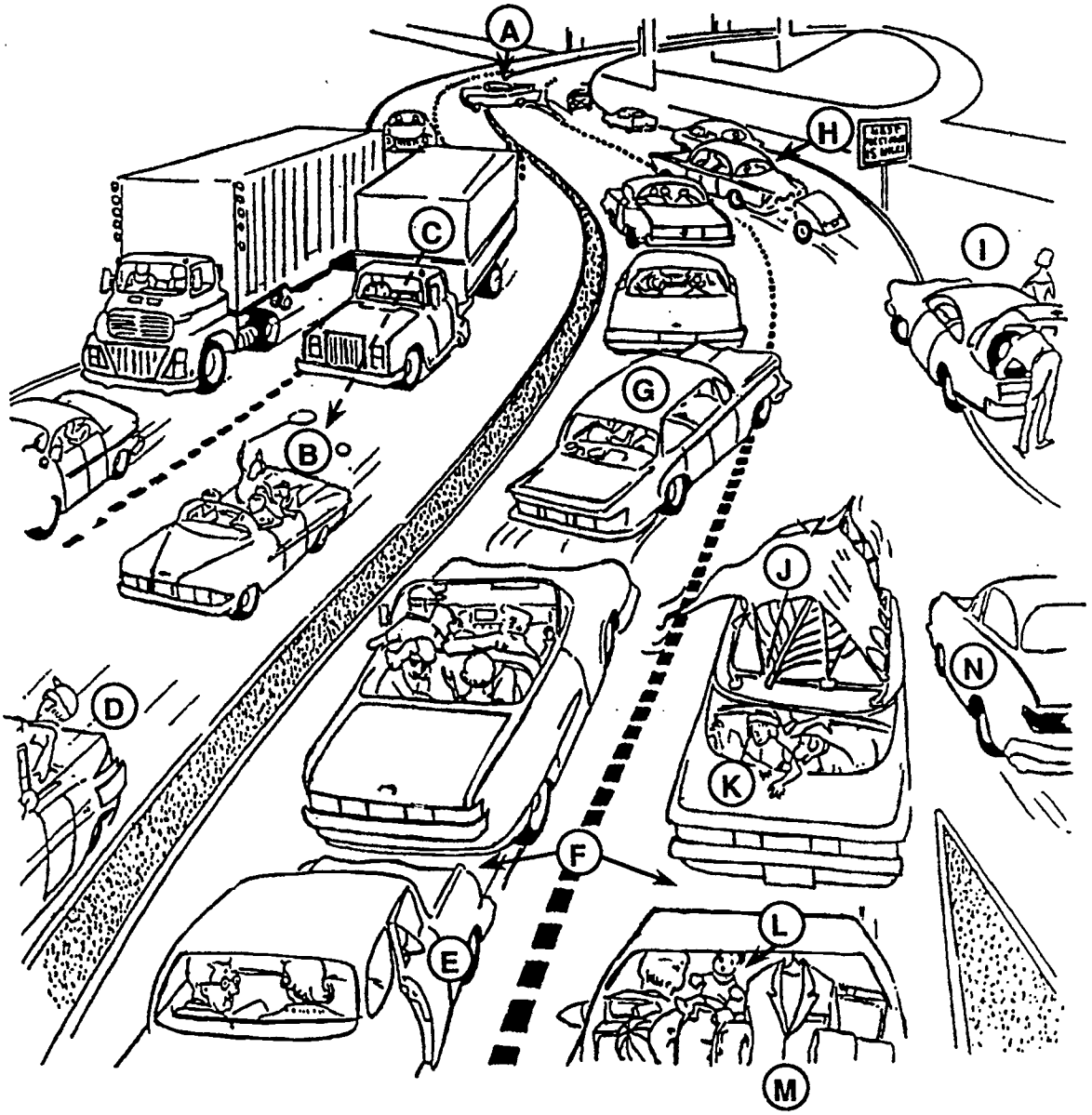
1. Is considerate of other drivers
2. Uses turn signals sufficiently in advance of intended lane change or turn
3. Is aware of other drivers' movements
4. Drives at a speed appropriate for weather and road conditions
5. Does not put more passengers in her/his car than the car was designed to hold
6. Is able to remain calm when under stress
7. Is alert to emergency vehicles and takes appropriate action

8. Watches out for pedestrians and bicyclists

9. Is aware of his/her limitations (fatigue, distraction)

10. Uses headlights when it is raining

Activity 4 Illustration



(See next page for explanation of answers.)

Activity 4 Answers

A. The car is making an illegal U-turn. It runs the risk of being hit by another car from either direction.

B. Children are playing with loose objects in an open convertible. This can be very distracting to other drivers and potentially very dangerous.

C. This truck may swerve because of the ball dropped or thrown from the open convertible.

D. A person is leaning back very far in an open convertible. Obviously, the person is not wearing a seat belt. If the car stops suddenly, the person will be thrown from the vehicle.

E. The door is not securely latched, and a passenger is leaning on the door. The passenger may fall out of the car if not wearing a safety belt or the door may swing wide open and be hit by another car, potentially causing both cars to go out of control.

F. These cars are following the cars ahead of them much too closely. In case of a sudden stop of the lead car, the others are likely to "rear end" the lead car and each other.

G. This car is changing to the right-hand lane at a point where (1) a second car is entering the highway, (2) a third car is too close to make a safe lane change, and (3) a fourth car is stopped along the berm and is partially in the right-hand lane. The driver of the first car has left him/herself no out and an accident is likely to result.

H. The car with the trailer is cutting off another car rather than waiting to merge properly. The trailer will strike the car that is already in the lane as the car that is towing it pulls into the lane.

I. The person whose car is stopped has not pulled the car onto the berm. There are no emergency markers placed behind the car. The driver is standing very close to the edge of the road. Cars on the road may hit either the front left portion of the car or hit the driver.

J. The top load on this car is not securely fastened and appears about to fly off. This can distract the driver of car, possibly causing an accident. Also, drivers of other cars may swerve to avoid hitting the objects that will fall or their vision may be obscured if the tarp comes completely loose.

K. The rear window of the car is open and the children are not wearing safety belts or using child restraints and so they are at risk of falling out. They could be very distracting to other drivers, and they could drop or throw something out of the window. If one of the children does fall out, other drivers will swerve to attempt to avoid hitting the child and will, at the least, hit another car. The same may true for objects falling out, depending on the size of the object and the alertness of the other drivers.

L. The baby is not secured in an in-front restraint seat. This may distract the driver, causing an accident, and result in severe injury to the child.

M. Items are hanging and piled high in the back seat. This obscures the driver's rear vision. The driver may change lanes without being able to see another car behind and to the side of her/him.

N. The car approaching on the entrance ramp is not slowing down to facilitate a safe merge into the freeway traffic. This car may hit either the car with the loose load on top or the car that is pulling into the lane. Also, in trying to avoid both of these cars, the car on the entrance ramp may hit the car that is stopped along the road as well as its driver.

Activity 5 Answers

Total Stopping Distance

SPEED MPH	REACTION DISTANCE	+	BRAKING DISTANCE	=	TOTAL STOPPING DISTANCE
20	22'		20'		42'
25	28'		28'		56'
30	33'		40'		73'
35	39'		53'		92'
40	44'		73'		117'
45	50'		83'		133'
50	55'		119'		174'
55	61'		150'		211'
60	66'		184'		250'

Activity 6 Answers

S 1. Usually accelerates slowly when entering a freeway

F 2. May not be very maneuverable, and may be difficult to park

S 3. Usually has front-wheel drive, which changes the dynamics of cornering and steering

S 4. Is closer to the ground

F 5. Is very spacious inside, and it has plush, comfortable seats

S 6. Can be easily affected by wind and turbulence from passing trucks or buses

S 7. Can be vulnerable to skidding

S 8. Can be hard for other drivers to see; could get caught in the other drivers' "blind spot"

S 9. Could be tiring to drive, physically and mentally, on long trips

S 10. May provide a driver with a rather limited field of vision

NOTE: These answers are very general. this exercise is intended simply to make you aware that there are handling differences between full-sized and compact cars.

Activity 7 Answers

F 1. It is always illegal to make a **left** turn on red after stopping at a red traffic signal.

T 2. If a school bus is stopped with its red lights flashing on a street that has four lanes (two lanes traveling in each direction), all traffic approaching the bus from either direction must stop.

T 3. Receiving a speeding ticket is common in today's society. However, you can also get a ticket for driving too slow.

T 4. An empty school bus is required to stop at all railroad crossings.

T 5. It is not wise to pass left of center within 100' of an intersection.

T 6. To avoid a traffic citation, your driver's license must be renewed before it expires.

F 7. The minimum recommended distance for activating turn signals to indicate a planned change of direction is 100'.

T 8. Automobile tires must have a minimum tread depth of 1/16".

Activity 8 Answers

G 1. Stop and regulatory signs

C 2. Railroad crossing sign

E 3. Divided highway ends

F 4. Keep right

B 5. Stop sign

I 6. Motorist service guidance (rest area)

D 7. Pedestrian crosswalk

A 8. School crosswalk

H 9. Construction and maintenance warning

Activity 9 Answers

1. Pick up the keys and either hold on to them or give them to someone who is sober.
2. If you're **sure** you are all right (i.e., not inebriated and **below** the legal Blood Alcohol Content limit), you can offer to drive the two of you home.
3. Search for a person at the party who is sober, and ask this person to drive the two of you home.
4. Call a parent, sibling, or friend to drive the two of you home.
5. Call a taxi to drive the two of you home.
6. Ask the host of the party if you and your friend can spend the night.

Activity 11 Answers

1. Driving excessively fast
2. Driving excessively slow
3. Alternating between fast and slow driving
4. Stopping at odd points
5. Pulling directly in front of other cars when starting out
6. Weaving between lanes while driving
7. Swerving suddenly while driving
8. Driving off the road

Activity 12 Answers

Examples of reasons why you should wear a safety belt while in a car.

1. By holding you in place when your car goes out of control, a safety belt helps you maintain control of the vehicle.

2. Safety belts prevent passengers from being thrown from the car through a window.

3. Use of safety belts saves everyone money indirectly through lower costs for such things as insurance premiums, social security disability insurance, and rehabilitation.

4. By using safety belts, you increase your chances of remaining conscious, alert, and uninjured so that you have a greater likelihood of getting yourself out of the vehicle if it is sinking or burning.

5. Safety belts prevent passengers from becoming missiles and injuring fellow passengers or the driver.

Activity 13 Answers

Safety belt laws are a good idea because using safety belts cuts down on injuries and deaths. The laws make it more likely that people will remember to use their safety belts.

Front-seat air bags (both driver- and passenger-side) are another good idea for the same reason as safety belts: they cut down on injuries and deaths.

The same is true of child restraint laws: child restraints lessen the severity of injuries and lower the death rate. It also makes if easier for the driver to focus on driving because they do not have to worry about a child wandering around the car or try to hold a child in place themselves in case of a sudden stop or accident.

Activity 14 Answers

Situation 1	B
Situation 2	C
Situation 3	A or B
Situation 4	A (However in choice A, you may have to leave the roadway, which may present an entirely new set of hazards, e.g. a ditch on the side of the road.)

Activity 15 Answers

1. Put on your right turn signal and safely ease to the right so the tailgater may pass you.

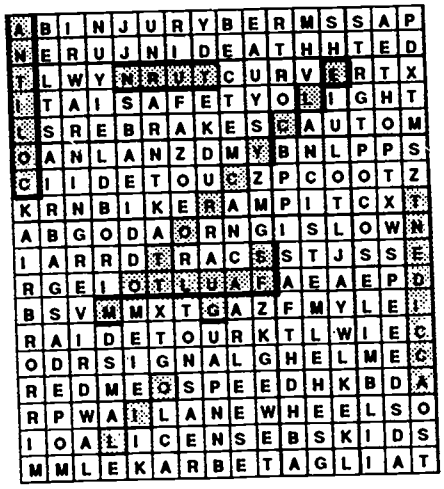
2. You should **not** jerk the steering wheel back. Keep the wheels straight and apply the brakes easily and cautiously.

3. Turn on your headlights (and your wipers, if necessary), gradually slow down, and pull as far off the road as possible.

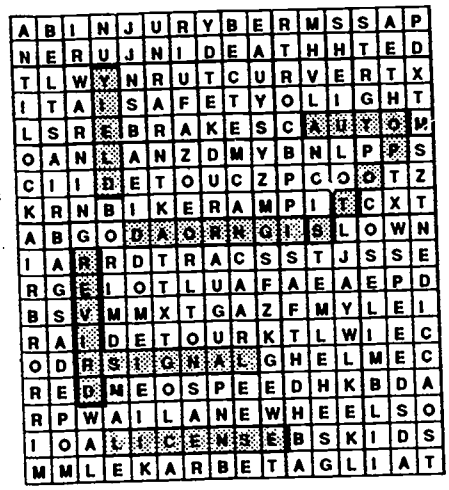
4. Look away; cover your eyes a little if necessary. Flick your own bright lights on and off quickly. The other driver may be unaware that her/his bright lights are on.

5. Avoid swerving–that is your primary responsibility. Keep your car straight; apply a light touch to the brakes and, at the same time, glance in the rear view mirror to assure yourself of the control of the driver behind you.

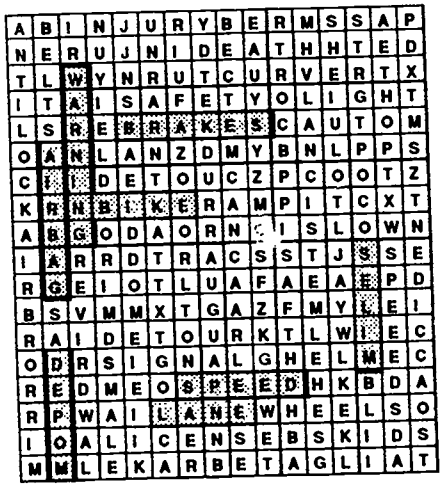
Activity 16 Answers



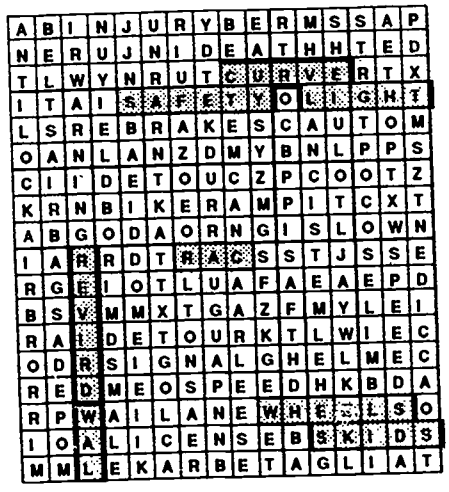
GAS
TURN
OIL
HELMET
ACCIDENT
FAULT
MOTORCYCLE
ANTILOCK



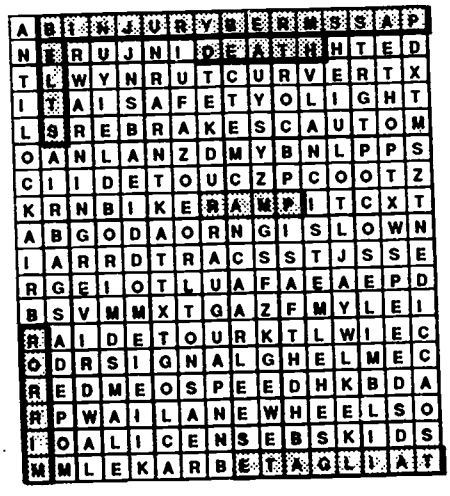
YIELD
SIGNAL
SLOW
STOP
ROAD
AUTO
LICENSE
SIGN



LANE
DETOUR
MILES
SPEED
WARNING
BIKE
BRAKES
AIRBAGS
MOPED



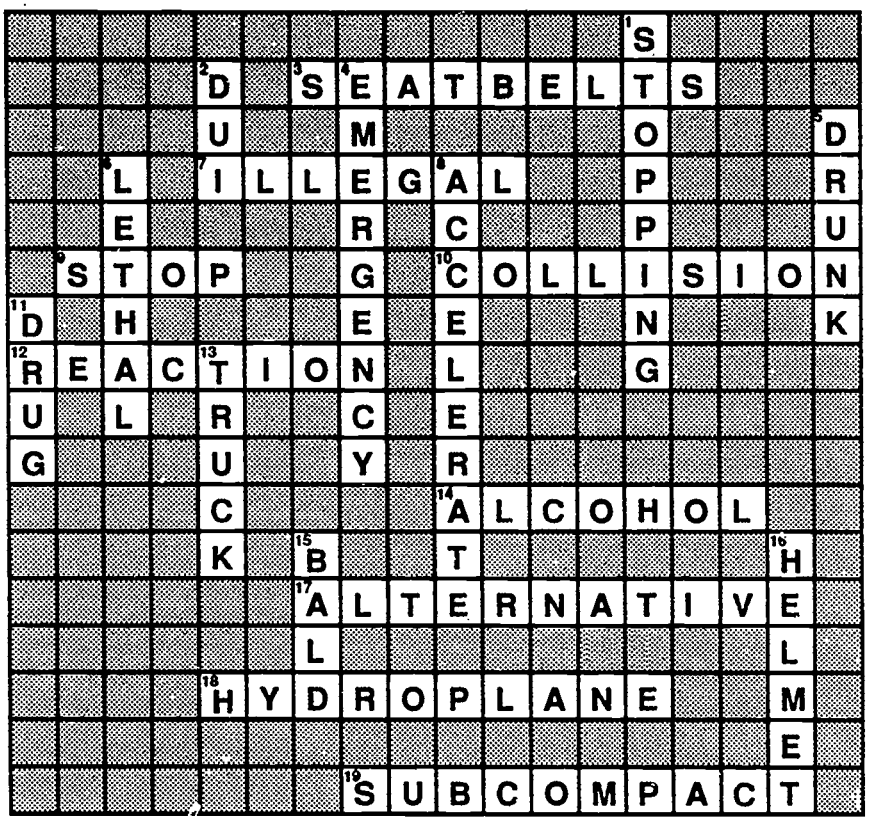
SAFETY
DRIVER
LIGHT
SKIDS
WHEELS
CURVE
LAW
CAR



TAILGATE
BELTS
RAMP
DEATH
INJURY
PASS
MIRROR
BERM

54

Activity 17 Answers



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