A GUIDE TO
CURRICULUM DEVELOPMENT
IN DRIVER EDUCATION

Bureau of Instruction and Curriculum
Iowa Department of Education

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FOREWORD

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Dr. A. James McKnight, President of the National Public Services Research Institute, was contracted as the curriculum specialist who developed this guide for curriculum development.

The opinions, findings and conclusions expressed in this publication are those of the author or those specifically referenced and are not necessarily those of the Governor's Traffic Safety Bureau or the National Highway Traffic Safety Administration.

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PREFACE

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o spare themselves, their families and sociated with accidental death and injury, neither the resources nor the expertise to d skills needed to enhance traffic safety. ignificantly the unnecessary loss of human accept their natural responsibility for and service by providing high quality, that protect the lives of their students hities.

of "A Guide To Curriculum Development in prepared for the Bureau of Instruction and Department of Education. The development National Public Services Research Institute Dr. A. James McKnight. Mr. James Weidman room lesson plans while Mr. Scott McKnight -wheel lesson plans. Mrs. Yvonne Mattocks f the Guide itself, from the initial era-ready copy.

lly acknowledge the guidance and assistance d Koroch and Mr. Robert Roush of the throughout the development of the Guide. bt of gratitude is owed to Mr. Richard Tack, who authored the original "Program tion" curriculum guide in 1975.

INTRODUCTION

The motor vehicle is an integral--and virtually indispensable--element of modern American lives and lifestyles. It, and the sophisticated highway transportation system developed to support its safe and efficient use, have allowed people to enjoy a hitherto impossible degree of mobility. This cherished freedom of mobility has opened new and varied occupational, educational and social opportunities for all Americans. However, the personal and societal benefits of "The Automobile Age" have proved a mixed blessing.

Freedom of mobility has not come free. Rather, the cost has been--and continues to be--high. More Americans have been killed or injured in traffic crashes than in all the wars ever fought. And, traffic crashes remain the single greatest cause of accidental death in America today--claiming 45,000-50,000 lives annually. Each year, another nearly two million Americans suffer disabling injuries from traffic crashes. The total societal cost of these and less severe highway crashes is estimated to exceed $45 billion annually.

A concerted effort to reduce this toll has been underway for decades. Government, industry and other sectors of society have combined to make cars and roads safer than ever before. Yet progress in these areas--making vehicles more protective and crash resistant, building safer highways and implementing sophisticated traffic flow systems--appears to have reached the point of diminishing returns. Surely advances in the "hard technology" of transportation system components will continue to be made, enhancing the safety and efficiency of the highway transportation system. But today, the driving factor most in need of improvement--and with the greatest promise in terms of accident reduction and prevention--is no longer the vehicle or the transportation environment but the driver.

A two-pronged approach has been taken to upgrade driver performance and, thus, enhance the safety and efficiency of the entire highway transportation system. One avenue of approach has been driver control, a function shared by law enforcement and licensing agencies who grant and--with cause--restrict or remove the driving privilege of operators who demonstrate an unwillingness or inability to drive safely. Complementing driver control activities are driver education efforts. Education programs enabling and motivating people to drive safely also are conducted by various organizations, e.g., state driver improvement agencies and civic associations. However, by far the greatest effort expended in this area is that provided by driver and traffic safety education teachers in our nation's secondary schools.

WHY DRIVER EDUCATION?

High school driver and traffic safety education is one of the most promising means of reducing significantly the human and societal costs of highway accidents. Secondary school driver and traffic safety education programs reach more than two million young people annually, providing them more than 100 million hours of instruction. Driver education reaches its youthful audience at an optimal time at the onset of their driving careers, before students have developed unsafe driving habits.

A key strength of this delivery system is the deliverers themselves--professional educators specializing in this unique discipline and, typically, dedicated to their chosen profession. By training and temperament, these individuals are prepared and eager to provide their students with experiences that will help them develop the knowledge, attitudes and skills that make possible a lifetime of safe driving.

As traffic crashes are the leading cause of death among school children and young adults, preparing students to survive their entry into the transportation system is essential. Unless they are equipped with these necessary survival skills, many young people will fall prey to their hazardous environment before having an opportunity to apply their other education-engendered knowledges and skills to the betterment of society. Thus, the essential goal of driver and traffic safety education is a fundamental goal of education in general.

ADDRESSING THE PROBLEM THROUGH EDUCATION

Improving teenagers' performance in just these three critical areas could significantly reduce both the number and the severity of crashes involving teenagers. Research has shown that well-developed and administered driver education programs can, in fact, improve teenagers' knowledge, attitude and performance in these areas.

To achieve improvement in these specific behavioral areas--and to fulfill its potential as a major contributor to the broader goal of citizenship education--driver education must address the variety of underlying factors that impel many young people to act in a manner--behind-the-wheel and elsewhere--that engenders extreme risks for themselves and others. Thus, driver educators must offer their programs in a manner attuned to their students' personal/psychological characteristics (e.g., anger, rebelliousness, hostility, aggressiveness) and their social/peer environment.

The task facing driver educators is as complex as it is important. Certainly, they must provide the information and experiences that will enable students to acquire basic vehicle handling skills. But, teachers must go far beyond the relatively simple task of familiarizing students with the mechanics of driving. They must also generate within students an understanding and appreciation of the process of driving, the practices and procedures necessary to safe driving, and the principles of safe driving which undergird these procedures and the transportation system as a whole. Additionally, if these goals are to be attained, teachers must provide educational experiences that will equip their students to make responsible decisions in a variety of personal and social contexts--in areas such as alcohol and drug use, resource consumption, and citizenship.

THE GOAL OF DRIVER AND TRAFFIC SAFETY EDUCATION

Research shows that critical (i.e., life-threatening) deficiencies of safe-driving knowledge, attitudes and operating skills are pandemic among beginning drivers--both before licensure and for several years beyond licensure. While the primary motivation leading students to enroll in driver education courses is to get a license, the State's reason for offering the program is to improve students' knowledge, skill, attitude and performance--for both the short- and the long-run--in several areas. Specifically, the objectives of driver and traffic safety education are to enable students to function as:

- safe, efficient motor vehicle operators--able to reduce the risks and costs of highway transportation for themselves and others.
- conscientious road users--able to recognize, accept and exercise their rights, responsibilities and obligations to others who share the highway transportation system.
- responsible citizens--supportive of improved traffic laws, enforcement and system development.

In sum, the ultimate goal of driver and traffic safety education is to help youth acquire the understanding and maturity of adulthood so that they are fully prepared to enter, survive and succeed in the highway transportation system.

PROGRAM ADMINISTRATION AND SUPPORT

Driver and Traffic Safety Education is a national, state and local concern. Laws have been enacted at the federal level and in all states recognizing the critical need to help protect young people through providing a quality driver and traffic safety education experience. Implementation of driver education to deal with young driver needs and problems rests with the local community--more explicitly, with the schools.

The State of Iowa responded to the need to prepare a safe vehicle operator's guide by enacting its first driver education program law in the early '50s. In 1965, the Iowa General Assembly created a state-wide driver education program and required every public school district in the state to make driver education available. Since that time, Driver Education programs have proliferated and quality has been continually upgraded. Since the late '70s, however, program quality and enrollment have declined in many communities.

The support mechanism for quality driver and traffic safety education--established through federal and state legislation--remains in place. However, uniform quality of, and commitment to, a program cannot be legislated. If driver and traffic safety education is to be worth the investment--if it is to help youth--local districts must assume responsibility for operating a quality program.

STATE ROLE

The state is responsible for insuring the overall quality of driver education. Within the state, the authority is delegated to the Department of Education. Section 321.178 of the Code of Iowa specifies that an approved driver education course

> "shall consist of at least 30 clock hours of classroom instruction, and 6 or more clock hours of laboratory instruction of which at least 3 clock hours shall consist of street or highway driving. An approved course shall include a minimum of 2 hours of classroom instruction concerning substance abuse as part of its curriculum."

The Code specifically states that the education course will be "programmed by the Department of Education". In addition to course programming responsibilities, the Department also is assigned responsibility in other areas such as:

- Administering the program in a physically responsible manner.
- Establishing certification requirements for program instructional personnel.
- Supporting personnel improvement activities.
- Maintaining liaison with local school representatives and community and professional groups.
- Engaging in other activities to improve the quality of driver education offerings.

In dispatching these responsibilities, the department must adhere to the statutes of the state and its own established policies and procedures. Title VI, chapter 6 of the Iowa Administrative Code specifies specific standards for personnel certification and approval, time standards, insurance coverages and the like.

FINANCIAL SUPPORT

Driver and Traffic Safety Education costs result from program administration, instruction, facilities, program equipment, materials, supplies and other operating expenses.

State Funding

The Iowa General Assembly enacted legislation in 1965 that created a statewide program of driver education. It required every public school district in the state to offer or make available driver education. Recognizing that this responsibility would involve additional expenses for school districts, the Legislature authorized reimbursement amounting to $30 for each student who completed an ap-

proved driver education program. This amount was intended to provide funding of 30 to 50 percent of the total cost, which varied among the school districts.

Ensuing years produced an increased number of students completing driver education and also an increased cost of providing it. For a number of consecutive years, consideration was given to increasing the amount of per student reimbursement, but without any increase resulting.

In 1975, the General Assembly enacted the foundation aid process which is still in effect. Sections 321.178 and 442.7 of The Code contain the modifications made that year. The change was based on the need for increased funding of driver education and a process was instituted that would not be dependent on repeated consideration of appropriation increases every year or two.

The change was made by increasing the foundation aid appropriation with driver education funding based on per student enrollment (K-12). The short-term advantage was an automatic increase in funding for driver education each year as the school aid formula was adjusted.

Other advantages were the simplified accounting procedures on both district and state levels. State payments for driver education are now included in the general foundation aid provided to school districts each quarter. Districts no longer need to wait until the end of the school year--and the completion of driver education programs--before applying for, and receiving, reimbursement.

In 1975, the General Assembly increased the state foundation aid by .3 percent for driver education. This meant that a certain part of the general foundation aid was designated for driver education. This process has remained unchanged since then, although the amounts have increased automatically each year. The per student enrollment amount (initially $4.00) has risen each year since that time. For 1988-89, it is estimated the foundation aid will amount to $9.24 per K-12 enrolled student.

Local Funding

The principal funding for quality driver education programs comes from the local district. In driver education, as with any education service, districts can expect to make a financial contribution. Driver education, however, is unique in its offering of practical experience to students. Providing this experience is more costly than providing purely academic experiences.

Schools may elect to fund driver education, less the reimbursed amount, entirely from district funds. Also, under current law, a student laboratory fee may be assessed.

OVERVIEW OF CLASSROOM CURRICULUM

The curriculum, presented in the following sections, provides a framework for supporting at least 30 hours of classroom instruction. Each of its six distinct, but inter-related, units of instruction has been prepared in a lesson format. The Guide identifies knowledge and attitude objectives, key content to be covered, the order in which to present it and appropriate teaching methodologies and aids.

Though the Guide recommends certain teaching methods be used in covering key content areas, it does <u>not</u> prescribe specific instructional activities. The selection and forming of specific activities to be used are left to each teacher's discretion. Teachers must respond to the instructional needs and interests of each class, as well as to the administrative realities of their programs, in preparing their lesson plans.

CURRICULUM PRIORITIES

As can be inferred, from the preceding paragraph, teachers must have leeway in using these lesson plans. Because the curriculum encompasses a great deal of content, and because many teachers are limited to only the minimum 30 hours of classroom instruction, it may be incumbent upon many teachers to prepare lesson plans less comprehensive in scope than the curriculum guide. To aid teachers in establishing priorities, the chart on the following page has been prepared.

CLASSROOM UNIT PRIORITIES

CLASSROOM CURRICULUM UNITS	CRITICAL OBJECTIVES: Must Be Acquired Thru. D.E.Classroom	CRITICAL OBJECTIVES: Must Be Acquired	SUPPORT OBJECTIVES
UNIT I: Introduction	X		
UNIT II: Basic Control		X	
UNIT III: System Interaction			
SIPDE	X		
Rules of the Road	X		
Seeing	X		
Communicating	X		
Managing Speed	X		
UNIT IV: Driving Environment	X		
UNIT V: Critical Situations			
Skid Recovery		X	
Collision Avoidance			X
Vehicle Failure			X
Controlling Accident Scene			X
UNIT VI: Factors Influencing Performance & Survivability			
Safety Restraints	X		
Alcohol	X		
Other Drugs		X	
Fatigue		X	
Emotions		X	
Vehicle Factors		X	

This chart places curriculum content areas in one of three categories: (1) critical objectives that must be acquired through classroom instruction, (2) critical objectives that must be attained, though not necessarily through classroom instruction, and (3) objectives which, while important to comprehensive driver education, are of lesser importance to the safety of young drivers.

Unit topics or subtopics have been placed in the second category if students can be expected to attain the objectives on their own (e.g., learning the types of permits and licenses and the requirements for obtaining them through independent study of the Iowa Driver Manual), or through non-classroom means (e.g., basic vehicle control and maneuvering through laboratory sessions or practice driving with parents), or in non-driver education classes (e.g., effects of drugs, fatigue and emotions through health courses). Topics and sub-topics have been placed in the third category if they address safe performances required only rarely (e.g., emergency driving skills and controlling the scene of an accident) or if they focus on subjects not immediately concerned with safe driving performance (e.g., consumerism, the driver control system).

OVERVIEW OF UNITS

Guidance for each unit of is presented in a lesson plan which provides:

1.Instructional objectives,

2.A summary of instructional methods and aids best able to convey critical content with maximal efficiency and effectiveness,

3.An outline of content supporting attainment of the unit's objectives.

The instructional objectives identified for each unit are limited to knowledge and attitude objectives--those objectives which can be attained through classroom educational experiences. These objectives state requirements for participating in the highway transportation system.

In attaining these objectives, students will acquire and understand concepts and principles which facilitate--through laboratory practice--the development of motor skills essential to safe, efficient driving. Thus, achieving the objectives presented, while constituting a valid, worthwhile educational goal in and of itself, should be regarded also as an intermediate step toward achieving the ultimate performance objectives for drivers using the highway transportation system.

The Guide does not specify particular instructional aids--textbooks, filmstrips, etc--for use with the units, as no one aid is available to all classrooms. Additionally, as new materials come on the market every year, any list of recommended aids would be incomplete and outdated almost as soon as it was distributed. Teachers are expected to acquaint themselves with the aids that are available and to incorporate into their lesson plans those which they deem able to facilitate attainment of student learning objectives.

Some visual aids are provided in the Guide. Their use is recommended, but not required. While they can facilitate acquisition of key knowledges, the instructional content is not predicated upon their use.

UNIT I: Introduction

This unit stresses why driver education is an important, and quite serious, educational endeavor. After acknowledging the student's reasons for wanting to take driver ed, it presents the rationale for offering driver education from the perspective of enhanced mobility and safety. It also introduces students to the concept of risk and their role within the highway transportation system. It concludes with a brief overview of the entire course.

Content and instructional methods recommended for this unit will help students to:

- Recognize the importance and extent of responsibilities that accompany licensure,
- Approach driver education as a true learning experience,
- Recognize that driver education can enhance both the quality of their lives and their longevity.

UNIT II: Basic Control

This unit covers: outside vehicle checks, pre-start in-vehicle adjustments and procedures; procedures and legal requirements for starting, moving, turning, stopping and securing the vehicle. The unit concludes by addressing the skills and abilities needed to back, park and make turnabouts successfully. While legal requirements governing these maneuvers are addressed, emphasis is placed on the visual and physical performances needed to assure safety during these maneuvers. Principles and procedures of safe, basic maneuvering help lay a foundation for safe performance in more complex traffic situations.

Content and instructional methods recommended for this unit will help students to:

- Follow appropriate pre-starting procedures,
- Use safe and efficient vehicle starting procedure,
- Put the vehicle in motion and retain forward control,
- Stop the vehicle smoothly at required locations,
- Accelerate safely and efficiently on grades,
- Maintain directional control while making left and right turns,
- Follow safety procedures in exiting vehicles,
- Maintain vehicle control while backing on straight and curved paths,
- Turn vehicle around in the roadway providing limited operating space,
- Park vehicle within legal and physical constraints posed by parking space,
- Withdraw vehicle safely and legally from parallel and angle parking spaces.

UNIT III: System Interaction

This unit describes principles and procedures for interacting with the highway transportation system, including the road, other drivers and other vehicles. Techniques of seeing, communicating, managing speed and managing space are presented, and their rationale explained. Legal, safety and efficiency principles undergirding these techniques are explained in the context of specific driving tasks and their application to driving situations in general.

Content and instructional methods recommended for this unit will help students to:

- Employ seeing techniques that allow them to gather, effectively and efficiently, critical information from ahead, behind and alongside the vehicle,

- Maintain space all around the vehicle sufficient to permit legal, safe, efficient and timely maneuvering,
- Abide by all speed laws and operate at a speed in which vehicle control is maintained and maneuvers may executed safely and efficiently,
- Signal and communicate with other road users in keeping with requirements of safe, legal vehicle operation.

UNIT IV: Driving Environment

This unit covers practices that can help drivers operate safely in situations where the roadway or the natural environment provides less-than-ideal conditions. The thrust of the unit is on principles and practices drivers can employ to compensate for dangerous conditions--i.e., reduced traction, reduced visibility and night driving--thereby preventing them from developing into emergency situations.

Content and instructional methods recommended for this unit will help students to:

- Search for and recognize roadway characteristics that result in lessened traction,
- Adjust normal driving practices to compensate for conditions that reduce traction,
- Adjust driving practices during periods of limited visibility to improve capability to see and to control the vehicle within the visual limits,
- Employ driving practices to increase others' capacity to see during periods of limited visibility,
- Compensate for hazards imposed by nighttime operation.

UNIT V: Critical Situations

This unit covers common emergencies resulting from roadway characteristics, vehicle equipment malfunctions and driver error. Instruction focuses on procedures to use when confronted with such emergencies. In addition to addressing emergency recovery procedures for skidding, running off the roadway and vehicle equipment failures, the unit covers procedures for quick accelerating, quick stopping and quick turning, providing guidance on selecting the appropriate emergency response. The unit concludes with instructions on what to do if an accident does occur.

Content and instructional methods recommended for this unit will help students to:

- Take appropriate evasive action to avoid collisions,
- Employ procedures to regain vehicle control when it has been lost,
- Follow emergency procedures to keep vehicle or equipment failures from producing collisions,
- Follow safe and legal procedures at an accident scene,
- Seek life-saving assistance and provide first aid at an accident scene.

UNIT VI: Factors Influencing Performance and Survivability

This unit presents safety belts as the best way to reduce the chances of injury and increase the chances of surviving in a crash. It explains how safety belts work and debunks common myths and misconceptions regarding their use. The unit also covers personal factors that may influence--and ultimately impair--a driver's ability to operate at peak performance levels. Although fatigue, emotions and drug use are addressed, the focus here is primarily on alcohol. The alcohol section concentrates on risks and consequences of drinking/driving and presents students with techniques they can use to keep themselves and others from accepting these risks and suffering the consequences. The unit concludes by addressing factors that inhibit optimal vehicle performance, presenting basic maintenance checks which will help drivers keep their vehicles in safe, legal operating condition.

Content and instructional methods recommended for this unit will help students to:

- Use safety restraints on all trips whether riding as drivers or passengers,
- Require their passengers to use safety restraints,
- Avoid excessive drinking,
- Avoid driving when under the influence of alcohol,
- Help protect others by keeping them from overdrinking, driving when impaired, or riding with an impaired driver,
- Follow directions for use when taking prescription and over-the-counter drugs,
- Avoid combining alcohol with other drugs,
- Plan and take measures to avoid driving when fatigued,
- Plan and take measures to avoid fatigue when driving,
- Avoid riding with fatigued drivers,
- Avoid driving when emotionally upset,
- Avoid driving unsafe vehicles.

ORGANIZATION OF UNITS

The sequence of instruction recommended in the Guide is considered to be optimal in terms of efficacy of learning for people who have enrolled to learn to drive. The sequence may not be optimal for educating students who have accumulated significant driving experience prior to beginning the course. Units have been ordered to allow the classroom instructional experience to:

- Be responsive to non-driver's motivations for taking the course
- Be applied and experienced immediately thereafter in laboratory instruction
- Reinforce and build upon concept and principles--the learning base--established in earlier units.

Student Motivations

As students typically enroll in the course with one goal in mind--to learn to drive--the organization responds as quickly as possible by presenting fundamental "learn to drive" instruction immediately after a brief (one period) introductory unit. By providing students with core information on how to drive during the second classroom session, students' expectations of the course will not be frustrated. To postpone providing this information (by using the second class period to review the rules of the road or licensing requirements, for example) would invite student disinteresting and dissatisfaction with, the course. Such a situation would serve only to make it harder for teachers to lead students to attain the crucial instructional objectives.

Each unit builds further on the foundation laid by preceding units, leading motivated students through safe driving instruction and other units critical to their survival when driving.

Immediate Application

A basic tenet of education is that students learn more fully and more quickly when they personally experience the usefulness, accuracy or truth of what they have acquired through mental processes. The classroom units have been sequenced to mesh with concurrent laboratory instructional activities which provide the opportunity to learn more fully by doing.

Students cannot be expected to develop skills efficiently during behind-the-wheel instruction, unless they have acquired information on driving procedures prior to this instruction. By starting with basic vehicle control instruction and moving thence to basic maneuvers, students have the opportunity to apply immediately what they have learned in class, either on the range or on the road. After acquiring these fundamental skills, students can move on to hone their performance in safe and efficient practices.

This provision for timely application of classroom instruction allows for maximum reinforcement of the concepts, principles and procedures covered in class. Students simply have no time in which to forget the content--thus making for more efficient, stronger instruction over all.

Learning Base Enhancement

Just as the course is ordered to accommodate reinforcement through on-the-road experience, so it is organized to provide for expansion of classroom instruction. Thus, instruction follows a logical progression:

- **Unit I** -- students learn what the instructor expects of them
- **Unit II** -- students learn basic vehicle control and maneuvering
- **Unit III** -- students learn the essential human processes involved in applying these manipulative skills properly and learn practices for operating with maximum safety and efficiency day-to-day
- **Unit IV** -- students learn how to keep dangerous situations from turning into emergencies

- **Unit V** -- students learn how to keep emergencies from turning into accidents
- **Unit VI** -- students learn how to keep accidents from producing injuries and how to keep themselves and their vehicles in shape so that they may realize the maximum benefit from the driving skills and knowledge they have acquired.

Through this sequence, each unit provides students with new, critical knowledges and attitudes and lays the foundation for understanding the more complex instruction offered in later units. In this fashion, the course weaves the various concepts and principles of safe driving into a coherent whole, allowing students to grasp the complimentary relationships among driving practices and procedures.

ORGANIZATION OF CONTENT

Curriculum content is assembled in terms of general principles rather than by driving situations or specific procedures. For example, the unit on system interaction is organized according to the basic principles of seeing, communicating with others, managing speed and managing space. Students are taught how these basic principles apply to every day driving and how they should be employed on the road.

This organization makes for more efficient use of classroom time. As an example, students can quickly grasp the concept of maintaining an adequate following distance and how that distance must be increased in less than ideal traffic or road conditions or when visual obstacles arise. Teaching this information by specific situations (e.g., driving in cities, driving on highways, driving behind trucks, driving in snow, driving at night, driving behind motorcycles) is far more time consuming and may, in fact, inhibit student's comprehension of a relatively simple concept.

Similarly, there is no separate section on traffic laws. Traffic safety law is firmly rooted in safe driving principles. By incorporating traffic law instruction with coverage of its undergirding principle (e.g., stop signs and seeing, yield signs and space management), students' understanding of safe driving principles is strengthened and their appreciation of the validity of traffic laws is increased.

TIME ALLOCATIONS

No specific amount of time have been assigned to units of instruction or elements within units. Time allocations must be assigned locally in terms of the total amount of time available to driver education. However, a suggested time allocation based on a 30-hour curriculum is provided below. Where more than 30 clock-hours of instructional time is available, the time spent on each unit should be increased proportionately.

UNIT	NAME OF UNIT	# OF HOURS
I	**INTRODUCTION**	**1**
II	**BASIC CONTROL**	**5**
III	**SYSTEM INTERACTION**	**10**
IV	**DRIVING ENVIRONMENT**	**4**
V	**CRITICAL SITUATIONS**	**2**
VI	**FACTORS INFLUENCING PERFORMANCE AND SURVIVABILITY**	**8**
		30

Time has been allocated among the units in consideration of the following factors:

- Relative criticality -- While all topics delineated in the course of instruction are considered critical to the goals of driver and traffic safety education, some are more critical than others. For example, practices which can help drivers keep out of crashes in

everyday driving conditions will be of more frequent use to drivers than practices that help them cope with far less frequently encountered situations (e.g., brake failure, hood latch failure).

- Direct applicability to performance -- While certain knowledges are critical to a full understanding of driving in the highway transportation system, not all are critical to safe performance on the road. For example, use of the SIPDE process may be helpful as an interim step in handling situations on the road. However, an understanding of the SIPDE process is of little use in and of itself on the road. For topics such as this, it is necessary to communicate only key principles. Time that might be expended on a detailed exploration of SIPDE can be put to better use on topics which are directly tied to what students must consciously do to drive safely and efficiently.
- Relative complexity -- Some concepts, principles and procedures are more complex than others. Instruction in the more complex areas demands more time than is required to communicate more familiar or more apparent information.
- Instructional methodology -- Some instructional objectives can be achieved through simple presentation of information. Other objectives, especially attitudinal objectives in areas such as drinking/driving, safety restraint use and speed management, are harder to achieve. These require more time-consuming methodologies such as discussion or role playing.

Time allocations must be adjusted to student learning abilities and needs. For example, if classroom and laboratory sections are not conducted concurrently, more time may have to be spent on the second unit to assure comprehension of the content. Teachers must judge when students have attained the objectives of any given unit sufficiently to justify moving on to the next.

INSTRUCTIONAL METHODS

The curriculum recommends that teachers use a variety of instructional techniques: home study assignments, presentation and interactive teaching. Where particular instructional method is most efficacious, it is noted at the start of the content section. Selection of most appropriate technique was based on two considerations:

- Effectiveness -- Some methods that are effective in helping students attain knowledge objects are ineffective in leading them to embrace improved attitudes. Others are useful in both of these areas, but incapable of improving behaviors. Methods must therefore attuned to the types of educational objectives being pursued.
- Efficiency -- Given the time allocations for each unit, it's essential to use a teaching method capable of accomplishing the instructional objectives in the shortest period of time.

The uses and limitations of the various methods called for are discussed briefly in the following paragraphs.

Home Study Assignments

Home study is the most time-efficient means of communicating information, as it requires no classroom time to provide students with key knowledges. It does have two major limitations, however. First, the printed word and static illustrations cannot fully communicate the dynamics of driving and the forces involved with these dynamics. This limitation is greatest when readers have little or no behind-the-wheel experience to help them relate "mere words and pictures" to real-world driving situations. To some extent, this limitation may be overcome through use of home study assignments which involve students, parents and other family members who drive. There's no need to limit family involvement in driver education to behind-the-wheel instruction. Students can learn from the experiences and knowledge of others in their families as well as from their teachers.

The greatest potential liability in family involvement via home study assignments is that students may acquire misinformation as well as correct information through this channel. Thus, teachers must be prepared to uncover and correct misconceptions, erroneous "facts" and unsafe beliefs emerging from such assignments. Conversely, an advantage of parent involvement through home study is that it

provides a mechanism for getting safe driving information to other family members, thereby extending the reach of driver education beyond a communities student population. Additionally, involving parents in their child's study tends to foster their support for driver education.

The second limitation of home study assignments is that merely assigning home study in no way assures that students will read the material, much less understand it. To overcome this limitation, students must know they will be held responsible for acquiring the information available through home study. Take home tests, pre-tests and periodic classroom reviews of information covered through home-study assignments will increase student's motivations to study at home conscientiously. Such testing and review also can help teachers assess student achievement of home-study learning objectives.

Research has demonstrated that home study is an effective means of improving driver knowledge and attitude provided it is combined with other sufficient motivation (in the form of tests and reviews) to complete the assignments. It is suggested that 10-15 hours of quality homework represents a reasonable assignment load for students. The bulk of these assignments should be devoted to units which are highly cognitive in nature and where materials are available.

The Iowa Driver Manual is the only home-study resource identified in the curriculum, as it is the only aid universally available to students and teachers. Teachers should also take advantage of textbooks available at the school in developing home study assignments.

Presentation

Presentation--either by the teacher, resource persons, or through surrogate teachers such as films or videos--is the most time-efficient means of conveying key information, concepts and principles to students in the classroom. Naturally, the effectiveness of presentations depends in large measure on the skill of the presenter and the students' perception of and openness to both the presentation and the presenter.

However, research demonstrates that even the best presentations are limited in terms of what they can accomplish. Presentations are quite good at helping students acquire knowledge. But many students are unlikely to believe the information is personally relevant and to act upon that information unless presentations are supplemented with interactive instructional methods such as class discussion.

Interactive Instruction

A substantial body of research indicates that peer-facilitated instruction--in the form of question and answer sessions, group discussions, problem-solving and role playing--may be more effective than instructor presentations.

Whatever the reasons, peer-facilitated instruction appears to be successful on breaking down the barriers that inhibit teenagers from believing information presented by adults. Additionally, interactive instruction keeps students on their toes and interest levels high.

Group discussion is an especially effective means of leading students to embrace attitude objectives. In areas such as safety belt use, drinking and speeding, students often hold unsafe attitudes based on myths. When students have been provided with the facts which counter these myths, hearing unsafe attitudes expressed by others in the group often causes the "scales to fall from their eyes." Misinformation and unsafe beliefs suddenly ring hollow. The result is often an improvement in attitude.

While discussion can be very effective in achieving attitude objectives, it has some disadvantages:

- It is very time consuming compared to most other methods.
- It requires great skill from teachers, who must help guide the discussion toward the desired outcome (student concensus accepting safe attitudes) without being seen as trying to impose attitudes on students.

- There is no guarantee that the final concensus will be exactly in keeping with the objectives.

Another effective interactive teaching technique is problem solving. When posed with problematic situations and asked to "solve it" (reduce the risks inherent in the depicted situation), students are forced to internalize and apply concepts and principles of safe driving. This process allows students to understand and appreciate more fully the soundness of these principles, thereby increasing the likelihood that they will employ practices based on these principles when they drive.

CLASSROOM LESSON PLANS

This unit contains lesson plans for the following classroom units:

Unit I: Introduction

Unit II: Basic Control

Unit III: System Interaction

Unit IV: Driving Environment

Unit V: Critical Situations

Unit VI: Factors Influencing Performance and Survivability

Unit sections will contain the following information:

Instructional objectives--a description of the knowledge and attitudes that students are expected to acquire.

Content outline--information to be taught, presented in outline form.

Visuals--the identification number of the visual (from the appendix) appropriate to the content.

UNIT I: INTRODUCTION

This unit addresses why students enroll in driver education and why the course is offered to them. The benefits of driving are identified, as are the risks involved. The goal of the course is delineated along with the student's responsibilities for achieving that goal.

INSTRUCTIONAL OBJECTIVES

Knowledge Objectives

Students will know:

1. The State has a vested interest in enhancing and assuring traffic safety and efficiency.
2. The overinvolvement of youth in accidents.
3. The nature of course requirements.

Attitude Objectives

Students will accept that:

1. The paramount goal is for students to learn how to drive safely.
2. Driving is inherently dangerous.
3. Younger drivers are the group at highest hazard in traffic.

The entire unit may be covered through teacher presentation. However, teachers may wish to cover the area of "Why Students Take Driver Education" through class discussion, if only to signal to students that their active participation is expected and encouraged.

If time allows, the content presented in "Why Focus on Young Drivers" may be followed with a brief discussion of accident experience among students and their peers (classmates, teenaged relatives) to reinforce and personalize the fact that teenagers are at high risk in traffic.

RATIONALE FOR DRIVER EDUCATION

School and state have well-defined reasons for sponsoring driver education. Their reasons may differ slightly from students reasons for taking course.

Why Students Take Driver Education

Student's Motivations:

- Primary--to get license two years earlier than otherwise possible.
- Secondary--to qualify for motorist insurance discounts offered to approved-course graduates.

License valued because:

- Enhances independence -- no longer need to rely on others (parents, friends) for transportation.
- Enhances mobility -- expands area in which they can seek social or work opportunities.

Why School and State Provide Driver Education

School and State want young people to enjoy the independence and mobility they desire:

- Recognize the social and economic benefits of mobility.
- Benefit from individual's exercise of mobility, in terms of improved quality of life and economic development.

Local, state and federal governments have made enormous investment in highway transportation system to improve and facilitate mobility for all citizens.

However, State also responsible for public safety.

Consequently, State's goal is to provide highway transportation system that accommodates safe and efficient mobility.

HIGHWAY TRANSPORTATION SYSTEM

Highway transportation system comprises three parts:

- Roads
- Vehicles
- Drivers

Roads

Governments have made massive investment in roadways--highways, bridges, roads.

Governments have also invested heavily in hardware to help drivers use roadways:

- Safely--traffic control devices such as traffic lights, pavement markings, stop signs and warning signs.
- Efficiently--street signs, exit signs, alternative routes.

Vehicles are integral part of system and give it much of its diversity.

Vehicles

Roads accommodate all types of vehicles--cars, vans, trucks, motorcycles, mopeds and bicycles

Vehicles designed for different purposes, different jobs

Vehicle design differences yield different performance characteristics in:

- rates of acceleration
- stopping distances
- turning radiuses

These differences make for a complex driving environment.

To survive in this environment, drivers must be aware of vehicle performance limitations and how to respond to them.

Additionally, ill-maintained vehicles can cause accidents.

Government tries to reduce vehicle-imposed risks to some extent

- Provides restricted lanes and roads to separate speed differences (e.g., trucks relegated to right hand lanes on steep upgrades; bicycles and mopeds forbidden on highways)
- Law enforcement activities (e.g., issue tickets for dangerous equipment defects like burnt out lights, faulty exhaust systems)

However, ultimate responsibility for maintaining vehicle in safe condition lies with driver.

Drivers

Drivers are most critical and diverse element of highway transportation system.

Drivers vary greatly in terms of skill, knowledge, perception and judgment.

All these factors essential if driver is to use roadway and vehicle safely and efficiently.

Government seeks to assure safe, efficient driver performance by:

- Law enforcement--ticketing drivers who operate unsafely

- Driver improvement initiatives--providing instruction to traffic violators in effort to help them drive more safely

- Driver sanctions--suspending or revoking licenses of drivers who fail to operate at acceptable level of safety

State also tries to enable and foster safe driver performance by supporting driver education courses.

ORIGINS OF DRIVER EDUCATION

There is no real requirement for public schools to teach the mechanics of driving.

Informal Instruction

For decades, people learned to drive without formal driver education.

In 1930s - '40s, licenses given to anyone who could pass simple written and driving tests

- There was no minimum age requirement

- Licensure of 10 year olds not uncommon

As more and more roads were built (in the '40s) and more and more vehicles and drivers filled the roads:

- highway transportation system became far more complex

- traffic accident rates soared.

Public safety necessitated improvement and greater regulation of all system components.

High School Driver Education

First major initiative to improve driver performance was to introduce driver education to public schools.

To assure driver education would be available to all students, state funds were invested to reimburse school districts for offering driver ed.

Studies showing driver education graduates less likely to be involved in accidents subsequently led state to raise licensing age for those not taking driver education.

Driver education graduates are considered "lower risk" than those without formal training because driver education stresses development of perception and judgment, as well as knowledge and skill, which are not easily acquired except through experience.

Unfortunately, the experiences which teach unsafe drivers how to drive safely are primarily accidents.

The goal of driver education is to substitute classroom and behind the wheel learning experien ces for the often lethal experiences of unsafe drivers.

WHY FOCUS ON YOUNG DRIVERS?

State focuses its education effort on young drivers because they are most at risk.

Driving is inherently dangerous for everyone

- More Americans killed or injured in traffic crashes than in all wars put together

- Traffic crashes are leading cause of accidental death, claiming 45,000 to 50,000 lives each year

- Another 2 million Americans are disabled each year in traffic crashes

Iowa drivers are no exception to the problem

- More than 200,000 accidents last year
- More than 12,000 injured each year
- More than 400 killed each year

Of all drivers, youngest are at greatest risk

- Traffic crashes account for nearly half of all deaths, ages 16-19
- 16-19 year olds are twice as likely to die in traffic crash as older people

This excessive risk also extends to teenage passengers

- Most teenage passengers killed were riding with teenage drivers at time of crash
- Driver education seeks to protect not only the students but friends who ride with them

Getting a license is one of the most dangerous things students will ever do.

WHAT THE COURSE WILL COVER

Course will teach what students need to learn and do to keep from killing or maiming themselves, their friends and other road users.

- how to avoid causing accidents.
- how to avoid accidents caused by mistakes of others.
- what kinds of hazards await students on the roads, how to find them, recognize them, and deal with them safely and efficiently.

COURSE GOAL

The goal of driver education goes far beyond teaching the simple mechanics of how to manipulate a car.

Goal is to enhance safety and efficiency of the entire highway transportation system by:

- Preventing accidents and injuries
- Increasing driver and passenger survivability in crashes.

STUDENT RESPONSIBILITIES IN COURSE

Students will be:

- challenged to acquire and demonstrate the knowledge and skills needed to earn a license and acquire a greater freedom of mobility
- expected to develop the judgment and sense of responsibility needed to apply what they have learned throughout the rest of their driving career.

UNIT II: BASIC CONTROL

This unit covers pre-starting procedures, as well as procedures for, starting, moving the vehicle, steering, stopping, turning, exiting and securing the vehicle. Backing, parking and making turnabouts are also covered, with emphasis on the procedures and legal requirements for performing these maneuvers.

INSTRUCTIONAL OBJECTIVES

Students will know:

Pre-start Procedures

1. Procedures for outside vehicle checks

2. Procedures for entering vehicle safely

3. How to adjust seat, mirrors, safety belts and headrests

4. The importance of locking doors

5. How to store objects to avoid impeding vision or creating hazards in crash

Starting Vehicle

1. The location and function of gauges and indicators

2. The location, function and use of controls

3. Safe starting procedures

Putting Vehicle in Motion

1. The purpose of each gear and vehicle shift patterns

2. How to accelerate smoothly

Steering

1. Proper location of hands on steering column

2. The relation between steering input and vehicle direction when going forward

3. The importance of looking far ahead of the vehicle

Stopping

1. How to decelerate gradually to a controlled stop

Turning

1. The relation between steering input and rate of turn

2. There is a differential in tracking between front and rear wheels

3. Techniques to accommodate tracking differential

4. Procedures for executing turns safely

Exiting/Securing Vehicle

1. How to immobilize the vehicle

2. Direction in which to turn wheels when parked on downgrade or upgrade

3. Procedures for exiting vehicle safely

4. Importance of locking the doors

Backing

1. The relation between steering input and vehicle direction when backing

2. Laws governing backing on public roadways

3. Visual (seeing) requirements for backing

4. Procedures to be followed in backing

Turnabouts

1. The ways in which a vehicle may be turned around

2. The laws governing turning around on public roadways

3. Visual (seeing) requirements for turning a vehicle around

4. Procedures to follow for each type of turnabout

5. At least one alternative to making turnabouts on public roadways

Parking

1. The major hazard created by parking a vehicle

2. Ordinances covering parking

3. The visual (seeing) requirements for parking

4. Procedures to follow for parking

5. The major hazard created by exiting parking spaces

6. The visual requirements for exiting a parking space

7. Procedures to follow for exiting parking spaces

8. The applicability of right-of-way laws to vehicles leaving parking spaces

The entire unit may be covered strictly through presentation techniques. However, in areas where students may already possess at least some information--e.g., indicators and controls--it is best to attempt to draw this information from them (through questioning) to preclude boredom. Diagrams or other visuals should be used to illustrate front/rear wheel tracking, vehicle positioning and lane selection when covering turns (forward and backing) and parking. Diagrams are also useful in explaining turnabouts--especially when students are asked to identify potential hazards at each step of the maneuver.

Elements of the Driving Tips section of the Iowa Driver Manual--"Backing," "Parking" and "Turning Techniques"--may be assigned for home study before these content areas are addressed in class.

PRE-START PROCEDURES

A trip begins not when a driver starts the engine, but when a driver heads for the car. A driver's actions before getting into the vehicle and after entering the vehicle--but before starting--can go a long way toward determining whether or not this trip will be made in safety.

Pre-trip Inspection

As driver approaches vehicle, must make sure is nothing in or near intended path that might damage car or be damaged by car:

- Objects, such as nails that might puncture tires or branches that might kick up and damage underbody (e.g., oil pan, hoses) must be cleared away
- Must check for people--especially children--and animals that might move into path after driver enters car

To make complete pre-starting check, must make complete circuit around car.

While check should be made before every trip, is especially important to check behind car when will be backing.

- Cannot get clear view of what lies in back of car when standing at front or sides
- Low-lying objects--or children--also not visible in back from these positions or when seated in vehicle

If children or animals spotted near car during pre-start inspection, driver must keep track of their whereabouts until either children or driver have left the area.

In making inspection circuit, driver should also check for visible damage to vehicles (e.g., flat tires, cracked lights or windows, signs of major leakage of vehicle fluids).

Vehicle Entry

After completing outside vehicle check, must enter vehicle safely.

When car is parked on roadside, driver typically will enter vehicle by walking to driver door, close to traffic lane. Proximity to traffic lane places driver at risk.

Keys to reducing risk:

- keep as far away from traffic as possible
- keep time of exposure to risk at minimum.

Procedures:

1. Stand at front of car, out of traffic path, until traffic lane is clear
   - Distance from front of car to driver door is less than that from back of car to door, leaving driver to be in traffic for shorter period of time
   - By standing in front of car, driver is protected by car from errant drivers (if approaching vehicle veers, it will sideswipe car, not exposed driver)
2. Have key in hand before entering traffic lane, eliminating time lost in fumbling for keys and selecting correct key from others on keychain.
3. When traffic clear, walk quickly to door, keeping next to vehicle.
4. After unlocking door, check again for approaching traffic before opening door.
5. If still clear, open door quickly, but only as much as is needed to get into vehicle easily.
6. Shut door as soon as fully inside vehicle.

Interior Adjustments

Upon entering, driver must adjust seat and mirror positions to accommodate safe, comfortable driving.

Seat Adjustment

Most common mistake in seat adjustment: too close to wheel

- When seat too far forward, driver's elbows are pushed back to side of body and wrists are bent too far forward. This restricts arm movement.
- Driver's arms must be free (elbows away from body) to turn wheel quickly in an emergency
- Seat is too far forward if, with hands at 9 o'clock/3 o'clock position, driver is unable to run them in complete semi-circle (180º) around steering wheel in both directions.

Seat should also be far enough back to allow rapid movement of foot from accelerator to brake. When seat too close:

- must lift more of leg to switch pedals, requiring more strength and time to execute maneuver
- ankle bent back more than necessary, producing fatigue and possibly cramps on long trips.

When seat adjusted properly, right leg should be approximately 3/4 extended when foot reaches pedals.

Some seats adjust up and down as well as forward and back.

- When seat is raised, it brings body further from pedal (extending leg) but closer to wheel (bending arms back more)
- Driver must find "golden mean" between forward and back and up and down settings so that both legs and arms are properly extended

Mirror Adjustment

Mirrors are essential for drivers to be aware of what is happening behind them:

- Inside mirrors serve primarily to let drivers keep track of events in the lane directly behind them.
- Outside mirrors allow drivers to see traffic behind in adjacent lanes.

All mirrors should be adjusted only after seat adjustments have been made.

Inside Mirrors

Procedures:

1. Place mirror on "day" setting.

2. Turn mirror, right/left, so that picture in mirror is centered on center of lane directly behind vehicle.

3. Turn mirror up/down until the bottom of the rear-window frame is just visible at the bottom of the mirror (Bottom of window frame serves as a reference point, helping driver judge distances behind).

Day/Night Settings

When rearview mirrors are adjusted for "day" viewing, will be automatically properly set for night viewing:

- Night mirrors work like polarized sunglasses, reducing glare from vehicles approaches from behind
- Night mirror should be used only at night

Outside Mirrors

Adjust outside mirrors according to the following reference points:

- Left mirror should reveal left rear fender in bottom right side of image
- Right mirror should reveal right rear fender in bottom left side

Convex Mirrors

Some outside mirrors--especially right side mirrors--have convex lenses.

Convex lenses are rounded out, like shoplifting mirrors in stores:

- advantage of convex mirrors--give wider view of traffic, allowing driver to see into two lanes.
- disadvantage of convex mirrors--make vehicles appear to be further away than they really are.

Securing Occupants and Cargo

Doors

All doors should be locked before starting the vehicle

- Unlocked doors may be knocked open in a crash
- A closed door strengthens the car body, reducing risk that it will be caved in during a crash
- Closed door also reduces the chance of occupants being ejected from car body in a crash
- Safest place to be in a crash is inside the passenger compartment--strongest part of car.

Headrests

Adjust headrest so that round part of back of head lies in middle of headrest.

- Headrest keeps head from snapping back if car hit from front or rear
- If headrest set too low (below bulbous part of head), it will not prevent snap back
- Snap back is major cause of whiplash injuries

Safety Belts

Fasten safety belts properly

- Lap belt goes snugly over pelvic bones
- Shoulder belts go over collar bone and ribs and should be fit snugly but not too tight (occupants should be able to fit fist between chest and belt)

Driver must also make sure all passengers are wearing belts

Safety Belt Law

According to Iowa law, driver can be stopped and fined if anyone in front seats of vehicle is not wearing belt.

To drive safely and legally, driver is responsible for seeing that all passengers are buckled -- only one person per belt.

Benefits of Belt Use

As is the case with other traffic laws, seat belt law is designed to reduce accidents and injuries.

- Seat belts protect people using them by reducing the number and severity of injuries arising from crashes.
- Seat belts also protect occupants from each other.
- In a crash, unbelted occupants can be thrown into others with enough force to seriously injure, and even kill, them.

Belts not only protect drivers in crash but also help drivers keep from having accidents.

- Belts keep driver in position for which mirrors have been adjusted, increasing chances that driver can see danger approaching from behind.
- Belts keep driver squarely behind the wheel, where the driver needs to be to control the car. Without belt, sudden bump or swerve could pull driver from wheel, resulting in loss of control.

The importance of safety belts will be dealt with later in the course.

Cargo

Just as unbelted passengers can pose a hazard in crashes, so can unsecured objects. Virtually any object lying lose inside a car may cause injury in a crash by striking the driver or other occupant.

Improperly stored items can also block the driver's view, keeping the driver from seeing a situation that may result in a crash.

To keep risks low:

- Place all lose items in storage space provided (e.g., glove compartment, trunk) whenever possible.
- Place objects that can't fit in storage places on the rear floor, braced as firmly as possible, (front seat will shield driver).
- Never store items on the dash or rear window ledge, as they will unnecessarily obstruct view of events ahead and behind.

STARTING VEHICLE

Before getting to the procedures involved in starting the vehicle, students should be familiarized with the location and functions of indicators and controls.

Indicators

- Alternator indicator--registers either the current or voltage output of electrical system
- Oil indicator--shows when oil pressure has dropped to a dangerous level

- Water temperature indicator--shows the temperature of the water in the cooling system
- Fuel gauge--shows the level of fuel in the fuel tank
- Speedometer--shows the vehicle's rate of speed
- Odometer--shows the total mileage traveled by the vehicle. Often a trip odometer is provided to show miles traveled.

Controls

Two types of controls:

- Primary--control the motion of the vehicle
- Secondary--devices affecting the safety and comfort of the vehicle.

Secondary Controls

Secondary controls are: parking lights and headlights, emergency flashers, turn signals, windshield wipers (slow and fast settings), windshield washers, horn and environmental controls (defroster, heater, air conditioner).

Drivers must know where each of these controls are and how to operate them before driving vehicle.

- Location of controls varies from car to car. Some makes have almost all controls mounted on steering column; others locate controls elsewhere (examples: high/low beam control on floorboard or turn signal lever, horn on steering wheel or turn signal lever).
- Fumbling around to try to locate or operate controls while on the road can cost precious time and keep driver's eyes off the road (searching for control), increasing the chance of accident.

Each control device has a specific safety function and should be used for the purposes intended.

Headlights

Headlights can be set at either high or low beams.

- High beams cast light further down road by lifting the angle at which the light rays are cast out.
- The higher angle can create problems for drivers ahead of the car, "blinding" them.
- Consequently, high beams should be used only when "extra" light is needed for driver to see and there are no other drivers ahead.

High/low beam indicator serves as reminder of which setting is in use. High beam indicator light should be regarded as warning light, reminding drivers to dim (switch to low beams) when within view of traffic ahead.

Parking Lights

Parking lights allow a parked car to be seen by others:

- They draw less current than headlights.
- They are not bright enough to allow drivers to see.

Headlights should be used instead of parking lights when the engine is running and drivers want to make their car more conspicuous.

Emergency Flashers

Emergency flashers make brake lights and headlights blink simultaneously. They serve two purposes: to help other drivers see the vehicle (blinking lights attract attention better than steady lights)

- give message that the driver needs help. Emergency flashers should be used only in event of emergency--i.e., vehicle has broken down or driver has been forced to stop in a hazardous position (e.g., in traffic, where would not expect to find vehicle moving extremely slowly or stopped completely.)

Windshield Wipers

Windshield wipers and washers help drivers maintain clear view of traffic in wet driving conditions.

- Wiper speed should be adjusted to match intensity of precipitation. The harder it is raining or snowing, the faster the driver should operate the wiper.
- If set too fast, blades may smear windshield and make distracting squeaking sound.
- If set too slow, precipitation will build up on windshield, distorting driver's view.
- Washer allows driver to clear dirt, salt and mud kicked up from wet road by traffic ahead.

Primary Controls

Primary controls are: steering wheel, accelerator, brake, gear shift and ignition.

Steering Wheel

Connected to the front wheels to turn them in the (horizontal) direction of desired path:

- Manual steering is a direct mechanical connection
- Power steering uses its engine power to augment and boost the manual input

Accelerator

Controls the amount of fuel supplied to the engine to regulate speed (in any one gear)

Brakes

Controls force applied on brake drums in order to slow rotation of wheels and thereby the motion of the vehicle

- Manual--force of foot pedal actually transmitted to brake pad hydraulics by means of brake fluid.
- Power--engine power used to augment manual brake application

Gear Shift

Gear shift lever controls the drive wheels--whether or not they will turn, the direction in which they will turn and how fast they will turn. Each gear serves a different purpose:

Automatic Transmission Gears:

PARK -- Engine disconnected from drive wheels; drive wheels locked. Car will not move.

REVERSE -- Engine connected to drive wheels in a way that causes them to rotate backwards.

NEUTRAL -- Engine disconnected from power wheels, but wheels not locked. Car will not respond to accelerator, but may roll if pushed or on incline. NEUTRAL is only gear, aside from PARK, in which ignition will start.

- However, car should be started in neutral only when driver is trying to restart a stalled car while it is rolling in traffic.
- When starting parked car, driver should always use PARK.

DRIVE -- Power wheels engaged, will move vehicle forward.

- The more gas provided, the faster the wheels will turn.
- Transmission will automatically shift through the gears, moving from lower gear to higher gear at the speed where a higher gear provides maximum fuel efficiency.
- The lower the gear, the slower the wheels turn but the more power is provided to the wheels.

SECOND -- The middle drive gear of most automatic transmissions. Is used primarily on:

- Steep or long upgrades when vehicle needs more climbing power than is provided in high gear.
- Steep or long downgrades to allow engine braking to supplement foot braking.

L or FIRST -- low gear, usually used only when low speeds are essential (e.g., driving on ice). Also may be used when maximum power needed to get heavy vehicle up steep incline.

Ignition

The ignition has three positions: off, power on and start. When in "power on" position, all electric devices (e.g., lights, radio, wipers, power door locks) will operate. Engine will not start or run until ignition has been placed in start position.

Starting The Engine

1. Driver must make sure vehicle is immobilized before starting.
    - Set parking brake.
    - Place transmission in PARK. (Automatic transmission)
    - Disengage clutch and move gearshift to neutral (Manual transmission)
    - Keep clutch disengaged until engine is running (Manual Transmission)
2. Give engine fuel (procedure for most vehicles, students should refer to owners manual)
    - If cold engine, press accelerator to floor and release. This sets the automatic choke.
    - If engine warm, press accelerator no more than half way to floor.
3. Insert ignition key and turn clockwise until starter kicks in.
4. As soon as ignition "catches," release key. If starter motor starts to "squeal," driver has kept key in start position too long.
5. Check all gauges. Make sure all indicator lights are off (oil indicator and safety belt indicator will remain on briefly after ignition catches).

Cold Engine

If engine cold:

- Let vehicle idle for a full minute before moving. This allows oil to warm and thin, lubricating engine.
- Failure to allow for engine warm-up can damage engine due to inadequate lubrication and may cause car to stall (because of resistance to unlubricated moving parts) when transmission shifted to drive.

Flooded Engine

If car fails to start, the engine may be "flooded". Too much gas has been fed into the carburetor. (Overabundance of gas forces out adequate air supply, preventing combustion.)

- Press accelerator all the way to the floor and hold for three-five seconds. This should drain most of the gasoline from the carburetor.
- Then, release accelerator and try ignition again.
- If that fails, wait 5-10 minutes, giving gas chance to evaporate from carburetor. Then try ignition again.

Dead Battery

If the engine fails to turn over, the most likely cause is a dead battery.

- When battery is dead, driver will hear "click" as key reaches "start" position, but the "growl" of the starter will sound weak or not at all.
- If growl sounds weak, it will sound weaker with each attempt to start the engine.
- If weakening persists after three attempts, and there is no indication that engine is trying to "catch," driver should cease trying to start engine, as he or she will only run down the battery further.

If faced with a dead battery, driver must either replace battery or--if some life left--use jumper cables.

PUTTING VEHICLE IN MOTION

Shifting Gears

Once vehicle has started:

1. Apply brake with right foot. This will allow driver to shift into the desired gear (DRIVE) without engaging REVERSE along the way, causing the vehicle to move.

2. Shift to DRIVE

3. With right foot still on brake, release parking brake.

4. When ready to move, place right foot on accelerator and press down slowly. (Automatic transmis sion)

Accelerating

The accelerator controls how much gas is fed into the engine.

- The deeper the driver presses the pedal, the more gas goes into the engine.

Increase the flow of gas evenly, until car reaches desired speed, by gradually increasing pressure on accelerator with the ball of the foot (i.e., the driver should not be driving flat footed).

STEERING

Hand Position

Hands should be placed at the 3 o'clock and 9 o'clock position:

- Only when hands in these positions can driver turn wheel a full 180° in either direction.
- Though seldom needed, such radical steering movements are necessary to execute an emergency turn.

Emergency turns are made only when driver is faced with a completely unexpected hazard immediately in front of vehicle. If hands not already in proper position, will not be time to get them to 3 o'clock/9 o'clock positions and still avoid hitting obstacle.

Turning The Wheel

There is always some "play" in a steering wheel

- Wheel can be turned slightly in one direction or the other without moving the wheels, hence, changing direction.
- Vehicles with rack-and-pinion steering tend to have less "play" than vehicles with power steering.
- When there is less play (i.e., steering is "tighter"), vehicle will respond by changing direction with smaller movements of the steering wheel.

Steering "Feel"

- Gauging the amount of wheel turn needed to make a particular path is a matter of "feel"
- Driver can get "feel" for steering of each vehicle only by driving the vehicle.
- It is important to drive slowly and with extra caution until driver gets used to vehicle responsiveness to steering input.

Maintaining a Path

Driver will need to steer vehicle all the time while driving.

- Travel paths change direction
- Bumps in roadway, angle of pavement can all push car off straight path.
- Steering a straight path requires constant slight movement of the steering wheel.
- With practice, these constant small steering adjustments will be made almost unconsciously.

The key to making these adjustments properly and maintaining a straight course lies more in the driver's eyes than hands. The most common error among young drivers in this regard is to concentrate their eyes on the road just a few feet in front of the hood.

- Looking "low" limits range of view and leads to in-lane weaving.

- Drivers need to look far ahead of the vehicle, giving them a wider perspective of their location within the road.
- Looking far ahead reduces the tendency to oversteer among inexperienced drivers.

STOPPING

In bringing a vehicle to a halt, the goal is to come to a gradual, controlled stop. Sudden stops not only jolt occupants, but also cause unnecessary wear to the brakes.

- The key to efficient stopping is to look far ahead and begin decelerating early.
- Begin decelerating by easing up on the accelerator.
- Then use the brake, beginning with only slight pressure.
- Increase pressure on brake slowly and steadily.
- Clutch must be disengaged just prior to stop to keep vehicle from stalling. When vehicle is stopped or nearly stopped driver must shift back to first gear (manual transmission).
- Easing up on brake just before coming to a stop will prevent "lurching."

Once driver has come to complete stop, must keep brake fully applied until time to accelerate again.

- Car can be kept in gear so driver can drive quickly away from approaching danger (e.g., car approaching from behind too fast to stop in time).
- As long as foot is on brake pedal, brake lights will be lit, signaling drivers approaching from behind that vehicle is stopped.

SECURING VEHICLE

At completion of trip, driver must take steps to assure that vehicle is secure:

- Shift to PARK (second gear, if manual transmission)
- Set parking brake
- Remove key from ignition

Parking on Grades

Downgrades

If parked on downgrade, turn wheels toward curb. If car starts to roll, it will be stopped by curb rather than roll straight ahead or out into traffic.

Upgrades

If parked on upgrade, turn wheels away from curb. If car starts to roll, it will stop on curb rather than roll straight back or out into traffic.

EXITING VEHICLE

Driver must exercise caution in exiting vehicle.

- Check left side mirror for gap in traffic.

- Make head check to verify gap before opening door.
- When sure traffic lane is clear, crack door open and press door lock.
- Make final visual check, exit vehicle and shut door in locked position.
- Walk next to car until completely out of roadway.

TURNING

A turn is any change in direction. This definition includes changing lanes as well as taking corners.

Steering

- When changing lanes or taking curves, hands should remain at 3 o'clock/9 o'clock position.
- For cornering maneuver, however, will have to turn steering wheel more severely, necessitating hand-over-hand action.
- Straighten the car as soon as the turn has been completed.

Lane Use

To execute a corner safely, drivers must both begin and end the maneuver in the appropriate lane. On streets with two or more lanes of traffic going in the driver's direction, the driver should:

- Begin the turn from the lane closest to the direction in which the turn will be made.
- End the turn in the nearest lane in the direction the vehicle will be driving.

The purpose of these lane usage rules is to reduce conflicts in traffic. Unless somehow told otherwise (e.g., through turn signals), drivers expect other drivers to keep going in the direction they are headed.

- A driver turning left from a right hand lane is making a totally unexpected move. So is a driver turning right from a left hand lane.
- In making these illegal maneuvers, driver risks cutting off a vehicle in the other lane.
- Not expecting this move, the cut-off driver may not be able to avoid hitting the turning driver or may react by cutting quickly into another lane, hitting someone else.

Speed

The other key to making a safe turn is for the driver to control the vehicle's speed. The momentum of a moving car forces it straight ahead.

- When executing a turn, the only thing forcing the car to change direction is the front tires.
- The faster the car is going (the greater the forward momentum), the harder it is for tires to force the car into a turn. Consequently, turning radius increases with speed.
- Driver must slow the car sufficiently before starting to turn, to a speed that will allow the tires to complete the front turn without straying out of the appropriate turning lane.

BACKING

Safe backing requires proper seeing, speed and steering.

Seeing

To back safely, driver must be able to see where going. The only way to get a good view of the area behind the car is to turn around and look at it. To get proper view, driver must:

- Place left hand at 12 o'clock on steering wheel
- Place right hand over back of passenger seat
- Twist body to the right and turn head so eyes can look straight through rear window.

Speed

Backing is more difficult than going forward, so it is essential to back slowly. This gives driver more time to correct vehicle drift.

- For cars with automatic transmissions, drivers usually will not need to use the accelerator, as the car will back at idle speed.
- If it is not necessary to use the accelerator, driver should use foot to cover the brake.

Steering

Often, when backing, the car will begin to drift (move off the path the driver wishes it to take). Only a slight movement of the steering wheel is necessary to restore vehicle to intended path. After correcting for drift, driver should always return wheel to 12 o'clock position.

When steering in reverse, the car will turn in the same direction as the steering wheel.

- To back left, turn top of steering wheel left.
- To back right, turn top of steering wheel right.

Backing Procedures

1. Make sure the car is at a complete stop (shifting into reverse while car is moving may damage transmission)

2. Keep foot on brake while shifting to **REVERSE**

3. Put left hand at 12 o'clock and right hand over back of seat. Look directly through rear window

4. Remove foot from brake. Use accelerator, if necessary. Otherwise, keep foot covering brake.

5. Back slowly, correcting drift with slight movement of steering wheel.

6. Come to complete stop.

7. With foot still on brake, shift to **DRIVE.** (Automatic transmission) or first gear (Manual transmission)

Turning While Backing

Backing becomes even more difficult when the driver must turn the vehicle in the course of backing.

- Backing in a turn is more demanding because front wheels will track outside the rear wheels. This means that, when the car's rear goes one way, the front end swings out in the other direction.

- Backing in a turn is more demanding because front wheels will track outside the rear wheels. This means that, when the car's rear goes one way, the front end swings out in the other direction.

- The sharper the turn, the further outside the front wheels will track. Thus, drivers must keep an eye on the front fender opposite the direction in which they are backing, to avoid having the fender swing out and hit something (another car, a tree).

Practices

Because drivers physically cannot keep one eye on the intended path and the other on the opposite front fender, they must:

- Stop from time to time to check the position of the front fender.

- To allow maximum clearance, try to position the car as far as possible to the side of the lane that matches the direction they will be turning (i.e., start from left side of lane when backing left).

- Turn the wheel slowly, one can always turn the wheel faster if the car is not turning quickly enough.

- If the car starts turning too sharply, countersteer (turn wheel in opposite direction).

- If backing slowly enough, only minor adjustments (countersteering) will be necessary to interrupt the larger steering into the turn.

Body position is also critical to allowing drivers a clear view of the path.

- Assume the same body position as is used for backing straight when making right hand turns.

- For left hand turns, place left hand over back of driver seat and right hand at 12 o'clock position on wheel.

Procedures

1. Position vehicle on side of lane closest to direction in which driver wishes to turn

2. Turn body in direction that gives fullest view of vehicle path

3. Turn steering wheel in direction of desired turn

4. As vehicle turns, make frequent check of opposite side front fender for clearance

5. Keep vehicle speed low to allow plenty of time for counter steering and minor vehicle-drift corrections

If backing into traffic, must be sure to stop car before any part of vehicle enters the roadway. Driver can then check for approaching traffic without having any part of vehicle exposed.

TURNABOUTS

Sometimes drivers will be proceeding in one direction and determine they should be going in the opposite direction. This usually happens when drivers realize they have missed a turn.

Types of Turnabouts

There are three basic maneuvers for making a turnabout:

1. U-turn -- Car makes a "hard" left turn of 180°. Since this turn is made in one movement, it requires either a very wide road or a car with a very small turning radius.

2. Three-point turn (K-turn) -- This maneuver consists of a hard left turn, followed by a backing right turn and completed by shifting to drive and straightening out.

- It allows vehicles to turn about on roads not wide enough to accommodate a U-turn.
- It is the most dangerous turnabout maneuver because it takes more time to execute than a U-turn, requiring an extra wide gap in traffic in both lanes.
- Additionally, the car is exposed to the prospect of head-on collisions in both lanes during the course of the maneuver.

3. Two-point turnabout -- a maneuver in which the driver uses a side street to change directions. Can be accomplished in one of two ways:

- turn right into side street, back left into desired lane and pull forward
- pull past side street, back right into side street, then forward, turning left.

Restrictions

All turnabouts are inherently dangerous because they expose drivers to traffic from opposing directions for relatively long periods of time. At many locations, it is illegal to make a turnabout.

- Emergency vehicle turn lane on interstates cannot be used -- Slow moving vehicle, unequipped with emergency vehicle lights, is at too great a risk of crash coming on to high speed lane.
- Other locations may have signs specifically prohibiting turnabouts--no U-turn signs or other regulatory signs expressly forbidding the use of streets or driveways for turnabouts.

Purpose for restrictions:

- Heavy traffic is usually present, making the likelihood of finding a gap big enough to turn safely very small.
- Prior accident experience -- repeated crashes at that location may have resulted from people trying to make turnabouts.
- Line of sight --a restricted line of sight that makes it impossible for drivers to tell if traffic is approaching.
- Prevailing traffic speeds--too fast for driver making turn to be able to match the speed of other vehicles.

Turnabouts are permissible where laws or signs do not expressly forbid the practice, providing the traffic flow and line of sight permits accurate assessment of risk. Drivers attempting a turnabout at unregulated locations who cause a crash may be ticketed for failure to exercise due caution.

The key to executing turnabouts safely is good visual habits. Drivers must search for traffic in both directions.

U-turn procedures:

- Move car to extreme right of lane.
- Signal left hand turn.
- Check traffic ahead and behind (use rearview mirror, left side mirror and head check) until have spotted large enough gap
- Turn left quickly (hand over hand, using full width of roadway to allow for quickest possible turn)
- Straighten car and accelerate to match speed of traffic.

Procedures for Three-point Turn:

- Position car to far right of roadway
- Signal left turn
- Scan for appropriate gap in traffic, as per U-turn
- When large enough gap available, turn left as sharply as possible, stopping vehicle just before front wheels reach edge of pavement.
- Turn steering wheel sharply right
- Shift to **REVERSE**
- Verify that traffic is still absent from lane to be entered, and back--turning right--using over-the-shoulder check, as per usual in backing
- When car has backed to point where can pull into desired lane, come to complete stop and shift to **DRIVE**
- Use over-the-shoulder check (right) to verify gap in right hand lane while straightening wheels
- Pull quickly into desired lane, steering slightly left until car is straight in lane, then straighten wheels.

Procedures for Two-point Turn, Forward

- Signal and make right hand turn, stopping as soon as rear of car is out of lane of traffic
- Shift to **REVERSE**
- Turning body--first left, then right--check traffic in both directions until suitable gap is identified
- Turn body left once more to verify gap still there
- Back left into desired lane
- Shift to **DRIVE**, (Automatic transmission) or first gear (manual transmission) and accelerate to match flow

Procedures for Two-point Turn, Backwards

- Stop car as soon as rear of vehicle clears turning lane (e.g., alley
- Shift to **REVERSE** and signal right hand turn
- Check adjacent left hand lane to make sure there will be enough room to back without left front fender interfering with traffic
- Turn body to right and back, turning right, into alley
- Shift to **DRIVE**, (Automatic transmission) or first great (Manual transmission) signal left turn and check traffic (right, then left, then right again) to verify adequate gap
- When gap available, proceed with normal left turn procedure

General Principles for Turnabout

1. Avoid blocking lanes.
   - Driver should not attempt a turnabout if traffic will back up behind them.
   - Drivers in back will try to use any gap in approaching traffic to try to pass drivers stopping or slowing for turnabout.
   - Often this situation will lead to a collision -- a passing driver hitting a turning driver.

2. Avoid interference--Turning drivers should never attempt to enter a lane under the assumption that others will stop or slow for them.
   - It is never safe for a driver to assume that others on the road even see them.
   - Since turnabouts are relatively rare, other drivers do not expect the maneuver.
   - Other drivers may see a driver making a turnabout but not recognize what the driver is trying to do.

3. Maximize visibility--If it is necessary to make a turnabout, driver should select the maneuver that offers the best visual field.
   - The longer a maneuver takes, the larger visual field is required to execute the turnabout safely. Typically, a U-turn requires less time than a two-point turn; a two-point turn requires less time than a three-point turn.
   - Whatever the turnabout maneuver chosen, the driver must have a full view of where he or she is going -- all the lanes the driver will be using. Hence, turnabouts should never be attempted near curves or hilltops where approaching traffic may be out of sight.
   - Two-point turns should not be attempted unless the side street used provides a clear view of traffic in both directions on the main street.
   - The backing maneuvers used in two-point turns place the greatest burden on drivers to maintain an adequate field of vision.

4. Avoid making turnabouts in heavy traffic:
   - It is almost impossible to find an adequate gap for any turnabout maneuver when traffic is heavy.

- Drivers will end up saving time and lowering their risks by using an alternative to turnabouts.

Alternative To Turnabouts

The safest way to change direction is to go around the block.

- Right turns are inherently safer than left turns (driver does not need to cross one lane of traffic before entering the turn lane),
- The best alternative is to circle back to the place the driver wants to go by a route that requires only a series of right turns.

Parking

The three basic types of parking maneuvers are:

- Parallel parking--backing into a parking space with the car body ending up parallel to the curb
- Angular parking--pulling into a parking space marked by lines at approximately a 45^{o} angle with the roadway
- Perpendicular parking--pulling into a parking space marked by lines at a 90^{o} angle to the lane of traffic

Of these three types of parking maneuvers, angular parking is the easiest. Parallel parking is the most difficult because it involves backing.

Hazards to Parking Maneuvers

The major hazard presented by all parking maneuvers is that drivers behind the parker do not expect the parker to slow or stop.

- The best way to reduce this hazard is for the driver to give plenty of warning to those behind of the driver's intentions.
- Signal well in advance of initiating the parking maneuver.

Sometimes drivers behind will mistake a right turn signal for a parallel parking maneuver as a sign that the parker wants to make a right hand turn ahead and may stop behind the parker so close as to deny access to the parking space.

- The parking driver should pull forward and look for another space.

Drivers behind may mistake the brake lights as an indication that the parker is slowing for a turn further ahead and might ride up on the parker's tail before realizing the true intention.

When backing into a parallel parking space, the left front end may swing into the adjacent (traffic) lane, presenting a chance of a collision.

Front end swing also may be a problem in angular or perpendicular parking, given the close quarters involved. Drivers must time the turn so as to keep the outside tracking front tires from swinging the front fender into a parked car, while maintaining enough clearance between the inside tracking rear wheels and a car on the other side.

Visual Checks

Before starting any parking maneuver, driver must make a series of visual checks.

When *parallel parking*, driver must look:

- Back--to verify there is adequate space behind vehicle to enter parking spot
- Left--to verify there is adequate space to accommodate left front fender swing out
- Left side mirror/head check--to verify that no car from behind is attempting to pass.

Visual checks for both ***angular*** and ***perpendicular*** parking are identical:

- Ahead--for approaching vehicles or pedestrians that may enter gap the driver needs to make turn
- Side mirror/head check--to verify that pedestrians or other vehicles approaching from behind will not enter gap needed to complete turn
- Parking slot--to make sure that car from opposite slot has not pulled through to park in space driver had wanted.

Parallel Parking Procedures

1. Activate right turn signal as soon as possible

2. If being followed, tap brake to flash lights as an extra warning of intent

3. Stop car with back end even with back of vehicle in front of parking spot, with approximately 18" of space between the vehicles

4. Shift to **REVERSE**, and check for left front fender clearance and clearance behind

5. Back slowly, turning steering wheel to the right so as to aim back of car toward the front of the car parked behind the slot

6. As front wheels come even with rear wheels of car parked ahead, begin to straighten steering wheel

7. When right front fender clears rear of car ahead, turn steering wheel sharply left while continuing to back *slowly*

8. Continue backing until car almost touches vehicle behind (if space is large enough, driver may have to straighten wheels earlier to keep back end from heading out into traffic lane)

9. Straighten wheels shift to **DRIVE** and pull forward until car is centered in parking space.

10. Put car in **PARK** (automatic transmission) or second gear (manual transmission) and set brake

Angular and Perpendicular Parking Procedures

1. Signal the turn early

2. Check for traffic ahead and behind that might cross path when turning into space

3. Pull slowly into space, trying to have front fender on side opposite that of turn pass within inches of rear bumper of vehicle on that side (this will help maintain clearance for rear wheels on other side of parking vehicle).

4. Center car in parking space, left and right.

5. Pull all the way into the space, making sure front fender does not cross end line

When ***perpendicular*** parking in shopping centers, pull through to "front" space, if it is empty. This will allow the driver to leave spot by going forward, eliminating the more difficult maneuver of backing out of the space.

Exiting Parking Slots

In general, it is more dangerous to leave a parking space than to get into it.

Dangers in Exiting:

- Parking slots usually afford drivers only a limited field of vision. In a parallel parking spot, the vehicle in the spot behind may restrict the driver's view of the adjacent traffic lane.
- especially problematic when the vehicle behind has a solid body (e.g., truck or van) and extends further toward the adjacent lane than the driver's vehicle. Such a situation limits driver's ability to see into lane. Vehicles on either side of head-in parking slot pose the same problem.
- lack of alertness on the part of drivers in traffic. They tend to concentrate on other vehicles in traffic and may not notice the light (brake, backup or turn signals) of vehicles about to leave parking spots.

Visual Checks

To exit parking spots safely, drivers must look in the appropriate directions before moving.

- Before leaving parallel parking spot, must check adjacent traffic lane by looking at side mirror and adding head check to verify that appropriate gap exists.
- For angular and perpendicular parking, must check for traffic in both directions behind -- even if traffic is supposed to be going only one way. (People often ignore one way directions in parking lots.)
- When backing out of head-in parking spots, driver must turn body to get clear view
- If solid body vehicles prevent clear view, passenger could direct traffic, allowing safe exit.

Exiting Parallel Parking Space

1. Shift to **REVERSE** and back car straight until just shy of vehicle in spot behind.

2. Shift to **DRIVE** and activate left turn signal

3. Turn steering wheel left (turned tires give approaching drivers a clue that vehicle may enter roadway)

4. Check adjacent traffic lane for approaching vehicles, using left side mirror

5. When appropriate gap identified, verify gap with head check.

6. Enter gap slowly, checking for clearance between right front fender and parked vehicle ahead.

7. After entering traffic lane, countersteer (to right) to align vehicle in lane, then straighten steering wheel and accelerate to speed of traffic.

Backing From Head-in Parking Slots

1. Shift to **REVERSE**

2. If backing, turning right, turn body to right and check for traffic approaching from right and cars backing from slots behind

3. Turn body to left and check for approaching vehicles and cars backing from behind

4. Turn right and check to make sure gap still exists.

5. Back slowly. Do not turn steering wheel until rear tires have passed back bumper of car parked on right

6. Begin turning wheel, checking left front fender for clearance. (NOTE: when leaving angular parking spot, may be no need to turn wheel if car parked with tires at angle used to enter space.)

7. When left front fender has cleared parked car, straighten steering wheel

8. Shift to **DRIVE**, (automatic transmission) or first gear (manual transmission) and proceed.

Legal Requirements Pertaining To Parking

- Cars attempting to leave any parking slot must yield to vehicles already in the traffic lane.
- Drivers also are legally required to signal their intentions to park (change directions) by using turn signals.
- When parallel parked, vehicle wheels must end up no more than 18" from curb
- In marked parking slots, cars must be completely within the space markings for that slot
- Posted restrictions for use of parking slots (i.e., handicapped parking only, compact cars only) must be obeyed
- Vehicles may not be parked on a crosswalk, in an intersection, on a sidewalk or in front of a public or private driveway.
- Vehicles may not park on a bridge outside city limits or in tunnels
- Vehicles may not be parked any closer than: 5 feet from a fire hydrant, 10 feet from a stop sign, 20 feet from a fire station entrance, 50 feet from a railroad crossing, hotel or theater entrance.
- Vehicles may not occupy "no parking zones" -- usually marked with signs or yellow paint on curbs
- Drivers may not double park -- leave vehicle in traffic lane along side another stopped or parked vehicle.

UNIT III: SYSTEM INTERACTION

The previous unit dealt with controlling the vehicle without regard to its surroundings. This unit describes procedures and principles for coping with the requirements placed upon the driver by the demands of the Highway Transportation System, including the road, other vehicles, and natural environment. The unit consists of the following sections:

- Driving Processes
- Rules of the Road
- Seeing
- Communicating
- Managing Speed
- Managing Space

INSTRUCTIONAL OBJECTIVES

Knowledge Objectives

Students will know:

SIPDE

1. The five human functions that make up the driving process

Rules of the Road

1. The meaning of traffic signs, signals and pavement markings

2. Why signs, signals and pavement markings are located where they are and how drivers can use them as guides for assessing level of risk

3. The laws governing right-of-way

4. The speed laws

Seeing

1. The need to gather information from all around the vehicle

2. Proper seeing techniques

3. That all vehicles impose a blind spot

4. Specific driver tasks and situations where special seeing techniques are needed for safe and efficient driving

5. General factors limiting drivers capability to gather information

Communicating

1. The legal requirements for signalling

2. How to signal

3. The need to signal all turns, lane changes, and sudden slow downs

4. The safety purposes of signalling

Speed Management

1. That speed limits must be different for different roadways and areas

2. The safety and fuel conservation benefits of effective speed management

3. That vehicles have an efficient speed range of operation

4. How speed adjustments (accelerating, decelerating, braking) affects fuel economy

5. The general relation between speed and stopping distance

6. The need to drive more slowly under certain conditions (e.g., poor visibility).

7. The major disadvantages (legal penalties, vehicle wear, fuel consumption) of excess speed

Space Management

1. The need to maintain space around the vehicle

2. Specific rules for achieving a safe distance from other vehicles

3. The minimum space (gap) needed to avoid collision, in specific driving situations

4. Conditions when extra space is needed to drive safely

5. Techniques (e.g., minimize, separate, compromise) for reducing conflict when space is limited.

Attitude Objectives

Students will accept that:

1. Traffic controls serve to expedite the safe, efficient flow of traffic

2. Speed limits are established on the basis of many environmental and engineering factors which are beyond the driver's control to overcome

3. Visual obstructions inside or outside the vehicle present a "clear" danger

4. The risks associated with excess speed are not worth the meager amounts of time that may be saved by driving too fast

5. Maintaining open space all around the vehicle is the only way to avoid crashes

6. Communicating the intent to change speed or position is essential to reducing risks.

Classroom discussion of speed management is strongly suggested, as this teaching method is best-suited to help students embrace desired beliefs in this area. The discussion should encourage students to reveal common rationales for speeding (e.g., it saves a lot of time, everyone else does it) and force them to examine rigorously the truth of these assertions.

Problem solving also is recommended for liberal use--e.g., visuals showing different types of roads and asking students to play traffic engineer (identify roadway/environmental factors that they would consider in establishing speed limits, warning signs, pavement markings); diagrams posing right-of-way conflicts; visuals showing blocked view situations, space limitations and "hidden hazards" (such as wheel of parked car ready to enter lane). All problem-solving exercises should require students to (1) identify the problems, (2) identify all possible ways to compensate for the problems and (3) describe the procedures for executing the optimal response.

Visuals may also aid in presentation of information, especially in covering content on: signs, signals and markings; blind spots; 2-second following distance; stopping distance; and exiting/entering freeways.

Appropriate home study assignments in the Iowa Driver Manual include the section on "Road and Highway Markings," parts of the "Driving Tips" section (Blind Spots, Following Another Vehicle, Passing, Speed, Right of Way, Interstate Driving) and parts of the "Other Vehicles" section (Motorcycles, Bicycles, Pedestrians, Mopeds).

DRIVING PROCESSES

The processes involved in driving have been frequently conceptualized by driver educators as follows:

Search -- visually searching the environment in order to be in a position to sense and perceive important highway, traffic and environmental conditions.

Identification -- identifying those aspects of the highway, traffic and environment to which it will be necessary to respond.

Prediction -- anticipating changes in highway, traffic and environmental conditions in relation to the motion of the vehicle.

Decision -- selecting a response appropriate to the anticipated changes and conditions.

Execution -- carrying out the selected response through control of the vehicle's speed and/or direction.

Among experienced drivers, these processes are carried out largely in a subconscious, reflex basis. Except when attempting to find unfamiliar destinations, their driving responses are carried out with little or no conscious attention. This is evident in their ability to carry on conversations while handling routine driving situations. Even when an unusual circumstance arises, drivers have typically initiated the "execution" of an appropriate response before they become fully aware of the situation to which they've responded.

While the SIPDE process is not a truly accurate description of the behaviors taking place in normal driving, it is a useful aid to learning. Having students verbalize each step in the process helps them integrate the classroom learning into the actual driving and aids instructors in identifying the strengths and weaknesses of students.

The various procedures and principles involved in safe system interaction cut across the SIPDE processes. For example, good speed management involves effective search, identification, prediction, decision, and execution. Each topic addressed in this section will aid drivers in carrying out the SIPDE process more effectively such that when they become internalized to the point where they are carried out subconsciously, they will be processes that will lead to safe vehicle operation.

RULES OF THE ROAD

As noted in the first class session, the transportation system has grown increasingly complex over the years.

To bring some order and safety to this potentially chaotic system, governments have created rules of the road to tell drivers what they must do to keep the risk of crashes to an acceptably low level.

- Ignoring these rules increases the level of risk for all road users
- Drivers who operate in this fashion risk getting tickets as well as having accidents.

How Rules of the Road Are Set

Rules of the road have been established so that the highway transportation system can fulfill its goal: to allow the largest number of people and goods to get to their destinations as quickly and safely as possible.

Decisions about which laws will prevail (e.g., appropriate speed limit, appropriate speed limit for certain stretch of road), are made by transportation professionals who consider not only driver capabilities but also other system factors beyond the control of drivers. The factors include:

- Roadway characteristics (lane widths, visual obstructions, degree of traction provided by paving materials, roadway configuration)
- Vehicle characteristics (the types of vehicles using the roadway and the normal speed and volume of those vehicles).
- Accident experience in relation to specific locations.

To operate safely in the highway transportation system, drivers must know the rules of the road and obey them.

Traffic Control Devices

Highway engineers use traffic control devices--signs, signals and pavement markings--to channel traffic flow and control vehicle speed and direction. If every vehicle on the roads moved in the same direction at the same speed, there could be no accidents. Under those conditions, there would always be space between vehicles. When there is space between vehicles, no crash occurs.

- This ideal condition cannot exist, because not everyone wants to go to the same place at the same time.
- Every time cars go in different directions or at different speeds, the potential for conflict (reduction of space between vehicles, collisions) exists.
- Traffic control devices are traffic engineers' way of alerting drivers to conditions which increase the normal potential for conflict and tell them how to operate to reduce the level of conflict.

Signs

Drivers can make use of three kinds of signs:

- Regulatory signs--such as stop signs, yield signs and speed limit signs
- Warning signs--such as curve ahead or slippery when wet
- Guide signs--such as highway exit signs

Regulatory signs indicate that a certain driver behavior is mandatory to assure reasonable safety. Drivers who disregard these signs threaten the safety of others and, consequently, leave themselves open to arrest.

Warning signs alert drivers to the existence of a potential hazard ahead.

- These signs do not prescribe the behavior the driver must adopt to keep risks acceptably low. That decision is left to the driver.
- However, if an accident occurs--if, for example, driver fails to slow sufficiently before entering a sharp curve--the driver is legally responsible for the crash.

Guide signs help drivers find essential services (such as hospitals, shelter and food) or popular recreation sites (such as parks, picnic areas, airports and athletic arenas).

Shapes of Signs [Visual 1 (Signs) may be used here]

Because traffic signs are read by people moving, often at high speeds, certain shapes are reserved for specific types of signs. The use of special shapes allow drivers to "read" at least part of the message before getting close enough to actually make out the legend on the sign. The most important sign shapes are:

- Octagon--used only for stop sign. Drivers must come to complete stop at this sign (before front end of vehicle crosses plane of sign). Driver must let cross traffic (vehicular or pedestrian) pass before entering or crossing intersection controlled by stop sign.
- Equilateral Triangle--reserved solely for yield sign. Driver must slow--stop if necessary--and let cross traffic pass before proceeding.
- Pennant--used only to designate no passing zone. NOTE: this sign appears on the left side of the street.
- Diamond--a warning sign, that alerts drivers to special road hazards ahead.
- Rectangle--when vertical, is a regulatory sign, telling drivers what they can or cannot do. When horizontal, serves as a guide sign giving drivers directions to services or popular locations.
- Pentagon (house shaped)--reserved for signs warning about the likely presence of children on or near the road. Used at school crossings, near schools, playgrounds and other areas where many children gather.
- Crossbuck--reserved for railroad crossings. A number sign under the crossbuck tells how many sets of train tracks are at the crossing.
- Circle--a warning sign alerting driver to the presence of a railroad grade crossing ahead.

Colors of Signs

The colors on a sign also inform drivers about the expected behavior or type of information ahead:

Red -- means stop.

- The stop sign is completely red
- The yield sign (equilateral triangle) is bordered in red to indicate the likelihood that driver will have to stop before proceeding.
- Red also is used on regulatory signs to indicate that a specific driving maneuver (e.g., left turn) is prohibited (red circle with red slash running from 11 o'clock to 5 o'clock over forbidden action).

Yellow -- the color of a warning or caution sign. Used on diamonds, pennants (no passing), pentagons (school crossing) and circles (railroad crossing)

Orange -- construction and maintenance warnings, indicating that workers may be on or near the road

White -- on regulatory signs (rectangles and crossbucks) telling drivers what to do

Green -- used on directional signs such as highway exit signs, telling drivers where a place is located and how far away it is

Blue -- indicates services ahead for drivers (e.g., hospitals, hotels, gas stations, restaurants, camp grounds)

Brown -- used on guide signs pointing to historic sites, parks or recreation areas

Message

In addition to shapes and colors, signs also bear messages.

- The message on a sign gives more information about what the sign is trying to tell drivers.
- Some messages take the form of pictures for drivers who can't read English

Traffic Signals

Traffic Light

The basic traffic light (or "semaphore") has three colored lamps: red on top, amber in middle, green on bottom.

- Lamps light in a standard sequence: red, then green, then amber.

Intersections controlled by traffic lights are much busier than intersections governed only by signs.

- Engineers try to use the least restrictive traffic control device possible, consistent with an acceptable level of safety. They don't want traffic to be tied up any longer than is absolutely necessary.
- Engineers will tighten the control at an intersection only after experience--in the form of numerous accidents--shows that the existing control is insufficient to keep drivers from having too many accidents. Hence, the very type of control device at an intersection gives drivers an indication of the level of risk present.
- Traffic on the cross street of an intersection controlled by a stop sign is normally heavier than that on a cross street of an intersection controlled by a yield sign. Similarly, traffic on an intersection controlled by a traffic light will be heavier than that on an intersection controlled by stop signs.

Red Light

Red means stop:

- Drivers must come to a complete stop at the designated location ("stop here" regulatory sign, stop line, cross walk).
- If there is no designated stop point, driver must stop vehicle before front bumper reaches intersection.
- Driver must remain stopped until light turns green. The only exception is when the driver wants to make a right turn, and there is no sign specifically prohibiting a right turn on red.

A right turn on a red light can be more dangerous than a right turn at a stop sign since other road users may not expect the vehicle to move. When making a right turn on a red light:

1. Come to a full stop
2. Check all lanes on the cross street to the left
3. Check the sidewalks and allow pedestrians to clear the crosswalk before starting turn.

Green Light

The green light means drivers can proceed into the intersection when the coast is clear.

- Most dangerous time to enter an intersection is just as soon as the light has turned to green.

- Cars on the cross street may have misjudged the light or may try to "beat the yellow." May enter the intersection as the light changes or shortly thereafter.

- Driver should always check to make sure the way is clear before entering an intersection on a green light.

Amber Light

The amber light warns drivers that the signal is about to change to a red light.

- It tells drivers to prepare to stop for the red in a controlled fashion.

- In fact it is illegal to enter an intersection after the light has turned amber.

Flashing Lights

Some intersections are controlled by flashing lights. Traffic on one road will have a flashing red while traffic on the cross street will have a flashing yellow.

- The flashing yellow tells drivers to slow down and be prepared to stop for traffic entering the intersection.

- The flashing red tells drivers to come to a complete stop, like for a stop sign.

Lighted Arrows [Visual 2. (Lighted Arrows) may be used here.]

Sometimes traffic lights present drivers with colored arrows rather than circles.

A green arrow permits drivers to turn in the direction in which it is pointing

- If a green arrow is appearing, traffic coming the other way will be stopped. Unless otherwise noted, drivers can turn with the arrow and be protected.

- It's a good idea to check and see what oncoming traffic is doing before starting the turn.

- When a green arrow goes out, leaving only a solid green light, a turn is not protected.

A yellow arrow, whether solid or flashing, tells drivers to proceed with caution in the direction in which it is pointing. Drivers should be ready to stop as they approach it. In most cases, it will soon change to red.

A red arrow prevents drivers from turning in the direction the arrow is pointing until the arrow goes out.

Lane Control Signal

Signals that present drivers with X's and arrows pointing down control the use of lanes. They are used on roads in which traffic can move in one direction on a given lane some of the time, and at the opposite direction at other times. These signals are usually found where traffic changes direction at different times of day (rush hours, for instance). Each lane will carry its own signal.

- A red X indicates the lane underneath is not open to traffic driving in the direction the driver is going. Never drive in a lane under a red X.

- A green arrow pointing down indicates that drivers can drive in that direction in that lane.

- A yellow X tells drivers to move out of the lane beneath it because a red X is coming up.

- A flashing yellow X means that the lane can be used only to make left turns. Drivers should enter these lanes with caution and only a little distance before reaching the intersection at which they will turn.

Pavement Markings

Pavement markings show drivers the paths they must maintain to avoid conflicts with other vehicles. The markings also warn drivers when certain maneuvers are unsafe.

Lane Delineators

- Yellow lines usually separate lanes of traffic that move in opposite directions. In almost every case, these lines should be on the driver's left.
- White lines usually mark off lanes of travel going in the same direction. Often roads have a white line along the right hand edge, telling drivers where the road ends and the shoulder begins.
- Solid lines indicate it is illegal to cross in order to pass another vehicle. Solid lines may be crossed only to turn into an alley or a driveway
- A broken line can be crossed in order to pass

Stop Lines and Crosswalks

White lines running across a roadway indicate where drivers must stop to avoid conflicts with cross traffic.

A single white line running across the driver's lane indicates the legal stopping point for a stop sign or stop signal.

Parallel White Lines running across the roadway mark out pedestrian crossing areas.

- Drivers may not stop with any part of the vehicle extending into a pedestrian crosswalk.
- As crosswalks are usually marked only where there is heavy pedestrian traffic, drivers should be especially alert to the presence of people traveling on foot.

Reversible Lane Markings [Visual 3 (Lane Markings) may be used here.]

Double yellow broken lines mark "reversible" lanes.

- These lines mean that traffic changes direction on this street at different times of the day.
- Drivers on streets with these double dashed lines should check along the side of the road or overhead for signs and signals that explain what lanes they can travel in safely.
- While looking for signs or signals, stay in far right lane where least likely to meet oncoming traffic.

Shared Left-Turn Lanes [Visual 4 (Shared Left-turn Lane) may be used here.]

A shared left turn lane will sometimes be designated between two lanes of traffic moving in opposite directions.

- They are marked by double lines: the outside lines are solid, the inside lines are broken
- Between these lines are arrows curving in opposite directions. Arrows indicating a left turn are alternated with arrows curving toward and to the right of the driver (indicating left turn for oncoming traffic).
- These markings typically occur on roads that were once narrow but later widened because of roadside development. They are fairly common around shopping centers.

Sharing a left turn lane can be dangerous. To handle the situation safely:

1. Be sure not to get into the lane too soon. The longer drivers are driving in the center lane, the more likely they are to meet someone coming the other way.

2. Be quick. Drivers should give themselves just enough time to enter the shared lane, straighten the car, signal the turn and, if they must, stop before making turn.

3. Watch for cars on side roads. They may want to cut across the driver's path to reach the other side of the street.

4. Do not use the center lane for passing. It is for turning traffic only.

Restricted Lanes

A series of diamonds marks a lane where certain vehicles are allowed to travel at certain times of the day (often during rush hour).

- It may be restricted to buses, bicyclists, people turning right at the next corner, car pools, etc.
- Drivers should look for a sign on the side of the road or overhead for details.
- If drivers are in a vehicle that does not qualify for the diamond lane, they must stay out of it.
- Driving in a diamond lane with an "unqualified" vehicle can result in a ticket.

Right Of Way

The legal concept of "right of way" is designed to resolve traffic conflicts that might otherwise result in a driver encroaching on the space another driver needs to maintain around his vehicle.

Meaning of "Right-of-Way"

- The law grants right of way to no one; it does, however, state who must yield the right of way.
- No one can insist on taking the right of way, because the law grants right of way to no one.
- The law states that a driver has failed to yield right of way whenever the driver enters a lane of traffic in such a way as to make another either change speed (e.g., slow down) or direction (change lanes) to make room.
- Where traffic controls such as stop lights, stop signs and yield signs are present, the driver facing these signs or signals has no right of way decisions to make. These devices are telling the driver to stop or slow to yield the right of way.

Right of Way Rules

Where signal control devices are not present, general laws of right of way provide guidance as to which drivers must yield.

- At four-way or three-way stop signs, a driver reaching a stop sign after a driver on the cross street has reached his sign must yield to the driver who got there first.
- Drivers turning left must yield to oncoming cars going straight ahead.
- A driver approaching the cross street of a T-intersection must yield to drivers on the cross street.

- Traffic on a minor artery wishing to merge onto a major artery (e.g., entering freeway from ramp) must yield to traffic on the major artery.

- On two equal roads, drivers coming from the left must yield to cars coming at the same time from the right.

If drivers are unsure, eye contact can be helpful. However, eye contact is not foolproof, both drivers could end up pulling out at the same time.

Speed Laws

Speed Limit Signs

Regulatory speed signs tell drivers how fast they can go safely under ideal conditions. Engineers determine this maximum safe speed taking into account factors such as traction available from paving surface, lane width, visibility, density and normal speeds of other traffic, presence of intersections, merging locations.

Advisory speed signs tell drivers how fast they can go along certain sections of the road and still handle permanent hazards safely. Advisory speed signs are usually found beneath the yellow warning signs (e.g., curve ahead).

In less than ideal conditions, such as when bad weather leaves the roads slippery or reduces visibility, drivers should drop speed below both posted and advisory limits.

General Speed Limits

Not all roads are posted with speed limits. It is simply not economically possible for the State to put up speed signs along every road and at every block. When drivers find themselves without posted limits, the following speeds are the legal maximums:

- In business districts -- 20 mph
- In residential or school districts -- 25 mph
- On secondary and primary roads -- 55 mph
- On interstate highways -- 65 mph
- On all other types of roads and locations -- 45 mph

Basis of Speed Limits

Limits reflect the driving environment normally provided by each type of location and roadway.

- Business districts typically have heavy traffic flow, many pedestrians, and numerous intersections. They offer almost unlimited opportunities for traffic conflicts. Drivers need to be going relatively slowly to identify hazardous situations and respond to them safely in the close quarters of city (business) roadways.

- As the likelihood of encountering dense traffic, frequent intersections, and the like decreases (moving from business districts to residential areas to rural locations), the prevailing speed limits are relaxed.

- Speed limits are at their highest on controlled access highways, where fewer opportunities for speed change (e.g., traffic lights) or directional conflict (e.g., intersections) exist and where the environment is more forgiving or driver-friendly (e.g., wider lanes, road shoulders, more gradual hills and curves, greater lines of sight).

Minimum Limits

Interstates and some other high speed roadways also may be posted for a minimum speed limit.

- Drivers may be ticketed for driving below the allowable minimum.
- The idea of minimum speed limit is to assure that all traffic will be moving within a fairly narrow range of speed (if vehicles traveling in the same direction are all going at the same speed, they cannot collide).
- The greater the difference in speed between two vehicles sharing a road, the higher the risk of a crash.
- The minimum on all interstates is 40 mph. Vehicles that cannot go that fast and drivers that do not feel comfortable driving that fast are not allowed on the interstate.
- Drivers should always remember that maximum safety is attained when their speed is both within the legal limit and matches that of other vehicles on the road.

SEEING

Most of what drivers do in driving is a reaction to what they see. The more information a driver's eyes collect from moment to moment, the better the driver will be able to deal with a changing traffic scene. Studies show the biggest reason drivers have accidents is because they didn't look at the right place at the right time.

We do most of our seeing in front of us. But good drivers always shift their gaze--far ahead, directly in front of the car, from side to side, and behind--to see everything that is happening around them. To see safely, drivers must know where to look and must have a clear view of where they are looking.

Seeing Ahead

Looking Far Enough Ahead [Visual 5 (Looking Ahead) may be used here.]

Drivers must look far enough ahead to see things early.

- Spotting and identifying a hazardous situation early allows drivers to make controlled responses and avoid panic moves which often cause accidents.
- One of the most common mistakes inexperienced drivers make is looking just in front of the car instead of far down the road.
- Expert drivers focus their eyes about 12 seconds ahead. All drivers should keep track of events occurring along the roadway as far ahead as the car will travel in 10-15 seconds.

--10 seconds equals about one city block at 25 mph

--10 seconds equals about a quarter of a mile (3 city blocks) at 55 mph

- If a driver often has to hit the brakes suddenly or make quick lane changes, it indicates that he/she is not looking far enough down the road.
- Drivers must scan the distance of the entire road ahead from right in front of the car to 10-15 seconds ahead. Keep eyes moving both near and far.

Scanning Roadsides

Drivers should glance to the sides of the road often. Looking along the roadside for:

- Cars and people that may be entering the road by the time the driver reaches them
- Signs warning of conditions ahead
- Signs with information about places ahead and how to reach them.

Advantages of Distance Scanning

- By looking far enough and wide enough ahead, drivers are able to see important things they may not see later (e.g., someone getting into a parked car).
- Looking far ahead gives driver time to predict what may happen and adjust (speed and position) to accommodate developing problems before they become emergencies.

Seeing To The Sides

When to Look to the Sides

- Whenever nearing a place where others may cross or enter path, driver must look to the sides to make sure no one is coming.
- While people--especially children--may dart into a road at any location, the most common sites where drivers will encounter cross traffic is at intersections.
- An intersection is any place where traffic traveling in one direction meets traffic coming from another, including crosswalks, railroad crossings, the ends of driveways, shopping center entrances and freeway entrances.

[Visual 6 (Watch It) may be used here.]

Controlled Intersections

- When preparing to cross or enter a cross street, drivers must check traffic coming from both directions.
- This is true for all intersections, even if they are "controlled" by signals or signs.

[Visual 7 (Stop Twice) may be used here.]

- Drivers can't rely on control devices to protect them. Right of way is just an idea, not a forcefield.
- Other drivers may run red lights, jump stop signs or drive the wrong way on one way streets.

Uncontrolled Intersections

At uncontrolled intersections where there is no red light or stop sign that is supposed to halt traffic on the cross street, drivers must look to the sides more carefully. They should:

- First look left--the first potential source of conflict
- Then look to the right -- traffic coming from that direction may hit the driver after he or she has crossed the first lane
- Then look left again, to make sure no vehicle not seen the first time has suddenly appeared
- After checking left, right, left, the driver then can proceed into the intersection.

Crosswalks

- When approaching a crosswalk, scan the entire area, left and right.
- Pay special attention to the right side area, as pedestrians and bicyclists on the right will be only a few feet from the vehicle.

- When turning right just beyond a crosswalk, check for anything that might be between vehicle and the curb. Glance over right shoulder for bicyclists who may be trying to go straight through the intersection.

- Drivers should also remember that, when they are turning on a green light, pedestrians crossing the street they wish to enter have a green light too. The driver must yield right of way to pedestrians in the cross street walkway.

- Crossing pedestrians may be expected anywhere there are many people. Drivers must step up scanning activities in these locations: shopping centers, parking lots, construction areas, playgrounds, school yards, construction sites.

Railroad Crossing

- Drivers must look both left and right as they approach a railroad crossing, even if the warning signal is not flashing (it may be out of order).

- If drivers are waiting at a double set of tracks while one train passes, they should not start to move out as soon as the last car goes by. There may be another train on the other tracks from the other direction.

- Drivers must wait until the first train is well down the track, giving them a clear view of activity on the other set of tracks in both directions.

Seeing Behind

When to Look Behind

- While most hazards will approach from the sides or the road ahead, drivers cannot afford to ignore what is going on behind them.

- Mirrors serve as drivers "eyes" in the back of their heads.

- Mirrors should be checked often: 3-4 times a minute.

- By checking all mirrors regularly, drivers will be able to spot someone following too closely or coming up too fast.

- By identifying these hazards early, drivers will have time to respond to them safely.

Blind Spots [Visual 8 (Blind Spots) may be used here.]

- Though mirrors are very useful, they can't show drivers the whole picture.

- When drivers face forward, there are two blind spots in their field of view, both big enough to hide a car.

--Blind spots are the areas between what the mirror shows and what can be seen out of the corner of the eye.

--There's a blind spot on each side of the car.

- No matter what kind of mirrors a vehicle has or how much a driver stretches to the side to change the scene revealed in the mirrors, the driver still cannot get a view of what's going on in the blind spots.

- While convex (rounded up) mirrors do let drivers see into the blind spot, as well as into distant lanes, they make objects appear further away then they really are.

- Even with these mirrors, the driver must make a head check to verify the true distance between his vehicle and the vehicle in the blind spot.

Checking Blind Spots

- The only way drivers can see what is in the blind spot is to turn their heads and look over their shoulders.
- When to Check Behind

Drivers should check their mirrors only when they are sure the path ahead is clear. Once they're sure of this, they can glance quickly into their mirrors.

- If they spot a hazard behind in the mirrors, drivers will need to monitor the situation.
- Monitoring should be done by stepping up the frequency with which they check mirrors, not by increasing the duration of their mirror checks. Drivers should never stare into the mirrors, as this will keep their eyes off problems ahead for too long).

Drivers must be sure to check behind before performing any maneuver that will frustrate other drivers' expectations:

- change lanes,
- slow down quickly, or back up.
- Must also check behind when driving down a long hill.

Changing Lanes

Drivers must make it a habit to look over their shoulders every time they change lanes. "Changing lanes" applies to:

- moving from one lane to another on a roadway
- entering a freeway or highway from an entrance lane
- leaving a freeway or highway via an exit lane
- entering the roadway from the curb or shoulder

In performing these lane changes, drivers must:

1. Use both the rearview mirror and the mirror on the side of the lane into which they will be moving. Rearview mirror check may reveal a driver coming up quickly who will want to pass by, entering the same lane the driver wants to enter.

2. Turn head and glance over the shoulder in the direction they will be moving, to get a view of the blind spot on that side.

3. Be sure to look fast. Drivers can't afford to keep their eyes off the road in front for more than an instant. (The car ahead could stop suddenly.)

4. Remember to check the far lanes. On a highway with several lanes, someone in another lane may plan to move into the same space the driver wants to occupy.

Slowing Down Suddenly

Drivers must always check behind before slowing down quickly:

- Slowing down for something in the road ahead that a driver behind can't see. For example, a driver may come around a corner and find a car stalled in the road. A following driver may not be able to see the stalled car.

- Getting ready to turn into a side road or driveway. Even if a driver signals a turn and starts to slow, a following driver may interpret that as the intent to turn at the next major intersection.
- Beginning a maneuver to pull into a parking space. Again, the following driver may misinterpret the intent as being to turn into an intersection further down the road.

Backing Up

- Backing up is dangerous because it's hard for drivers to see behind their cars. This is why drivers should always walk behind their cars, checking for children or objects hard to see from the driver's seat, before getting into a vehicle to back it up.
- Because no combination of mirrors gives drivers a full view of what's behind, they must turn their bodies and look directly through the rear window whenever they back up.

Driving Down Long/Steep Hills

- Trucks and buses will often build up speed on a downgrade.
- By stepping up their mirror checks on a downgrade, drivers will be able to spot these vehicles early and react appropriately.

Ability to See

- A variety of factors can limit a driver's ability to see everything that must be seen to drive safely.
- This is critical because 80% of all information drivers need to operate safely must be gathered by the eye.
- The only physical test administered in the licensing exam is a vision test, (hearing, reflexes and other physical abilities are far less important to safe driving).

Practices that Improve the Ability to See

- Clear snow, ice or frost from all windows before starting to drive
- Do not hang things from the mirror or place unnecessary decals on windows (Besides blocking vision, they are illegal.)
- Store all objects in the vehicle in low, secure locations--not on the dashboard, rear window ledge or from hangers.
- Make sure that top loads are arranged so they don't hang down to block the driver's view
- Do not travel with the trunk or hatch up. (Leaves driver blind to what's going on behind and lets harmful exhaust fumes into the car.)

COMMUNICATING

To share the road safely with others, drivers must know how to send messages to other drivers and how to interpret sometimes obscure messages sent by others.

Drivers must communicate their intention to change speed or direction. However, such messages cannot be received, if the intended receiver does not know that the other driver is there. Hence, drivers must always operate in a fashion that communicates to others on the road: "I am here."

Communicating Presence

Positioning the Vehicle

- Keep the car where it can be seen by others. Drivers can't communicate with people who don't know where they are.
- One way to avoid not being seen is to keep out of other drivers' blind spots.
- If the front bumper is pretty close to being in line with the adjacent vehicle's back bumper, the trailing vehicle is in the other driver's blind spot.
- If the driver finds himself/herself in another's blind spot, he/she should slow slightly (drop back) or speed up (pull forward) slightly so the vehicle will remain in clear view.
- When passing another vehicle, pass through that vehicle's blind spot as quickly as possible.

Headlights

- Whenever drivers can't see well--because of darkness, fog or other environmental conditions--they should turn on their headlights. Headlights give the message: "I am here."
- Headlights are useful on gray days when the car seems to blend into the surroundings.
- Whenever a driver has difficulty seeing other cars, it's likely that others are having trouble seeing the driver's.
- Drivers should also tell others when they are hard to see. Flashing headlights gives the message: "I almost didn't see you."
- Parking lights are inferior because:

--They don't help the driver see.

--They give a false message (that the car is parked), and other drivers may get the wrong idea about what the vehicle is doing.

They make the car look farther away than it really is. (Parking lights are dimmer and smaller. Cars on cross streets and oncoming vehicles wishing to make a left turn may see parking lights and misjudge the gaps between vehicles.)

Horn

- The horn can also send the "I am here" message. To give this message, drivers should use only a short beep.
- A long blast gives the message: "immediate danger present." It should be used only in true emergencies. The short beep is appropriate for getting the attention of people near the road or drivers about to be passed to let them know a driver is moving in the vicinity**Communicating Change of Direction**

Since drivers expect other vehicles to keep moving straight ahead, it is important to signal all lane changes. Lane changes include:

- Turns
- Entering or leaving parking spaces
-

- Merging
- Changing lanes

Hand Signals [Visual 9 (Hand Signals) may be used here.]

Drivers may use the following hand signals:

- Moving left -- left arm extended straight, horizontally
- Moving right -- upper arm extended horizontally, forearm pointed straight up, fingers extended.

Turn lights are generally better communicators than hand signals, because flashing lights draw attention better.

When to Signal Direction Changes

The key to communicating a change in direction effectively is to give others time to read the message and react.

- Under Iowa law, drivers must signal every turn or lane change:

  --At least 100 feet before making a move at speeds under 45 mph

  --At least 300 feet before making a move at speeds of 45 mph or more

- Since it's hard to estimate these distances on the road, a good rule of thumb is to activate the turn signal at least three or four "blinks" before starting the maneuver.

  --For a turn at an intersection, start signaling about half a block away.

- If planning to turn into a driveway or alley just beyond a major intersection, the driver must be careful not to mislead others by signaling too early.

  --If driver starts signaling before reaching the intersection, others seeing vehicle go through the intersection may mistakenly assume that signal was made accidentally.

  --It is better to wait until the moment the major intersection is entered before giving signal.

Signalling When Passing

- Since passing is inherently dangerous, it is important to let the driver about to be passed know what will happen.
- Driver should give the horn a beep (to draw attention to the turn signal) before pulling into the left lane to pass.
- Drivers should never use horn when passing on the right. Some people tend to move automatically to the right on a multi-lane road when they hear a horn behind them.

Communicating Change of Speed

Brake lights give the message: "I am slowing down." The problem with this message is that it doesn't tell others how quickly a vehicle is slowing and whether or not it will be coming to a full stop.

The way to communicate "I will be slowing quickly" is to tap the brake pedal three or four times rapidly.

- This flashes the brake lights, attracting others' attention and warning them to expect a sudden slow or stop.

- Drivers should flash their brake lights whenever they will be slowing or stopping suddenly at a location where others might not expect it:

  --in the middle of a block: when getting ready to park or turn

  --when coming upon stalled traffic or something in the road that the driver behind can't see.

Communicating Breakdowns [Visual 10 (Communicating Breakdowns) may be used here.]

When drivers get a flat tire or have an engine breakdown on the road, they must communicate this fact to others immediately. When drivers encounter car trouble and must slow suddenly or stop they should:

1. Warn traffic behind -- Turn on emergency flashers. If vehicle doesn't have flashers, use turn signals on the side of the car where most traffic will travel

2. Pull off the road -- Move the car as far away from traffic as possible.

- Get as far to the right side of the road as possible.

- If on a wide divided highway, traveling in the left lane, the driver can pull the car over to the left if there is a wide shoulder or center strip.

- Use the left lane only if no other choice, since traffic in the left lane is moving faster than traffic in the right lanes.

3. If the driver can't pull off the road, try to stop where people have a clear view of the vehicle from behind--not just beyond the crest of a hill or just around a curve.

4. Place emergency flares or triangles at least 200 feet behind the car--signal this far behind the vehicle to give approaching drivers time to change lanes and go around vehicle. If emergency flares or triangles are not available, use a flag, white rag or (at night) a flashlight to warn approaching drivers.

5. Be sure to stay off the roadway--Stand by the side of the road and wave traffic around the car.

If a disabled vehicle must be stopped just beyond a hill or a curve:

- Place emergency flares or warnings behind the car on the upstream side of the hill or curve.

If flares are not available, the driver should stand by the side of the road on the upstream side of the hill or curve.

MANAGING SPEED

An earlier section of this unit discussed how traffic engineers determine what is an appropriate speed limit. They consider a variety of things such as:

- Presence of dangerous curves or intersections

- Types of development

- Things happening (along the side of the road)

- How well drivers can see what's ahead

- How much and what kind of traffic is usually on the road
- How people park on the road
- How pedestrians use the area
- The number and kinds of accidents that have happened there.

Traffic engineers study roads and their actual use for a long time, getting a "big picture" of what speeds are necessary to maintain an acceptable level of safety. Speed limits, then are chosen in a very scientific way.

Posted speed limits are set for normal conditions. However, there are many conditions in which drivers must operate below the posted limit in order to be at a safe speed.

Too many drivers think that they know much more about driving and the road than the professional engineers. These drivers tend to ignore posted speed limits. As a result, are tickets and they get involved in accidents.

Speed And Accident Risks

- Excess speed is involved in about one of every 6 traffic crashes.
- Not only does excess speed increase chances of having a crash, it also decreases a driver's chance of getting out of an accident alive.
- Excess speed is the primary cause of almost one third of all fatal crashes. The chances of dying in a crash double as speed increases from 55 to 65 mph.
- The chances of dying triple as speed increases from 55 to 75 mph.
- The faster a vehicle goes, the longer it will take a driver to stop safely and the more room is needed to make a quick maneuver to avoid a collision.

Speed and Stopping Distance

Speed management is critical to accident avoidance because speed is the major determinant in how long--in time and feet--it will take a car to stop. The faster a car is going, the more distance a car will travel before it can stop.

Worn, wet or hot brakes and bald or underinflated tires can increase stopping distance. Extra weight (in the form of heavy loads or trailers) will also increase a vehicle's stopping distance.

Reaction Time

The driver's reaction time is another factor in determining stopping distance.

- Reaction time is the time lapsed between the moment a driver identifies a hazard and the time the driver executes the response (hits the brakes). Hence, reaction time includes much more than "reflex" time.
- It includes the time the driver requires to sort through the various options for dealing with the hazard and deciding that braking is the appropriate response.
- Reaction distance is much less than half of the total stopping distance for all normal driving speeds.

Braking Distance

- The bulk of the distance covered is "braking distance"--the area covered by the car once brakes have been applied.

- Drivers have little control over their vehicles' braking distance--except in terms of having controlled the speed at which they were driving when braking was initiated.

- Once brakes have been applied, it becomes strictly a matter between the brakes and the forward momentum of the vehicle.

- Young drivers feel they have better than average reflexes. The problem is reflexes do nothing to decrease braking distance,the major factor that determines where they will stop.

Relation of Speed to Stopping Distance [Visual 11 (Average Stopping Distance) may be used here.]

Because of their lack of experience, younger drivers also tend to underestimate how long it will take their vehicles to stop.

- Many believe that if they drive twice as fast, their stopping distance will be twice as long.

- Stopping distance increases geometrically, rather than arithmetically, with speed.

  --A vehicle going 40 mph instead of 20 mph needs three times as much distance to stop (150 feet instead of only 50 feet), not twice the distance.

  --The stopping distance required for a vehicle going 60 mph is four times that of a vehicle going 30 mph (360 feet versus 90 feet).

The primary rule governing safe speed selection is: drivers should not go faster than the speed at which they will be able to stop before reaching a hazardous situation ahead.

Adjusting Speed To Roadway Configuration

Drivers must also select a speed that is safe for the layout of the road.

Speed in Curve

- When driving along a straightaway and approaching a curve, the car will tend to keep going straight. The faster a car is going, the more stubborn this tendency becomes.

- The only thing fighting this tendency is the front tires. The only part of the tire in contact with the road is about the size of a human hand.

  --Between the two front tires, drivers have less than two square feet of rubber on the road to turn the entire car from its straight ahead path.

  --If going too fast for a curve, front tires will lose their grip on the road and cause the car to skid or run off the road.

- Drivers should lower speed before entering a curve.

  --It is far less safe to brake in a curve because the traction (the gripping bond between tires and pavement surface) is already under stress as the car is turning.

  --Braking while turning only increases the likelihood of a skid or worsens a skid.

- As drivers come out of curves, their feet should be on the gas not the brakes. The driving force of the tires against the road will help improve traction.

Speed on Hills

When traveling downhill, drivers must take the pull of gravity into account.

- Gravity will pull the car along faster.

- To compensate for this, drivers should begin braking sooner.

Adjusting Speed To Visibility

Drivers must adjust speed to how well they can see.

- The rule in this regard: at any speed, the distance the driver can see ahead must be no less than the distance the driver will need to stop.
- The harder it is for a driver to see the road ahead, the slower the driver must go. If the driver's view is blocked or limited in any way--by weather conditions, roadside environment, or the road itself--the driver must adjust speed to deal with the problem.

Trees, bushes or buildings at intersections can block the driver's view of cars coming from the side. Drivers must approach a "blind" intersection slowly enough to be able to stop if a car suddenly pulls out.

Steep hills and sharp curves also limit visibility.

- Drivers must approach these hills and curves with the assumption that a hazard lies just out of sight.
- Since a driver can't know whether or not a car is stalled on the road just over the crest of the hill or just around a curve, the driver must approach the hill or curve slowly enough to be able to stop if this--or some other hazard--is present.
- In approaching a hill or curve, drivers must also check behind to determine the proximity of vehicles following them.

Cars parked along the side of the road also block driver's views.

- People may be ready to get out of a car or walk from between parked cars.
- Drivers should give parked cars plenty of room and reduce speed so that they will be able to stop quickly, should someone suddenly emerge from cover.

Darkness, rain, snow and fog also limit visibility. These will be discussed in Unit IV "Driving Environment".

Adjusting Speed To Other Traffic

Another important influence on how fast drivers should go is how fast other vehicles on the road are moving.

- The safest and most basic rule for sharing the road with others is: blend with the speed of traffic around you.
- Drivers should not travel significantly slower or faster than others on the road.
- Wherever they are cruising, drivers should try to keep their speed even. Many accidents are caused by drivers who constantly brake and then speed up.

Speed and Lane Use

On multiple lane highways, drivers should try to pick the lane where traffic is moving at a speed at which they feel most comfortable and which keeps them within the speed limit.

- The right lane is for slower vehicles, the left for faster-moving traffic.

- On expressways, drivers should choose the left lane for passing, the center lane for cruising and the right lane for entering or leaving.

Anticipating Speed Changes

Drivers do encounter situations where they must react to slower moving traffic. The key to handling these situations safely is to adjust speed early. Drivers can keep a steady pace better by taking the right action as soon as they figure out what is happening ahead. A few examples:

Large trucks and small, underpowered cars

- If coming up behind these vehicles on a long or steep upgrade, drivers should realize that they will have to pass them.
- Drivers should move into the passing lane early to avoid closing in behind the slow-moving vehicle and getting stuck there.

Vehicles slowing ahead

- When the brake lights on the vehicle ahead come on, drivers should lighten up on the gas and warn cars behind.
- If they begin slowing by decelerating early enough, they may not have to use the brakes at all.
- If a driver waits until the last moment and slams on the brakes, all the cars behind will have to do the same. Then, all the cars will have to start up again, one by one.
- To further smooth out speed, drivers should look through the windows of the car immediately ahead, watching the brake lights of cars ahead of that vehicle. This gives the observant driver extra notice of possible slow down and provides additional time to decelerate and consider the option of passing to get around the slow down.

Roadway narrows

- A sign will usually warn drivers that a lane is about to end.
- Whether the driver is in the vanishing lane or the one into which other drivers will merge, the driver should immediately prepare to change speed--either to fit into a gap in the continuing lane or to make room for a driver seeking to leave the vanishing lane.

Leaving Expressway [Visual 12 (Leaving Expressway) may be used here.]

When leaving an expressway, the driver will have to slow down.

- Most modern expressways have a special lane (deceleration lane) for motorists needing to leave the highway.
- Drivers should never slow down while still in the regular express lane when there is a deceleration lane available. Accidents are often caused at expressway exits by drivers who slow down before reaching the deceleration lane.
- If there is no deceleration lane, it is best for drivers to slow down just as they reach the exit ramp. Even if the ramp is short or severely curved, it is not a good idea to slow down much before reaching the ramp (while still on expressway). Instead, drivers should maintain speed and then brake fairly sharply as they enter the ramp.
- If drivers miss an exit, they should continue on to the next exit, then work back to the desired exit; drivers should never attempt to back up on an expressway.

Adjusting Speed To Save Gas

Drivers who choose their speeds wisely not only reduce risks but also save fuel. Two of the best things a driver can do to save on gas are: drive at the right speed and maintain a steady speed.

The Right Speed

Though every car is different, most get their best mileage at speeds of 35-45 mph. In most vehicles, the faster a driver goes above 45 mph, the more fuel will be used to get to the same place.

- The 35-45 mph range provides optimum fuel efficiency for most engines because the transmission is in high gear and the engine is nearing peak torque. Speeds below that range impose a fuel penalty because

  (1) the vehicle is in a lower gear,

  (2) the increased rolling resistance requires more horsepower to move the vehicle.

- Speeds above the 35-45 mph range impose a fuel penalty because increased wind resistance works strongly against forward motion, requiring more horsepower to sustain speed.

- Fuel penalties are substantial.

  --Driving at 65 mph can burn up to 25% more fuel than driving at 55 mph.

  --Driving at 70 mph can burn up 40% more fuel than at 55 mph.

A Steady Speed

No matter how fuel efficient a car's engine is naturally, the driver can get the most efficiency by maintaining a steady speed.

- Drivers who constantly change speeds by as little as 5 mph reduce mpg by 1 mile per gallon.

- Greater fluctuations in speed cost even higher fuel penalties.

Fuel Savings

Overall, drivers who travel at their maximum-efficiency whenever it is safe to do so and consistently try to maintain steady speeds can cut their annual gas bills anywhere from 10% to 50% depending on the type of vehicle driven.

SPACE MANAGEMENT

As long as drivers maintain empty space (distance) between their vehicles and other objects, there can be no crashes.

- A basic goal of driving, therefore, is to maintain a cushion of space all around the vehicle.

- In driving, space is time. The wider the cushion of space a driver maintains, the more time the driver has to respond to traffic developments and avoid disruption of the traffic flow -- either by changing lanes or slowing gradually.

- The more space a driver maintains, the more time the driver has to assess situations and respond with the appropriate maneuver in a controlled fashion.

- Since drivers can be hit from any direction, they must maintain a "cushion of space" in all directions: to the front, the sides and behind.

Space Ahead

Following Too Closely

"Following too closely" is one of the leading causes of traffic crashes.

- Typically, such crashes occur because the driver is going too fast to stop before hitting the vehicle ahead.
- Since stopping distance increases with speed, to avoid involvement in "following too close" accidents, drivers must maintain a wider cushion of space ahead when driving at higher speeds.

Two-second Rule

The best way to assure adequate space ahead, at any speed, is to follow the "2-second rule." This rule works as follows:

- When the rear bumper of the car ahead passes a marker (pavement marking, signpost, tree, etc.) on or near the road, driver should start counting the seconds it takes his or her vehicle to reach that same spot.
- Driver should count: "1-second-1, 2-seconds-2."
- If driver reaches the marker before finishing the count, driver is following too closely and should slow down (drop back).

The 2-second rule is appropriate, because it takes drivers roughly 2 seconds to identify and respond to changes in speed of traffic ahead.

- The 2-second rule is also superior to the old space management technique of estimating car lengths.
- It is difficult to estimate a distance such as "8 car lengths," while everyone can count off 2 seconds.

Extra Following Distance

In some situations a 2-second following distance is not enough. Drivers should open up a 3- or 4-second following distance in the following situations:

When following motorcycles.

- Many motorcycles can stop in a shorter distance than can cars. If the cycle falls, motorcyclist can stop almost instantaneously.
- The driver will need extra distance to avoid the rider.
- The chances of a motorcyclist dropping the bike are greatest on wet or icy roads, metal surfaces such as bridge gratings or railroad tracks, and on gravel.

When a driver behind wants to pass.

- Driver should slow down to open up a 4-second gap.
- This helps the driver pass in two ways

--Because the driver ahead is going slower, the passing driver can get by more quickly (limiting passer's exposure to risk).

--When the passing motorist pulls back into the lane, both the passer and the driver who has been passed will have 2-second following distances available.

When following drivers whose view to the rear is blocked.

- Drivers of trucks, busses, vans or cars pulling campers or trailers cannot see behind very well.

  --They may not realize a driver is behind them and would be less likely to signal a sudden stop (flash brake lights) if it became necessary.

  --Drivers following these vehicles will need the extra space to come to a controlled stop in this situation.

- Drivers following such vehicles will not be able to see "through" them to identify developing situations further down the road.

- Dropping back to a 3-4 second distance gives them extra room to see around the solid bodied vehicles and to the sides.

When hauling a heavy load or pulling a trailer. The extra weight will increase the vehicle's stopping distance.

Space To The Sides

The key to maintaining space to the sides is to avoid traffic situations where other drivers may inadvertently "squeeze" in on a vehicle. Some tips for maintaining room to the sides:

1. Avoid driving alongside other cars

   - The adjacent driver may "crowd" the lane.
   - Vehicle will be in the adjacent driver's blind spot.
   - Adjacent driver may try to change lanes and pull into vehicle.
   - Driver should move ahead (speed up) or drop back (slow down).
   - It is especially important to avoid driving alongside cars at freeway exits.
   - A driver in the left-hand lane may suddenly pull right to make the exit or a driver in the exit lane may change his or her mind and suddenly veer left back onto roadway.

2. Give extra space to parked cars. Someone may step out of the car or from between parked cars. Or, a parked car may start to pull out suddenly.

3. Open up space between vehicle and oncoming cars.

   - If possible, stay out of the lane next to the center line.
   - This leaves drivers more room to avoid an oncoming car that suddenly swerves toward them.
   - It is very important at intersections, where another driver could turn left without giving a signal.
   - If drivers must drive in lane bordered by a center line, "cheat" somewhat toward the right side of the lane.

4. Make room for cars entering freeways. If driving in the right-most lane, and there is room in the adjacent lane, switch to the adjacent lane. Drivers also should do the same, if possible, for vehicles whose lane will end shortly.

Never try to "share" a lane with people on motorcycles, mopeds or bicycles. Two wheeled vehicles are more unstable and may wobble in lane. They need the whole width of the lane to operate safely.

Splitting The Difference

Sometimes there will be dangers on both sides of the car. For example, there may be parked cars to the right and oncoming cars to the left.

- In these situations, the best thing to do is "split the difference." Steer a middle course between oncoming cars and parked cars.
- If one danger is greater than the other, give more room to the worse danger.
- An example: there are oncoming cars to the left of a vehicle and a child riding a bike to the right. The child is the greater danger; more likely to make a sudden (and unsafe) move and be unprotected from injury. In situations such as this, the driver should move away from the greater hazard,maintaining a narrower than usual space cushion on the side of the lesser hazard.

Separating Hazards

When drivers face danger on both sides, they don't always have to steer between them.

- Sometimes, drivers can separate these hazards by adjusting speed.
- This will allow drivers to take the dangers one at a time.
- Example: There is only one oncoming car to the left and a child on a bike to the right. Instead of driving between the car and the bicycle, the driver can reduce speed and let the oncoming car pass, then move to the left to allow extra room to the right when passing the bicyclist.

Space Behind

The most difficult part of space management is controlling the amount behind the vehicle. It is more difficult for drivers to control the following distance of those behind them than it is to control their own following distance.

Keeping Space Behind

Drivers can help the motorist behind keep a safe distance by:

- Driving at a steady speed
- Not stopping or slowing suddenly without warning the driver behind (tapping brake)
- Getting out of the stream of traffic if it becomes necessary to slow down or stop.

Dealing With Tailgaters

Drivers will often find themselves being tailgated. The impatient tailgater jeopardizes both himself and the vehicle ahead, because he has left an inadequate space cushion in which to stop.

- The first rule for handling tailgaters is: don't make the situation worse. Drivers should not flash their brake lights or turn on the tail lights to make tailgaters think they are stopping.

- When tailgaters realize they have been tricked by false light signals, they may attempt to retaliate by following even closer.

- Drivers also should not speed up, in an attempt to open space between them and the tailgater. The tailgater will usually keep pace, with the end result that the driver is still being tailgated, only at higher speeds.

- The best way to handle a tailgater is for the driver to let the tailgater pass.

  --If the driver can switch to another lane, he should do so.

  --If traveling on a 2-lane road or if traffic in adjacent lanes prevents a lane change, the driver should gradually slow the vehicle by lifting up on the gas pedal. This will make it easier for the tailgater to pass.

- If the driver can not provide an opportunity for the tailgater to pass, the best move is to pull off the road (when it safe to do so) and let the tailgater go by.

Sharing Space

Drivers must learn to judge how much space they need to cross lanes of traffic, merge and exit from traffic and pass other vehicles. In making any of these moves, drivers must yield the right-of-way to other vehicles. The challenge is to find and use enough space to keep their movements from interfering with others.

Space To Enter

When entering a stream of traffic at an intersection, drivers must select a gap large enough to give them time to turn and get up to speed. They will need a gap that is:

- About a half block on city streets

- The equivalent of a full block on highways

Space to Merge

When merging with other traffic, drivers will need a gap of 4 seconds.

- That will give both the driver and the car behind a 2-second following distance.

- Drivers must find a 4-second gap whenever they change lanes, or enter a freeway from an entrance lane, or merge with another road.

- If drivers must cross several lanes, they should take them one at a time, filtering through traffic slowly. If drivers stop to wait until there is a 4-second gap in all lanes, they will tie up traffic and may cause collisions.

Maintaining space in a merge is a matter of having the right speed.

- Drivers entering expressways are in danger of being hit from behind by two sources. If they slow down too much on the entrance ramp, they may be rear ended by drivers who are concentrating on scanning the expressway looking for an entry gap in traffic.

- If they fail to get up to the speed of expressway traffic by the time they merge into the expressway lane, they run the risk of being rear ended by vehicles already on the expressway.

- The key to successful space management in entering expressways is to start watching expressway traffic as soon as possible.

- Drivers must begin scanning the expressway while they are on the ramp, so they will have plenty of time to find a good gap in the traffic.

- Drivers must enter the expressway at highway speed. As soon as drivers gets on the entrance ramp, he should begin to build speed so that by the time he is ready to enter the expressway he'll be going as fast as the other traffic (reducing speed conflicts). The drivers who enter traffic too slowly are setting themselves up to be rear-ended.

- To reduce potential speed conflicts, drivers must not slow down at the end of the ramp. If they must slow, they should do it before reaching the end of the ramp. That way, they'll still have space ahead to speed up before getting onto the expressway.

- If drivers do slow on the ramp, they must be sure to watch for traffic behind and tap the brake lights to warn it that the vehicle is slowing early.

Sometimes, drivers will have to slow at the end of the ramp.

- This might happen because the driver ahead on the ramp suddenly decides to stop or because someone on the freeway changes lanes and ends up in the gap the driver was planning to enter.

- In such situations, the driver must wait for a very big gap before trying to merge with the high speed traffic on the expressway. It will take the driver a great distance to build up speed that matches traffic flow.

Space To Cross Traffic

- When crossing through traffic, drivers must have enough room to get all the way across.

- Stopping half way across is only safe if there is a median divider large enough to "hold" the car.

- Before entering the intersection, the driver must make sure that there are no obstructions (other vehicles or people) blocking the path ahead.

- It is very dangerous to be "caught" in an intersection with traffic bearing down. This is why it is against the law to enter an intersection if the move will result in blocked traffic.

Even if drivers have a green light, they should not start across is cars block the way. The light may change before the cars can clear out.

Drivers should never assume that others will share space with them.

- Just because an approaching car has a turn signal on and is slowing down does not mean the driver will turn at the intersection. He may plan to turn just beyond the intersection, or the signal may have been left on from an earlier turn. This is particularly true of motorcycles. Signals on most motorcycles don't cancel automatically.

- Drivers must wait until others actually start to turn before moving into traffic.

Turning Off Other High Speed Road

- As drivers expect others to continue going straight, making right or left turns on high speed roads is always dangerous.
- If a right- or left-turn only lane is available, drivers should use it. Enter this restricted lane at the place where it begins.
- As is the case with expressway exits, drivers should try to maintain the prevailing speed until they have entered the turn-only lane.

[Visual 13 (Median Protection) may be used here.]

- On divided highways where no left turn lane is available, drivers can protect their space behind by pulling their car into the median space. This is the best place to slow down or stop, while checking traffic coming the other way, as the median will "cover" the car.

Space To Pass

Passing another vehicle is always dangerous because the passing vehicle must go through the other driver's blind spot at relatively high speed with a very narrow cushion of space to the side. Passing on a 2-lane road is one of the most dangerous maneuvers in driving. Before deciding to pass, the driver must consider:

- Oncoming cars. At highway speeds, (50-55 mph), drivers need over 1600 feet (about 1/3 mile) to pass safely. It is hard to judge the speed of oncoming cars that far away. They don't seem to be moving as fast as they really are. A car that far away generally appears to be standing still. If a driver can really see an oncoming car coming closer, it is probably too close for the driver to begin to pass at highway speeds.
- Hills and curves. To be sure that there is no oncoming traffic within a third of a mile, drivers must be able to see at least a third of a mile ahead. Any time their view is blocked by a curve or a hill, they must assume an oncoming car is just out of sight. Drivers should treat curves or hills as they would an oncoming car. This means they shouldn't start to pass if they are within a third of a mile of a hill or curve.
- Where roads cross. It's dangerous to pass where someone is likely to enter or cross the road. Such places include cross roads, railroad crossings and shopping center entrances. When passing, the driver's view people, cars, or a train is blocked by the car being passed. Also, a driver turning into the oncoming lane won't expect to find a car there moving in the opposite direction. The turning driver may not even have checked for this possibility before pulling out.
- Lane restraictions. Before passing, the driver must look ahead for road conditions and traffic that might cause other vehicles to move into the intended path. Drivers might lose their space for passing because of people or bike riders near the road, a narrow bridge, or an obstacle in the other lane (patch of ice, broken pavement, tree branch).
- Space to return. A driver should never pull out to pass unless he/she knows there is enough space to return. Pass only one car at a time. Before returning to the driving lane, a driver must be sure to leave enough room between self and the car being passed. One way to do this is to look at the passed car in the rearview mirror. When the driver can see both headlights passed, there is enough room to return to that lane.
- Signs and markings. No-passing signs and markings have already been reviewed. Iowa law requires drivers to complete their pass before reaching the beginning of a "no passing zone." Drivers who are still in the left lane when they reach a "no passing zone" are breaking the law.

Space And Emergency Vehicles

Most drivers think the main reason the law requires drivers to pull to the right and stop when they hear a siren or see flashing lights is to clear a path for the emergency vehicle so it can get by quickly. Actually, the most important reason for this right-of-way law is that emergency vehicles travel at high speeds and, consequently, are hard to control in tight spots. Emergency vehicles need a very big cushion of space. By squeezing to the sides of the street, drivers give the emergency driver the large cushion of space needed to maneuver safely.

Extra Space to Drivers Who Need It

- Drivers need to give a wide berth to certain categories of people who constitute a danger.

- People Who Can't See

Other drivers and pedestrians whose view is blocked may enter a vehicle's path because they don't know the vehicle is there. Drivers must constantly be on the lookout for others who will have trouble seeing them, such as:

- Drivers at intersections or driveways whose view is blocked by buildings, trees or other cars

- Drivers backing out of driveways or parking spaces

- Drivers whose windows are blocked with snow, ice or loads

- Drivers of large, solid-body vehicles like vans and delivery trucks

- People with umbrellas in front of their faces or hats pulled down low

- People whose view is blocked by other traffic, parked cars, busses or other large vehicles.

When drivers spot these clues, it is best to send an "I am here" message with the horn.

People Who Are Distracted

- People may fail to see a driver even though he is in full view if their minds are on something else. Drivers must be on the lookout for distracted people such as:

- People making deliveries

- Construction workers

- Children, who often run into the street without looking

- People who are gathered around or passing something unusual (e.g., a disabled vehicle)

- Drivers or pedestrians who are talking to each other, tending to children, looking at maps or are otherwise preoccupied.

People Who May Be Confused

- People who are confused are very likely to make a sudden move without thinking--or looking. Confused people that drivers must beware of include:

- Tourists, especially at complicated intersections. (Clues to look for: out-of-state license plates, baggage on vehicle)

- Drivers who slow down for no apparent reason. For example, a driver braking on the exit lane of an expressway may have suddenly realized he doesn't want to exit and may jerk back onto the road.

- Drivers looking for a street sign or house.

Drivers Who Are In Trouble

Drivers who make mistakes are drivers in trouble. They may be in trouble because they have been drinking or showing off. Or, they may simply be new to the road or have had some sort of equipment failure. Whatever the reason for the situation, others must get out of the way of drivers in trouble. Drivers must watch out for:

- Others who have lost control of their cars (skidding, swerving off the road, traveling too fast on slick streets)
- Others who pass as they approach a curve or oncoming car. (The driver being passed should slow down and let the passer back into the lane.)
- Drivers who have sudden vehicle failure (e.g., flat tire).
- Others about to be forced into a driver's lane by a car, pedestrian, bicyclist, object in the road or a sudden narrowing of the road.

Parked Cars

Drivers can't assume that parked cars will stay parked. They must keep an eye out for cars about to pull out in front of them. Clues that a car's door may fly open or the car pull out include:

- Someone in the driver's seat
- Exhaust coming from the tailpipe
- Turn signals or brake lights
- Wheels turned toward the street

Slow Traffic

Some vehicles have trouble getting up to speed or keeping to speed. For instance:

Big trucks, cars pulling trailers and small cars often have trouble keeping up speed on long or steep hills. It also takes them longer to build up speed when entering traffic from a side road or expressway entrance ramp

Bicycles and mopeds are slow, and their drivers make unexpected moves.

Certain pedestrians are slower than others, too. Drivers must pay special attention for elderly and handicapped pedestrians.

- [A series of problem-solving visuals may be used here:
- Visual 14 (Lane Drop)
- Visual 15 (Left-Turning Car)
- Visual 16 (Expressway Merge)
- Visual 17 (Entrance/Exit Ramp)
- Visual 18 (Shopping Center)]

UNIT IV: DRIVING ENVIRONMENT

This unit covers handling the complex natural environments in which driving occurs. Instruction is approached from an accident prevention point of view. Contents include adjusting driving practices to compensate for limited traction, limited visibility, and difficulties imposed by night driving. These topics are not addressed as emergencies. Rather, they are addressed as potential emergencies. The unit focuses on how to handle these situations to lessen the probability that they will lead to a true emergency.

INSTRUCTIONAL OBJECTIVES

Knowledge Objectives

Students will know:

<u>Reduced Traction</u>

1. The major environmental factors that reduce traction

2. Speed reduction is the principal way to handle reduced traction situations

3. Procedures for handling common reduced traction situations

<u>Reduced Visibility</u>

1. The major environmental factors that limit visibility

2. The procedures for improving visibility when driving

3. Techniques to compensate for common conditions limiting visibility

<u>Night Driving</u>

1. Safety precautions to take in preparing for night driving

2. The need to adjust driving practices during night time driving

3. Ways of modifying their seeing techniques to improve ability to see at night

4. How they should modify driving practices to compensate for visual limitations posed by night time driving

Belief objective

Students will accept that they seriously increase risk for themselves and others if they fail to adjust their driving to conditions.

Content may be covered entirely through presentation. Group discussions and problem-solving should concentrate mostly on night-driving situations, as these are the most frequently encountered environmental problems. The single greatest night time hazard--over-driving headlights--can be emphasized through visuals and problem-solving.

The "Bad Weather Driving" section of the <u>Iowa Driving Manual</u> is an appropriate home-study assignment.

REDUCED TRACTION

Traction is the affinity that binds tires to the road surface. It is what holds the car to the road and allows drivers to pick up speed, slow down, stop and change direction.

- Traction is reduced whenever there is any foreign substance (e.g., liquids, leaves, gravel) on the road surface. These substances interfere with the bond between the tire and the road. The more (deeper) the foreign substance present, the more traction is reduced.

- The only way to improve traction is to reduce speeds. Lower speeds reduce a vehicle's lateral force and give the tires more time to plow through the surface debris, locate the road surface and bond with the road.

- Tire treads are designed to gather water and other debris and channel them away from the road surface. This serves like a windshield wiper, clearing away debris to provide for an adequate bonding.

- Snow disrupts traction more than water because it is denser. This makes the tire work harder to fight through and achieve traction with the road. Ice is especially dangerous as it forms a complete barrier between the tire and the road. Like glass, ice has virtually no bonding qualities.

Anticipating Reduced Traction

To cope with reduced traction conditions, drivers must know where and when these conditions are most likely to occur and how to compensate for these conditions.

- Areas shaded by large, permanent objects, such as buildings, trees, or overpasses, can provide less traction than the rest of the road. This is because rain or snow tends to linger in these areas longer. In cold weather, these locations tend to freeze first and thaw last because of the cooler temperature provided by the shade.

- Bridges and overpasses also are very dangerous. They tend to be the first sections of the road to freeze because they receive no "retained" heat from the ground below. Elevated, curved ramps are particularly dangerous because the front tires will need to have good traction to force the car to make the curve.

- Road surfaces are often slippery on hot days, just after a rain has begun to fall--especially if it hasn't rained for a while.

--For the first 10-15 minutes, the rain combines with oil from asphalt and cars as well as with dirt, dust and rubber on the pavement, to create a very slick mixture.

--Busy intersections are especially hazardous because this is where vehicles tend to stop for longer periods of time (waiting for light changes or gaps in traffic), leaving more "gunk" on the roads.

- Wet roads are most dangerous when the temperature is hovering near the freezing point. At temperatures of 30-34 degrees, water and ice combine to form the slipperiest mixture of all.

Adjusting For Reduced Traction

To handle reduced traction situations safely, drivers must use the best (most traction-bearing) path available, lower their speeds, increase the normal space cushion, and minimize changes in speed and direction.

Find The Best Path

If faced with a low traction area such as a body of standing water or an icy patch, drivers should try to go around this area, if at all possible. If drivers cannot skirt the hazard, they should try to pick the best path through the hazard.

- On wet roads, drivers should try to place their tires in the tracks left by the tires of vehicles ahead. The tires of the preceding vehicles will have already swept away some of the water from these paths, leaving the driver's own tires with less water to plow through.

- In snowy conditions, drivers will be better off steering into loose snow, out of hard packed snow grooves.

Reduce Speed

The single best way to improve traction is to reduce speed. Reducing speed gives the tires more time to sweep away whatever substance is causing the loss of traction.

Drivers should try to match their speeds to the degree of traction afforded. General rules of thumb:

- On wet roadways, cut speed by 15% (about 5 mph in city travel, about 10 mph on highways)
- On snow covered roads -- cut speed by half
- On icy roads, slow to a crawl.

As icy roads provide virtually no traction, the best speed is 0. Drivers shouldn't drive on ice unless absolutely necessary.

Increase Space

It will take vehicles longer to stop in reduced traction conditions. Therefore, drivers must increase the normal following distance to avoid rear ending others.

Space Ahead

Drivers should increase the 2-second following distance to a 3-second distance on rainy roads and a 4-second distance on snowy roads.

Space When Stopped

Drivers should also maintain extra space between their cars and the vehicle ahead when stopped.

- Instead of stopping one car length behind the vehicle, they should wait two lengths behind. In the event that the driver's rear ended, this will prevent the driver's vehicle from being pushed into the vehicle ahead.
- It is especially important to leave this much space behind a vehicle ahead when that vehicle is stopped on an upgrade. On snowy roads, the force of gravity may send the vehicle downhill, into the driver behind.

Space to the Sides

Drivers must also be extra protective of their space cushions to the sides.

- On slippery surfaces, vehicles in adjacent lanes may skid, sending the rear of their vehicles into the driver's lane.
- Not only should they avoid driving next to vehicles, they should drop well back of vehicles in adjacent lanes to give the other driver plenty of time (space) in which to recover from a potential skid.
- To open up space to the sides, drivers should always slow down--never speed up--in reduced traction situations.

Minimize Changes In Speed/Direction

Maintaining speed and direction is especially important when traction is low. Every time a driver turns, accelerates or brakes, the bond between tire and road is momentarily weakened. This increases the chance of the wheel spinning and the car sliding out.

Speed Changes

All changes in speed must be made gently.

- Drivers must accelerate slowly and brake lightly.
- Waiting for and maintaining extra large space cushions will give drivers the room needed to stop more slowly and will give the tires more time to build traction.
- To slow on slippery surfaces, drivers should first reduce speed by easing up on the accelerator. Brakes may be applied later.
- Brakes should never be jammed on, as this will increase stopping distance. When brakes are jammed on in low traction conditions, there's a greater chance of brake lockup. Non-turning wheels cannot sweep the road surface as well as turning wheels.
- After first decelerating by easing up on the gas, drivers may begin to brake lightly, gradually and steadily increasing pressure to come to a full stop.

Direction Changes

Drivers must also try to minimize changes in direction. Any change in direction (e.g., switching lanes, taking curves, turning) increases the demand for traction from the front tires. Wet or snowy roads may not be able to provide enough traction to accommodate the maneuver.

- The more severe the desired change in direction, the greater the demand on front-tire traction. To accommodate the demand, drivers should change direction as slowly and as gradually as possible.
- Drivers must remember that each time they change direction, they increase their chances of losing traction and sliding out. The more changes in direction they make, the more chances of sliding they take.

Hydroplaning

If drivers drive much too fast on slippery roads, they can end up water skiing on four wheels. This phenomenon is called "hydroplaning."

- It occurs when the tires are moving so fast or the rain is so heavy that the rubber cannot make any contact with the road.
- In this situation, the tires are actually riding on a film of water.

Causes of Hydroplaning

Excess speed causes hydroplaning.

- Most tires can wipe water from the road at speeds of up to 35 mph.
- The higher above 35 mph the car goes, the less complete a job the tires can do of wiping the road.
- In a very heavy rain, tires can be completely overwhelmed by the water, losing all contact with the road at 50 mph.
- Hydroplaning can occur well below 50 mph on vehicles equipped with bald or nearly bald tires. It is, after all, the grooves in the tires that channel the water off the road.

Hydroplaning and Traction

When a car is hydroplaning, the tires provide no traction. This leaves the driver with absolutely no control over the car.

- Drivers cannot change direction or stop when hydroplaning. If the car was not completely straight when the hydroplaning began, it can go into a severe skid.
- A gust of wind will be sufficient to knock a hydroplaning car into a skid.
- What makes hydroplaning so dangerous is that drivers don't realize they are hydroplaning until they try to turn or stop and find the car will not respond.

Avoiding Hydroplaning

Drivers can reduce the chances of finding themselves in a hydroplaning situation by taking care of their tires.

- Tires should be properly inflated with adequate tread available. (The shallower the tread, the less water the tire can channel away.) Drivers can check tire tread with a Lincoln penny. Stick the penny into the tread "head first." If the tread does not at least touch the top of Abe's head, the tire should be replaced.
- Once the driver's on a wet road, the only way to prevent hydroplaning is to be sure to drive at a moderate speed. This gives the tires a fighting chance to achieve traction.
- Drivers should also open up extra following distance if they are behind a large truck. The truck tires are set further apart than a car's and channel extra water into the tracks that the car's tires will follow.

Signs of Hydroplaning

Sometimes tires will warn a driver that hydroplaning is imminent.

- If the tires make a sloshing sound, this is a cue that the tires are riding more on the water and less on the road.
- Drivers cannot count on their tires to give them this warning, however. It is not an easily identifiable sound and few drivers can interpret it correctly even if they hear it.
- The failure of the vehicle ahead to leave a true track is hydroplaning. Drivers following at the same speed may also be hydroplaning.

Stopping Hydroplaning

Drivers who find themselves in a hydroplaning situation, must ease off the accelerator until traction returns.

- Drivers must not brake until traction has been restored. Using the brake can throw the car into a skid.
- Drivers should also avoid turning the steering wheel. If they cause the car to change direction, even slightly, they could start a skid.

REDUCED VISIBILITY

Environmental factors such as frost, ice, rain, fog, temperature differences and sun glare can reduce visibility.

Maintaining Visibility

The first rule for improving visibility in these conditions is to keep the windows as clear and clean as possible. Drivers should scrape frost and ice from all windows before driving.

Defrosters

They should use the defroster to help loosen ice on the front windshield.

- This will also allow them to free the wipers more easily, reducing the chances of damaging the wiper blade with the scraper. Damaged blades do not clear the windshield completely, leaving streaks which reduce visibility.

- Drivers should also know to keep the defroster on in very cold weather. This will keep condensation from forming on the inside of the windshield, and if it's storming out, keep ice from reforming on the windshield.

Windshield Wipers

Whenever it is raining or snowing, drivers should use their windshield wipers.

- The driver should set the wiper speed to match the intensity of precipitation.

- They should also use the windshield washer (if available) to keep the windshield clean of debris (dirt, oil, salt, etc.) kicked up by other vehicles on the road.

Condensation

If condensation forms on the interior of the windows, drivers must wipe it off.

- They should not use their hands, as the grease may leave streaks. Rather, they should use a clean cloth or tissue. Drivers must be sure to keep this cloth in arms reach, so they will not have to take their eyes off the road to "hunt" for it while driving.

- To prevent condensation build up, drivers should try to minimize moisture inside the vehicle.

- Using the defroster is the best way to do this, although this will often not prevent condensation from forming on the side and rear windows.

- To prevent the build up of condensation on these surfaces, drivers may need to open the vents.

Compensating For Reduced Visibility

Since drivers can't control external factors such as rain, fog, or glare, they must compensate by adjusting their driving practices. In general, drivers must adopt the same practices required in reduced traction situations:

- Reduce speed

- Increase space cushion.

- Use headlights

- Signal speed changes

- Use lane delineators

Reduce Speed

The major reason to drive more slowly in reduced visibility situations is that drivers will need more time to search for and identify potential hazards accurately.

- Drivers must be sure to select a speed that allows them to stop within the distance at which they can see objects clearly.

- Driving slowly gives them the extra time needed.

Increase Following Distance

Low visibility conditions require greater following distances because drivers cannot see ahead as far as they normally could.

- Drivers may be able to see only the vehicle ahead rather than what is happening with traffic further down the road.
- Since they can react only to the actions of the car immediately ahead, they must leave themselves more space in which to make the appropriate response.

Increase Space to the Sides

Drivers need to maintain extra space to the sides:

- When drivers have difficulty seeing, their natural tendency is to concentrate on the road ahead.
- In that situation, drivers will often forget to check their blind spot before changing lanes. Drivers do not want to find themselves trapped in such driver's blind spots.
- Additionally, the blind spot may be bigger than usual, if the other driver has failed to clear frost or snow from the side and rear windows or the side mirror.

Increase Headlights

When driving in fog, snow, or very heavy rain, drivers will need to use their headlights to see and be seen.

- In these conditions, low beams are more effective than high beams.
- The light from high beams will bounce off of fog or sheeting rain and back into the driver's eyes. This creates a self-imposed glare which reduces their ability to see.
- The high beams might blind drivers ahead (either oncoming cars or those traveling in the same lane), causing them to lose sight of the road and crash.

Signal Speed Changes

Drivers should also make a point to signal changes in speed.

- This is especially important when reduced visibility is combined with reduced traction, as others in the road will need the extra time to adjust to the change smoothly.
- The flashing lights (either turn signals or tap brake lights) are especially valuable in low visibility conditions because they are more eye catching than a hand signal or a solid brake light.

Lane Delineators

Drivers should use lane markings in reduced visibility conditions.

- These can be a valuable reference point in very heavy fog to help drivers keep the car within the lane.
- Checking the lane markings will force the driver to stop staring ahead, helping the driver resume a normal searching pattern.

Stopping

In a very heavy downpour or dense fog, it may be impossible to see well enough to drive at any speed. If this happens, drivers should pull off the road and wait until visibility improves.

Handling Glare

When driving into low sunlight, it can be very hard to see obstacles that may be on the road. In addition to reducing speed and increasing the space cushion, drivers should take action to reduce the amount of glare assaulting their eyes. These actions include:

- Adjusting sun visor so that shadow comes just below the eyes (a lower shadow line means that the visor has been dropped down too far, needlessly restricting the driver's field of vision). Visors can be swung over to cut down on glare from the side, as well.
- Wearing polarized sunglasses. Polarized lenses will eliminate glare, while unpolarized lenses dim the intensity of the glare only slightly.
- Looking away from the sun. Drivers should try to avoid looking directly at the sun by lowering their eyes or looking to the side. Squinting can also improve matters. However, drivers must be aware that all of these actions restrict their field of vision and should be accompanied by an even greater reduction in speed.

NIGHT DRIVING

Darkness presents drivers with the same visibility problems associated with fog and heavy rain. The major difference is that nighttime is predictable. Since everyone knows when night will come, drivers have no excuses for being unprepared to drive safely at night.

Problems of Night Driving

Like other reduced visibility conditions, nighttime driving increases the demands placed on eyes. Drivers must force them to work harder to see. Specific visual capabilities taxed at night include:

- Night vision -- the ability to see in low levels of light. The ability to see well at night varies from driver to driver. But no one, not even a cat, can see as well at night as during the day.
- Glare resistance -- the ability of the eye to continue seeing when "overdosed" with light. In darkness, the eye's pupils widen to allow more light to enter the eyes. When widened pupils suddenly receive a burst of light (from headlights or other sources) the pupils cannot contract fast enough, allowing drivers to see only light rather than objects.
- Glare recovery -- the ability to regain normal vision in prevailing light, once the glare is over. Essentially, this is the reaction time of the pupil--how quickly the eyes can "digest the overdose of light" and start to widen pupil again.

The greatest cause of nighttime crashes, is not driver's being blinded by others headlights. The greatest reason for nighttime crashes is drivers overdriving their own headlights--i.e., driving so fast that they are unable to stop within distance at which they can see objects clearly.

Preparing To Drive At Night

Drivers can reduce the risks of nighttime driving before starting the car by taking steps to assure that their eyes will be able to receive as much light as is available.

- Avoid using tinted eye glasses. Tinted lenses reduce the amount of light available to the eyes. At nighttime this only makes a bad situation worse. Sunglasses should be avoided at all costs. Lenses with "adjustable tint" should be avoided if possible. Even when "clear," adjustable lenses have a residual tint.

- Clean and check headlights. Dirty lenses on headlights can reduce the amount of light they will throw on the road by as much as 90%. Headlights should be cleaned weekly; more frequently, if driver has been operating on dirty, muddy, salty or wet roads. Driver should also make sure that all headlights are working. It is illegal and unsafe to drive at night with only one headlight working. One headlight does not provide enough light to allow the driver to see clearly within the distance needed to stop at even low (city driving) speeds.

- Make sure both high and low beams are working. Low beams allow drivers to see clearly only about 100 feet ahead. Drivers will be overdriving low beams at speeds of 30 mph or more, absent other sources of light. High beams allow drivers to see only about 250 feet ahead. Unless other light sources are available, drivers will be overdriving their high beams at speeds in excess of 50 mph. [Visual 19 (Overdriving Head Lights) may be used here.]

- Verify that the high-beam indicator light works. The light reminds drivers when they are using high beams.

- Set the rearview mirror at "night" setting. This setting reflects headlights from vehicles behind away from the driver's eye. The effect is like putting sunglasses on the mirror.

- Adjust instrument panel lights. Instrument panel should be at the dimmest setting at which the driver can still read the instruments. Lights from the instrument panel do not help the driver see what's going on in or near the road. However, instrument panel lights can bounce off the windshield, creating interior glare. Also, light inside the vehicle will cause the pupils to restrict. Drivers want to keep their pupils dilated, to see far out into the night.

- Clean windows. Dirty windows not only reduce the amount of light that can get through the windshield, they diffuse (spread) glare from oncoming headlights, making a normal glare situation even worse.

- Don't smoke. Smoking leaves a film on the windshield, inhibiting vision and diffusing glare. Additionally, carbon monoxide in the smoke impair night vision and slows glare-recovery time.

Night Driving Techniques

As in other reduced visibility situations, night driving requires drivers to reduce their speed and maintain a larger cushion of space around their vehicles. Additionally, drivers must know how to use their headlights properly and how to deal with headlight glare.

Headlight Use

By law drivers must use their headlights from sunset to sunrise or whenever visibility is 500 feet or less.

- Since high beams allow drivers to see clearly further down the road, they should use high beams whenever it is safe to do so.

- It is unsafe, and illegal, to use high beams when an oncoming vehicle is within 500 feet of the driver, or the driver is within 200 feet of a car ahead

- Failure to switch to low beams in these conditions may "blind" oncoming drivers or drivers immediately ahead. If these drivers are blinded, they may lose track of their lane and have an accident.

- Switch to low beams whenever overtaking another vehicle. High beams could blind a driver when reflected off the side mirrors.

- Switch to low when approaching the crest of a hill. Assume that an oncoming driver is just beyond the crest.

- Refrain from using high beams on city streets. When not going more than 30 miles an hour, drivers don't really need the extra light. Additionally, light is usually available from other sources (streets lights, neon signs, etc.). While high beams won't help a driver see better on city streets, they may blind others, including those waiting to cross at intersections.

Handling Glare From Oncoming Vehicles

If blinded by high beams from an oncoming vehicle, driver should:

- Flash headlights off and on, very quickly, a couple of times. Often, drivers who have forgotten they are on high beams will respond quickly by dimming their lights. Drivers should not switch on their high beams to get the other driver's attention. This may blind the other driver, doubling the risk (two blinded drivers rather than one).

- Reduce speed. Their eyes will need time to recover from glare. While the eyes are recovering, the driver will want to cover as little ground as necessary.

- Look away from lights. Squint and focus eyes along the right side of the lane. Drivers can use lane markings, the curb, or the shoulder edge as a reference point to help keep in lane.

Handling Glare From Vehicle Behind

If blinded by the lights from a car behind (via the rear view mirror), the driver should:

- Respond by flicking headlights off and on quickly. This will encourage drivers to either switch to low beams or drop further back. Even if the driver behind does not take the hint, it will alert him or her to the fact that the flashing driver intends to do something.

- If the glare situation persists, the "something" that should be done is to slow down, encouraging the driver to pass and get the source of the glare out of the way.

- Until the driver behind has completely passed, the blinded driver should avoid staring at the rearview mirror. As the driver is passing, avoid staring in the side mirror.

Space Cushion

In addition to driving slower, drivers should maintain larger space cushions at night.

- Little more than the lights of other vehicles are visible. Darkness hides the surroundings, depriving drivers of the reference points their eyes need to judge speeds accurately. Without these reference points, the eyes require more time to determine how quickly vehicles are stopping or approaching.

- Maintaining a 3-second following distance will give the eyes time to determine how quickly vehicles are stopping. Drivers should also wait for extra wide gaps in traffic before attempting to cross or merge.

- Passing should be kept to a minimum--especially on 2 lane roads. Not only is it extremely difficult to tell how fast oncoming traffic is approaching, but the driver runs the risk of blinding the driver of the car being passed, via the side view mirror. Passing on high speed roads is not a good idea either.

- Drivers should remember that if they have to go above 50 mph to pass another driver, they are overdriving their own headlights (high beams).

Others' Tail Lights

One way to partially offset the loss of visual input from objects clothed in darkness is to make the most of what is quite visible at night driving--the tail lights of other vehicles.

- Drivers can use the tail lights to help judge their closing rate. As a driver gets closer to tail lights, they will appear to get larger and further apart.
- By tracking the tail lights of others, drivers can also get an early warning of problems, as yet unseen, on the road ahead. If the tail lights (vehicle) ahead make a sudden lane change, it may indicate something is blocking the lane ahead.
- If the tail lights start bobbing up and down, the driver can prepare for a rough road--potholes or debris.

UNIT V: CRITICAL SITUATIONS

This unit covers emergencies induced by roadway factors, vehicle malfunctions and driver errors. The unit focuses on how to handle the emergencies (causes and responses), not how to prevent them from occurring. Specifically, instruction covers how to regain control of a vehicle, how to avoid collisions and how to respond to vehicle failures. The unit concludes with instruction on how to control the scene of an accident.

INSTRUCTIONAL OBJECTIVES

Knowledge Objectives

Students will know:

Skid Recovery

1. Procedures for handling vehicle skids

2. Procedures for returning to the roadway after running off the travel lane.

Evasive Responses

1. Procedures to follow in making evasive maneuvers (quick acceleration, quick stop, quick turn).

Vehicle Failures

1. Common vehicle failures which drivers must handle immediately

2. The most critical procedural elements to follow in responding to vehicle problems.

Controlling Accident Scenes

1. The basic procedures for protecting an accident scene

2. The need for, and limitations of, their providing first aid

3. The need to obtain emergency medical services quickly.

Attitude Objectives

Students will accept that:

1. They can act in an emergency situation to avoid or reduce the consequences of a collision

2. Improper acts can worsen an accident situation.

> The entire unit can be covered through presentation. Visuals (especially film or video) can be useful in communicating the rapidity with which evasive responses must be executed and the dynamics of steering input/vehicle response in the maneuvers.

SKID RECOVERY

Drivers may find their vehicles starting to skid whenever they drive too fast for conditions.

Causes of Skids

There are three basic causes of skids:

- Overacceleration--drive wheels spinning too fast to maintain adequate traction with the road surface. In a rear wheel skid, the rear wheels have less friction than the front wheels and so move faster.

- Oversteering--occurs when driver turns vehicle too severely for the vehicle's speed. In this situation, the rear of the vehicle wants to continue in a straight line. When it overcomes the side (turning) force of the front tires, it does. A speed of 5 mph may be too fast on icy roads, creating an oversteering situation.

- Overbraking--braking too hard can lock the wheels. Since locked wheels produce less traction than rolling, the rolling wheels (with better traction) can overpower them and send the vehicle into a skid.

Correcting a Skid [Visual 20 (Skid Recovery) may be used here.]

To correct a skid, drivers should:

- Stay off the brake. Hitting the brakes may lock the wheels and make the skid worse.

- Ease off the gas pedal--to reduce speed, helping tires get better traction.

- Turn the steering whell quickly in the direction they want the car to go. In turning the wheel, drivers should consciously oversteer to get the rear end going in the proper direction.

- Quickly countersteer--to keep the rear end from skidding out in the opposite direction. Drivers should commence countersteering as soon as the car starts to line up. If they wait until the car has straightened out before countersteering, it will be too late to keep the rear from continuing in the opposite direction.

- Continue to correct steering, right and left, until the vehicle has completely recovered from the skid.

Off Road Recovery

Many accidents occur when drivers who have gone onto a shoulder (either deliberately or inadvertently) attempt to get back onto the roadway.

Hazards

- The front wheels have difficulty climbing over the edge of the pavement.

- The driver will turn the steering wheel at a rather sharp angle, so the tires will face the edge "straight on."

- Since the shoulder material provides less traction than the roadway, the driver must accelerate hard to force the front tires over the edge.

- When the drive wheels get onto the roadway, they find better traction. The result is a slingshot effect, which may carry the car across the lanes of traffic at the angle of entry.

Techniques

To return to the road safely, drivers should:

1. Allow the car to slow as much as possible before trying to get back onto the road. Bring the car to a complete stop if there is enough room.

2. Turn steering wheel sharply to the left, so that the left front wheel will drop over the edge of the pavement (when the driver is ready, not unexpectedly).

3. Be prepared to turn the wheel sharply to the right as soon as both front wheels are on the pavement. Driver should execute both turns as a single "left-right" maneuver.

EVASIVE RESPONSES

True emergencies should arise only rarely for drivers who maintain good seeing, speed management and space management practices.

Even careful drivers can find themselves in emergency situations created by others who are not looking or controlling their speed properly.

Because true emergencies seldom occur, most drivers are not well prepared to handle them.

- Handling them safely requires rapid analysis of the situation and selection of the correct response.
- It requires that the responses be executed quickly. Unfortunately, crash avoidance maneuvers require skills that are seldom used.

Common Errors

The most common errors drivers make in situations requiring evasive maneuvers:

- Failure to respond -- The driver just "freezes" at the wheel.
- Overbraking -- This locks up the wheels; the reduced traction from locked wheels increases stopping distance and may send the vehicle into a skid.
- Failure to select proper maneuver -- Driver hits brake, when situation more easily evaded by another maneuver.

The three best ways to avoid collisions are: stop quickly, turn quickly, or accelerate quickly.

Emergency Stop

Stopping can be an excellent response to emergencies ahead because (1) it reduces speed, buying the driver time to prepare for another maneuver, and (2) it will reduce the force of impact (lower speeds equal lower impact forces) with object that may be hit.

Stopping Technique

To execute an emergency stop:

1. Apply the brakes quickly

2. Push hard until wheels are just on the verge of locking

3. Quickly release the brake, then immediately push down again, hard, until just shy of the lock point.

4. Continue this pumping action until the car comes to a complete stop.

Brake Application

The key to a quick stop is to apply the brakes until they are just short of lockup.

- It is at that point where brakes provide their maximum stopping power.
- If the wheels do lock, the driver cannot control the direction of the vehicle or stop as quickly as when the tires are rolling.

- The driver must release the brakes until the wheels begin rolling again, then resume braking.

- Drivers should realize that the pumping action is not the goal, but rather the result of overapplication of the brakes.

- Ideally, the driver should brake until just short of lock up and keep brakes in that position--eliminating the need to pump.

Emergency Turn

While stopping is the most natural response, it is not always the best response.

- It is hard to judge space available in a split second. There may not be enough space to stop.

- Stopping requires more open space than a quick turn. After all, a quick turn requires the driver to move only eight feet to the left or the right.

- A quick stop may be a poor option if the driver is being tailgated. In this situation, drivers may avoid hitting the vehicle ahead, only to find themselves rear ended.

- Emergency turns require less space ahead than emergency stops because it does not leave the tires working diametrically opposed to the forward motion of the car. Additionally, turning gives drivers two options--they can go either left or right--versus the single option provided by an emergency stop.

Direction of Turn

- A quick turn to the left can be dangerous. Unless the driver's pre-emergency scanning has indicated that there will be no conflict with traffic from either direction in the left lane, a driver may avoid a crash ahead only to pull into a crash to the left.

- Drivers who do not have time to stop or room to turn left, may still be able to turn to the right. It would be better to run completely off the road than to hit another car.

Hand Position

To make an emergency turn, the driver's hands must be in the correct position on the steering wheel.

- The only way to make an emergency turn is for the hands to be in the 3 o'clock/9 o'clock position as a full turn of the wheel is necessary.

- This is why drivers should always have their hands at these positions. That way they are prepared to make an emergency turn.

Turning Technique [Visual 21 (Emergency Turn) may be used here.]

To make an emergency turn to the left, drivers should:

1. Turn the steering wheel a full half circle (180°) in the direction of the turn

2. "Countersteer" immediately by turning the wheel in a full circle (360°) in the opposite direction. This will head the car back toward the original lane

3. As the car begins to return to the original lane, turn the wheel a full half circle (180°) back to the left, at which point the hands will be in the original position.

4. After returning to the original path, the driver may need to continue countersteering until all skidding is under control.

To turn quickly to the right, driver should simply reverse the process: first making a half circle right, then a full circle left, and ending with another half circle right.

Countersteering

The first two turns (half circle left, full circle right) must be made as one continuous maneuver. Driver must be ready and able to countersteer immediately:

- If make first half-circle turn and don't immediately countersteer, will go into uncontrolled skid.
- If are thrown away from wheel (by force of first half-circle turn), won't be able to recover in time to countersteer.

Braking

Throughout the quick turn maneuver, drivers must keep off the brakes.

- Braking will only reduce the driver's ability to control the skid, especially if the driver has turned onto a soft shoulder.

Quick Acceleration

- up quickly may be the best way to avoid conflicts from the side (cross traffic). Though it is a natural reaction to hit the brakes when a car is spotted approaching from the side, drivers must fight this tendency if there is not enough room to stop.
- To accelerate quickly, drivers should push the gas pedal all the way to the floor.
- If driving a vehicle with manual transmission, the driver should first shift to the next lowest gear and then floor it.

[Visual 22 (Which Maneuver?) may be used here for problem solving.]

VEHICLE FAILURES

The overwhelming majority of accidents are caused because of driver error. Vehicle failure accounts for less than 5% of all accidents. Most types of vehicle failure that result in accidents could have been prevented by regular vehicle inspection and normal maintenance.

Drivers are responsible for maintaining their vehicles in safe condition. After all, if their vehicle lets them down and causes an accident, it's the driver--not the car--that gets the ticket.

Brake Failure

If the brakes suddenly give out, driver should:

a. Pump the brake pedal rapidly and hard, several times. Often this will build up enough brake pressure to stop the car.

b. If pumping doesn't work, apply the parking brake. Be sure to keep hand on brake release, so brakes can be released if the rear wheels lock and the car starts to skid.

c. Shift to low gear and look for place to slow for a stop. This is the least desirable option, as it could force the car to stall on the road. It can be very dangerous if the driver is being tailgated.

Whichever compensating technique is used, the driver must be sure to pull the car completely off the roadway before coming to a stop. After stopping, the driver should call for help. Under no circumstances should the driver try to drive the car to a mechanic.

Flat Tire

A tire can go flat on the road either through a slow leak or through a sudden "blow out." The term "blow out" is somewhat misleading, as many drivers expect to hear a loud pop. Tires can

without making a sound. Even if they do, drivers may not hear it or may think it is coming from some other vehicle.

Cues to Flat Tire

When a tire is completely flat (wheel rim pressing on rubber), the driver will hear a loud "thump-thump-thump." However, tires will often give clues to the driver before thumping begins that they are about to go flat:

- As a front wheel begins to go flat, the steering will start to feel "mushy." The front end may begin to wander.
- As a rear wheel goes flat, the rear end may start to "fishtail."

Procedures for Handling Flat Tire

No matter what the location of the tire, when it goes flat the driver should hold the steering wheel tightly and:

1. Slow gradually by easing the foot off the accelerator.

2. When moving slowly enough, steer the car off the road.

3. Apply brakes when the car has almost stopped.

Drivers must remember that, if they start braking while the car is moving fast, the reduced traction from the flat can send them into a skid.

Steering Failure

In cars with power steering, the steering system will fail if the engine dies. Usually, engine dies as driver slows to make a turn. When this happens, drivers should:

1. Pull hard with both hands on the wheel to complete the turn or to move the car off the roadway.

2. Stop the car. Drivers should remember that they will have to push extra hard if the car has power brakes.

3. Restart the engine.

Stuck Accelerator

If a car does not respond (slow down) when the driver eases up on the accelerator, the driver should:

1. Keep eyes on the road. Don't look at the accelerator.

2. Quickly shift to NEUTRAL.

3. Pull off the road as soon as possible.

4. Turn off the engine as soon as the car has braked to a stop.

Drivers should remember that, if the car has power steering and brakes, turning the engine off while the car is moving will only make it harder to handle. Shifting to NEUTRAL lets the driver use these power options while removing power from the drive axle.

Headlight Failure

If the headlights suddenly go out, driver should:

1. Try the dimmer switch. Low and high beams operate independently.

2. If the dimmer switch does not provide light, try the on-off headlight switch a few times.

3. If flicking the on-off switch does not restore light, turn on emergency flashers, parking lights or turn signals. Some light is better than none.

4. Pull off the road as soon as possible, and leave emergency flashers on.

Hood Latch Failure

If the car's hood suddenly flies up, drivers must:

1. Slow down.

2. Try to peek over the dash and under the hood to see.

3. If there is no gap between dash and hood, put head out window and try to look around the hood. Use the lane marking or center line as a reference for location and lane.

4. Get off the road as quickly as possible.

General Guidelines for Coping with Vehicle Failure

Whatever the type of emergency a driver's vehicle presents, drivers should always follow these guidelines:

- Respond quickly.
- Don't make the problem worse for themselves (e.g., by braking the car into a skid when a tire blows) or for others (e.g., by jamming on the brakes when being tailgated).
- Get off the road as quickly and safely as possible.
- Be sure the problem is corrected before resuming driving.

Drivers who try to "nurse" a disabled vehicle back to their place or to a garage run the risk of having an accident--adding body damage (theirs and the car's) to the cost of towing. Instead of needing just a simple mechanical repair, the vehicle and the driver may be totaled.

CONTROLLING ACCIDENT SCENES

A driver who is involved in an accident or comes upon an accident that others have had is responsible for doing two things:

1. Making sure that the accident does not get worse (i.e., cause another accident), and

2. Getting professional help to control the scene of the accident and provide medical care.

Protecting The Scene

The first responsibility of a driver who is involved in an accident, is to warn others of the problem, so that they can avoid hitting the people and vehicles already involved in the crash.

- To help others realize a crash has occurred, drivers should follow the same procedures discussed in the earlier section on communicating breakdowns: getting the vehicles as far off the road as possible, and setting out flares or warning triangles well behind the crash.

- Activate emergency flashers or any other lights that are still working. If no flares are available, someone should go up the road to warn traffic by waving their arms. (The warner must be clearly visible--e.g., light clothing, flashlight at night--and stand out of the roadway.)

- Driver should remember that, if the crash scene is "hidden" by a hill or curve, the flares, etc., should be placed behind the car on the other side of the hill or curve.

Drivers who have come upon an accident, should stop to help.

- Drivers must be sure to park beyond the crash scene. If they park before the crash scene, their vehicle will obscure the view of the accident by others approaching from behind. Others may not recognize the situation, increasing the risk of a rear end collision.

- By parking behind an accident vehicle, a driver reduces the open space available to drivers coming from the rear that may be needed to steer around the accident.

- In pulling beyond the accident site, drivers should be sure to park off the road, so that traffic passing the accident can get back into that lane as quickly as possible.

Getting Help

After taking these steps to assure that the crash site is protected, drivers should notify emergency services (police and medical) that a crash has occurred. In calling (911 in most locations), drivers should be sure to:

- Identify themselves--so emergency personnel won't mistake it for a crank call.

- Describe the location of the crash as exactly as possible--so emergency personnel can get to the scene without unnecessary delay.

Caring For The Injured

Once drivers have arranged for professional assistance, they should try to care for the injured until that help arrives:

- Drivers should not try to play doctor.

- Their goal should be only to sustain life until the professionals can get there.

- Trying to do too much for the injured may only make their injuries worse.

Yield to Medical Knowledge

If someone else is available who knows more about first aid than the driver, the driver should let the person with the greatest medical knowledge take the lead in helping the injured. Drivers should stay out of the way of people who know more, unless their assistance is specifically requested by those with medical knowledge.

Sustain Life Only

In trying to sustain life, drivers should follow basic first aid procedures:

- Don't move the injured unless it is absolutely necessary. Injured people should be moved only if they are in imminent danger of suffering greater damage. Examples: if gas is leaking from vehicle, there is danger of an explosion; if person is in the road, they may be in danger of being hit by traffic.

- Try to keep the injured from moving themselves. Any unnecessary movement can worsen an injury. Example: if the spine has been injured, additional movement may result in paralysis.

- Keep the injured warm. In an accident, both injured and uninjured occupants are likely to suffer shock, which lowers the heart rate and body temperature. Occupants should be covered with jackets, blankets or whatever comes to hand.

- Try to stop any bleeding. To stop severe bleeding, apply direct pressure to the source of the blood.

- Keep an eye on all victims. Watch those who are obviously injured for any sign of a sudden worsening in their condition. Watch those without any apparent injury, because they may have sustained internal injuries.

All occupants should be kept still and warm until medical professionals can check them out.

UNIT VI: FACTORS INFLUENCING PERFORMANCE AND SURVIVABILITY

This unit focuses on self-protection and the protection of other road users. It emphasizes safety belts as the most effective means to prevent traffic injuries and fatalities. It also addresses factors that influence driver or vehicle capabilities, ultimately affecting the quality of driver performance. The effects of alcohol are emphasized. Drugs, fatigue and emotions also are addressed. The unit concludes with a review of basic maintenance checks that can reduce the risk of vehicle failure.

INSTRUCTIONAL OBJECTIVES

Knowledge Objectives

Students will know:

Safety Restraints

1. The benefits and effectiveness of restraints

2. The fctors relating to dynamics of a crash, especially the concept of the second (human) collision

3. Why restraints are effective

4. Facts that counter arguments against safety belt use

5. They have responsibility for protecting occupants in their vehicles.

Alcohol

1. How the body processes alcohol

2.That alcohol adversely affects the brain and, consequently, the SIPDE process

3. The factors and relationship among factors leading to blood alcohol concentration (BAC)

4. That behavior becomes more affected as BAC increases

5. OWI is a problem, and youth are overinvolved in drinking/driving crashes

6. The major factors which make youth different in the OWI crash pattern

7. Which, and at what BAC level, abilities are adversely effected by alcohol

8. The types of errors made by drinking drivers

9. The legal penalties of OWI

10. How to calculate BAC levels

11. At least 2 methods people may use to limit drinking before driving and to separate drinking from driving

12. Alternatives people may follow to avoid drinking and driving

13. How to recognize signs of overdrinking in others

14. At least one method for intervening in the drinking and drinking/driving of others.

Other Drugs

1. General types of drugs and how they affect human performance

2. The importance of following dosage instructions for prescribed and over-the-counter drugs

3. The kinds of impairment resulting from drugs and the importance of avoiding driving when impaired by drugs

4. The danger of combining alcohol with any other type of drug

5. To avoid driving if alcohol and drugs are combined

6. There are legal penalties for driving under the influence of controlled dangerous substances.

Fatigue

1. Drivers perform more poorly when fatigued

2. At least two measures to follow to avoid fatigue when driving will be necessary

3. At least two ways to prevent fatigue when driving

4. They should not continue to drive if fatigue sets in

5. Signs of fatigue in others as evidenced by driver's behavior and performance.

Emotions

1. General types of emotions and how they may be expressed

2. Their emotions may affect driving abilities and driver performance

3. That emotions can be compensated for or controlled before and during driving

Vehicle Performance Factors

1. Drivers are responsible for maintaining their vehicles in safe operating condition

2. How, and how often, to make basic vehicle maintenance checks.

Belief Objectives

Students will accept that:

1. Wearing safety restraints is the single most important thing an occupant can do to protect against injury

2. All occupants should wear safety restraints

3. They can take steps to maximize their safety

4. They have a responsibility--moral and legal--to protect other road users

5. They can be affected by alcohol, fatigue, drugs and emotions

6. They are personally responsible for their driving behavior and accidents when they occur because of impairment by alcohol, fatigue, drugs or emotions

7. They can be a significant force in keeping others from drinking and driving.

Content in areas of Fatigue, Emotions and Vehicle factors may be effectively communicated through presentation. Presentation of crash dynamics (in safety restraint section) can be facilitated through use of film or video stressing the rapidity with which the "human collision" occurs and the power of crash forces generated in relatively low-speed crashes.

Group discussion examining the validity of myths inhibiting belt use are considered essential to achieving belief objections. Similarly, group discussion of key alcohol myths (e.g., "people relax and drive better after a drink or two," "some people can drink a lot and not be affected," "coffee, exercise and fresh air will sober you up," "you can't get drunk on beer") are deemed essential to attainment of attitudinal objectives.

The concept of peer intervention to help friends impaired by alcohol or other drugs may also benefit from discussion of what intervention techniques appear most practical, and what makes students reluctant to employ them.

If time allows, students may be involved in role-playing exercises that give them a chance to practice--and get comfortable with using--intervention techniques. Students can be divided into three groups, each group assigned (as home study) to develop a true-to-life scenario with one stage of intervention (before drinking, during drinking, after drinking). Groups can play out the scenarios in class, each scenario followed by a critique from other students of the effectiveness of the intervention techniques displayed and optional techniques not used.

Sections from the Iowa Driver Manual appropriate for home study include "Operating While Intoxicated or Drugged" (from section 2), "Equipment" (from section 3), and "Alcohol and Drugs" and "Other Drugs" (from section 5).

INTRODUCTION

No one is at 100% all the time. But drivers need to know about the physical and mental factors that have the greatest detriment on their safe-driving performance. Additionally, since drivers may be in accidents even when they are performing safely (e.g., a drunk driver or a driver suffering a heart attack suddenly veers across the center lane into oncoming traffic), they need to know what they can do to improve their chances of surviving a crash.

SAFETY RESTRAINTS

Using occupant restraints is the single most important thing anyone can do to improve the chances of surviving a crash.

Types of Restraints

Safety Belts

The most common type of restraint is safety belts:

- The lap belt (found in the rear seats) is the most basic restraint.
- The combination lap-shoulder belt, as found in front seats, provides greater protection.

The major disadvantage of either belt system is that, to provide the protection they are capable of, occupants must do something: adjust them properly and buckle them.

Automatic Restraint Systems

To get around this disadvantage, automotive engineers have developed automatic restraint systems that work without any help from the occupant.

Automatic Lap/Shoulder Belt System

- Automatically locks itself into place over the driver and the right front seat passenger when doors are closed.
- Major limitation of this system is that it does not automatically provide protection to those in the back seat.

Air Bags

- Stored in steering column and dash on the passenger side.
- When the front bumper hits something (usually at speeds above 5 mph), bags inflate, then rapidly deflate, leaving driver with clear view.
- The major disadvantages:

  --They provide protection only in head-on crashes, not when the vehicle is hit from the side or rear

  --They provide protection only for the initial impact. This leaves occupants unprotected if a second crash occurs--e.g., if the car bounces off of one vehicle and into another. In some, air bags offer an additional measure of protection to occupants, but they are not a substitute for seat belt use.

Child Safety Seats

A special type of safety restraint are child safety seats.

- Iowa law requires drivers to have all children under the age of 3 fastened in an approved car safety seat.
- Children between the ages of 3 and 6 must be secured in either a safety seat or in seat belts.
- Safety seats are essential for small children because regular safety belts do not fit small children properly. Hence, regular safety belts can produce internal injuries to small children.

Car safety seats should be used for anyone weighing less than 40 lbs. or under 40 inches tall.

- Children over these sizes are too big to be protected properly by the safety seats and should be secured in safety belts.
- In a lap/shoulder combination belt, the shoulder strap should be placed behind the children until they are tall enough that the shoulder strap will lie across the collar bone, and not across the neck.

What Happens In A Crash

To appreciate the importance of wearing safety belts, people must know what happens in a crash. The most important thing to remember is that, in any given accident, at least two collisions take place:

- The first is the vehicle collision -- The car hits something; crushes up, and then stops.
- The second, more important collision is the "human collision"--the crash of the people in the car that occurs after the first collision.

The human collision is the one that hurts people and the one against which safety belts provide protection.

Crash Dynamics

An example of how the two collisions occur within one accident: A car smashes head on into a solid wall at 30 mph.

- Bumper stops as soon as it hits wall, but rest of car keeps going forward
- Forward motion mashes up the front end of the car. The crumpling helps soak up the force of the crash so the rest of the car can stop.
- All this happens fast. About 1/10 of a second passes between the time the bumper hits the wall and the time the car comes to a complete stop.
- During that tenth of a second, an unbelted occupant is still traveling at 30 mph inside the car. It takes the occupant about 1/50 of a second before hitting some part of the car--e.g., a windshield or steering wheel. That's the human collision.
- The entire accident--from the moment the car hits to the moment the driver hits--is over in .12 seconds.

Crash Forces

The forces involved in these crashes are tremendous:

- At 30 mph, a person is thrown with the same force as if they had jumped off a 3-story building.
- No one's arms are anywhere near strong enough to catch him or herself and "break" that kind of fall. But safety belts are.

How Safety Belts Work

Belts work in several ways to protect occupants in a crash.

1. They start stopping a person sooner.

- Belts are part of the car, so they start losing speed as soon as the car does.
- The occupants body slams against the belt and begins to slow down with the car ("ride down").
- By stopping earlier, the occupants body has a longer time in which to spread out the crash forces.

2. Its expand a bit when a body slams into them.

- Slight though the expansion is, it serves the same purpose as the crunching of the fender (absorbs some of the crash energy).
- These little "edges"--a few milliseconds of extra stopping time, a few millimeters of expansion--don't sound like much, but in a crash where action is so powerful and over with so quickly, they represent a big percentage of what's available and can make a very big difference in the outcome.

3. Belts channel the force of a crash.

- Belts distribute the crash forces to the strongest parts of the body -- the hip bones (lap belt) and rib cage (shoulder strap)
- By spreading out the crash force over a larger part of the body, belts ease the pressure on any one vital part.

4. Its help control what hits occupants and what they hit.

- In a crash, everything in car moves toward the point of impact:

--If hit from the side, occupants and objects will be thrsideways toward crash point.

--If hit from front, occupants thrown forward toward the hood and anything in between (steering wheel, shift lever, windshield, dash, etc.)

--If hit from rear, occupants thrown back against the seat, then snap forward (like coming off a diving board) straight for the hood.

- Belts don't keep occupants from moving toward the crash but belts assure that occupant will collide with the belt, not with hard dangerous objects like glass or window frames.

5. Belts keep the "human collision" from becoming a collision between two humans.

- Two unbelted occupants will often smash into each other in a crash, simply because they are both going to the same location--the point of impact.

- The results can be disastrous. At 30 mph, a person's body will hit with the force of several thousand pounds--enough force to severely injure and even kill.

Belts and Accident Prevention

Belts Can Prevent Accidents.

Belts keep drivers behind the wheel--where they need to be to control the vehicle.

- Unbelted drivers can be torn away from the wheel by taking a turn too fast or hitting a pothole and bouncing up.

- If thrown far enough away from the wheel by these events, the driver could lose control and crash.

--The emergency turn maneuver, for example, is very difficult to complete if driver is unbelted.

--The first half circle turn in an emergency left turn can throw the driver so far right that it is physically impossible to make a full 360° turn in the opposite direction.

Keep Control In Accidents
Not all crashes are "one shot deals":

- Often a car will hit one vehicle, bounce off, hit another, and bounce again.

- Drivers not wearing belts run a much bigger risk of being knocked out or pulled from behind the wheel as soon as they hit the first car.

- If that happens, they are in no position to do anything to avoid hitting something else.

- Belts help drivers stay behind the wheel after the first crash, giving them a chance to control the car and avoid second and third collisions.

Effectiveness Of Belts

Each year, traffic crashes injure about 2 million people and kill another 45 thousand. Studies indicate that belt use could cut the number of serious injuries received by half and could reduce fatalities by 60-70%. Wearing lap belts alone cuts chances of being killed in a crash by half.

- Unbelted drivers are 3-4 times more likely to be killed than drivers wearing a lap/shoulder belt combination.

- Canadian Air Force study found belts were effective at speeds of up to 600 mph.
- At 25 mph or 75 mph, occupants much more likely to survive a crash if they are wearing belts.
- The slower the speeds involved in a crash, the greater the chances of survival--belted or not. This is because crash forces increase with speed.

1. 30 mph crashes are often fatal to unbelted occupants; belted occupants almost guaranteed to survive in crashes below 30 mph.

2. At high speeds (55 mph and even more) belts are about the only way occupants have fighting chance to survive.

Young Drivers at Risk

Though all drivers should use belts, young drivers need them more than others.

- The reason for this is that young drivers have the highest crash rate and the highest traffic fatality rate of any age group.
- The crash rate is so high because of inexperience and overinvolvement with excess speed and drinking/driving accidents.
- The other common element of teenage accidents is failure to use belts.

Myths Inhibiting Belt Use

Though evidence of safety belt effectiveness is irrefutable, too many people still do not buckle up. The "reasons" belt non-users give for their actions are illogical and, often, downright wrong. "Reasons" commonly offered include:

- Belts will trap occupants in car
- Belts cause internal injuries
- Belts are uncomfortable and make it harder to drive
- Belts aren't needed for short trips
- It's better to be thrown clear of the car
- If people don't want to wear belts, that's their business
- Asking someone to buckle up will insult them or make them nervous

Trapped In Car

Some people fear their car will go off the road and that a belt would trap them inside, leaving them vulnerable to a fiery explosion (ruptured gas tank) or a drowning (car will sink in water).

- Though television shows make it appear that most accidents result in fiery explosions or watery graves, such crashes seldom occur in real life.
- Indeed, fire and water problems occur in less than one of every 200 accidents.

Even if a driver is involved in such accidents, they'll be much better off if belted in.

- The belt will cut their chances of being knocked unconscious or otherwise being disabled early in the accident.
- People will have a harder time getting out of a car if they are unconscious or maimed than they will have with pushing a button and removing a safety belt in a split second.

Internal Injuries

When properly fastened and adjusted (e.g., lap belt across hips rather than over stomach) belts will not cause internal injuries.

- In a high speed crash, belts may leave bruises over the hip bone. But such a minor injury is far better than what would have occurred if no belt had been worn.
- Studies in Australia showed a sharp drop in spinal, chest, skull and facial injuries after a mandatory belt law was passed. Most people would prefer a bruised hip to a fractured skull.

Belts Uncomfortable

Seatbelts help people sit up straight. Because of this, backs won't tire and start to ache so quickly. In this way, belts make driving more comfortable.

- Since shoulder belts move with the driver, they give all the freedom of movement a person needs in driving.
- Belts make it easier to drive because they keep drivers behind the wheel--where they must be. That's one reason race car drivers always wear belts.

Short Trips

People who argue that belts aren't needed on short trips imply either that accidents don't happen on short trips or that the speeds involved are so low that no one would be hurt anyway. Both implications are wrong.

- Three out of four fatal accidents occur on short trips within 25 miles of home.
- More than half of all accidents in which someone is hurt occur at low speed (under 40 mph).
- A crash at speeds as low as 12 mph can kill--about the speed driven in a shopping center parking lot.

Better Thrown Clear

Being "thrown clear" sounds like a good idea, but it's not. The key word isn't "clear." It's "thrown."

- When an unbelted occupant is "thrown" in a crash, the impact with the windshield (as they leave the car) or a tree, curb or pavement (as they land) may well kill them. Even if it doesn't, they can be hit by a car while lying dazed or unconscious on the road.
- Studies show that people are 25 times more likely to be killed or seriously injured when "thrown clear" than when they stay inside the car.
- showed that 4 of every 5 people killed by being thrown out of the car would have lived if they had stayed inside.

Nobody's Business

Every time drivers "mind their own business" by not wearing a belt, they'll increases thier chance of losing control of the car. That increased risk makes the belt decision the business of everyone sharing the road with that driver.

- Also, since belts can keep people from crashing into each other, the unbelted occupant poses a hazard to everyone else in the vehicle.
- When someone is killed or hurt because of not wearing safety belts, family and friends suffer economically (hospital bills, insurance rates, etc.) and emotionally.

- Even total strangers have a stake in cutting accident costs, because everyone shares the burden of higher medical insurance, welfare expenses, rehabilitation training and worker compensation costs arising from needless injuries and deaths.

- Traffic crashes cost more than 44 billion dollars last year. If more people wore belts, billions could be saved--for everyone.

Insulting/Nerve Racking

Buckling up doesn't show a lack of confidence in someone's ability to drive. It just shows a healthy respect for reality--the fact that anyone can be in a crash on any given trip.

- Using belts actually shows respect for others, because it shows you're interested in protected them from hazards created by unbuckled occupants (bodies crashing together).

- Next to no one is "scared" by a request to buckle up. But studies show that 9 of 10 people do buckle up when asked. The request is viewed as evidence of concern for their safety, not as a threat to their safety.

- Asking others to use belts is an act of enlightened self-interest. It protects all occupants from each other in event of a crash.

- It also helps reduce the consequences of a crash--not only financial burdens, but also the guilt and remorse associated with having a friend or family member hurt because someone was "too shy" to ask them to buckle.

ALCOHOL

Drinking and driving is a serious problem.

- Drinking drivers were involved in more than 25 thousand traffic deaths last year--about 3 people an hour.

- Young drivers are especially susceptible to risks engendered by drinking and driving. Of all those killed in drinking/driving accidents, over a third are under 25 years old.

- In fact, drinking and driving is the leading cause of death for people age 15-24.

- Another 200 thousand young people are disfigured, maimed or otherwise horribly injured each year because of drinking and driving.

How Alcohol Works

To understand why alcohol degrades driver performance, people must understand how alcohol works.

Alcohol Absorption

Alcohol is different from anything else people eat or drink. When it gets in the stomach and small intestine, it's absorbed directly into the blood stream. It does not need to be digested first.

Alcohol Distribution

- Once in the bloodstream, alcohol is carried throughout the body --fast. On an empty stomach, alcohol starts reaching the brain less than 5 minutes after the first swallow.

- Once there, it enters the brain cells and keeps them from working normally. As soon as that happens, alcohol affects how people think and act.

- Some parts of the brain are more resistant to the effects of alcohol than others. As the level of alcohol builds up in an individual (as drinks are consumed more rapidly than the alcohol can be eliminated from the system) it progressively affects all parts of the brain, further deteriorating the performance of those brain parts that are most susceptible to alcohol while at the same time starting to affect other, more resistant parts.

  1.The part of the brain affected first is the higher learning center--the part that controls judgment and inhibitions.

  2.As alcohol levels rise, the part of the brain that controls vision, coordination and muscle control is affected.

  3.The last part of the brain affected is the "core area" that controls vital functions. When alcohol reaches this level, a person will pass out (the brain is entirely sedated), leaving only the automatic functions of breathing and heartbeat.

  4.Even these automatic functions can be shut down with higher levels of alcohol--resulting in death from an overdose of alcohol.

Alcohol Elimination

Alcohol levels decrease when the body is able to eliminate alcohol faster than alcohol is being fed into the system.

- Alcohol is eliminated almost entirely (90%) through oxidation.
- Oxidation occurs in the liver, where the alcohol is burnt into harmless byproducts.
- The average liver is large enough to burn up about 1 drink an hour.

Whenever the drinking and absorption rate exceeds the rate of elimination (1 drink per hour), alcohol will build up in the bloodstream and all body organs. When alcohol builds up high enough, the drinker becomes drunk.

During the "sobering up" process (i.e., when alcohol is being eliminated faster than it is being taken into the system) the effects of alcohol dissipate in reverse order:

- When people who has been staggering (because alcohol has built up sufficiently to impair balance and muscle control) recovers to the point that they is able to walk steadily, this does not mean they are stone sober.
- Other faculties affected earlier--judgment and inhibitions, for example--will still be impaired.

What Determines BAC

Doctors--and the police--measure how severely an individual is impaired by alcohol by measuring the concentration of alcohol in the system. Blood alcohol concentration (BAC) depends on three factors:

- the amount of alcohol consumed,
- how long the person has been drinking
- how much the drinker weighs.

Number of Drinks [Visual 23 (A Drink is a Drink) may be used here.]

The amount of alcohol consumed is a function of the number of drinks the person has imbibed. Beer, wine and liquor all have different concentrations of alcohol. But a typical "drink"--be it a can of beer, a glass of wine or a shot of liquor--contains six-tenths of an ounce of alcohol.

- Beer contains approximately 5% alcohol. A 12 oz. can of beer, then, contains .6 oz. of alcohol (12 oz. X 5% alcohol = .6 oz. alcohol)
- Most wines contain about 12% alcohol. A 5 oz. glass of wine, then, contains .6 oz. of alcohol (5 oz. X 12% alcohol)
- A shot of liquor is about 1.5 oz. The blood alcohol concentration in liquor is indicated by the "proof" number. The proof number is twice the blood alcohol concentration. Thus 80 proof whiskey is 40% alcohol. A shot of 80% liquor contains .6 oz. of alcohol (1.5 oz. X 40% alcohol)

People who drink "non-standard" drinks--such as 16 oz. cans of beer or "doubles"--are ingesting more than one drink's worth of alcohol per drink.

Number of Hours

The number of hours a person drinks affects BAC because the only way to eliminate alcohol from the system is to oxidize it. Since the average liver can burn only one drink's worth of alcohol an hour, having more than one drink an hour causes BAC to rise.

- If someone takes no more than one drink (.6 oz. of alcohol) an hour, that person's BAC will never exceed the 1-drink level, no matter how long the person continues to drink.
- If the same person takes 2 drinks an hour, alcohol will build up.
- At the end of the first hour, one drink will have been burned off, but the other will remain in the system.
- If 2 more drinks are taken in the next hour, one of them will be burned off and one will remain, leaving 2 drinks in the system.

Number in System

To figure out how many drinks are in the system, a person can simply count the number of drinks consumed and subtract the number of hours since the person started drinking. For example, someone who has consumed 6 drinks in 3 hours will have approximately 3 drinks left in the system.

- There is nothing a person can do to speed up the oxidation rate.
- Drinking coffee or taking showers has no effect on the rate at which the liver works. At best, these "quick fixes" will help a drunk stay awake and clean.
- Only time (for the liver to do its job) will lower the BAC.

Weight

The number of drinks minus the number of hours spent drinking determines how much alcohol is in a person's system. This amount, and a person's weight determines BAC.

The rule governing weight and BAC is: the bigger the body, the lower the BAC for given amounts of alcohol.

- In general, a smaller person, drinking the same amount and at the same rate as a bigger person, will have a higher BAC.

- The major reason for this is that bigger people have more blood and other body fluids with which to "dilute" the alcohol. (The bigger the container, the greater the capacity.) Example: a 140 pounder with 3 drinks in the system will have an BAC of .06%; a 100 pounder will reach the same BAC with only 2 drinks in the system.

BAC Rule of Thumb

The "average" person (approximately 130 lbs.) will have an BAC of .02% for each drink in the system.

- Four drinks would bring BAC to .08%.
- Lighter persons would reach this level with 3 or fewer drinks.
- Heavier persons would reach this level with 5 or 6 drinks in the system.

Other Factors

Emotions, expectations and physical condition also can play a role in determining how alcohol will effect the individual at any given time:

- Anger, jealousy or other emotions can all quicken or intensify the effects of alcohol.
- So can a lack of drinking experience. Inexperienced drinkers often anticipate how drinks will affect them.

--Expect to feel a little light headed, a little silly, maybe a little reckless.

--Often this expectation becomes a self-fulfilling prophecy--one or two drinks feels like 4, 5 or more.

- Because alcohol is a depressant drug, it will magnify any physical fatigue present. This can make the drinker exceptionally drowsy.

Alcohol and Driver Performance [Visual 24 (BAC/Driver Condition) may beused here.]

Because safe driving is, essentially, a mental process, alcohol's effect on the brain translates to effects on driver performance.

- After only one drink, a driver will be slightly affected.
- With 2 or 3 drinks in the system, a driver will begin to "feel" the effects of alcohol. His driving will feel it too.
- With 4 to 6 drinks in the system, a driver will be legally drunk (.10% BAC), and his chances of having an accident will be greatly increased.

Alcohol and Judgment

The first faculty affected--judgment--is critical to all driving situations.

1. Drivers must constantly be able to judge: speed (theirs and others), and space (room to merge, turn or stop).

- Often, drivers will say that a drink relaxes them and helps them drive better.
- They are not more relaxed, their system is more depressed.
- They only think they are driving better because their judgment is impaired.
- Because of their poor judgment, they cannot assess their driving performance accurately.

2. Alcohol's affect on judgment is progressive: the more alcohol in the system, the more quickly judgment is affected and the more severely it is affected.

3.Poor judgment is accompanied by a false sense of security (alcohol's effect on inhibitions).

- This can lead drivers to take more risks than they normally would.
- This is especially dangerous for young drivers since studies show they are more apt to take risks than older drivers to begin with.
- Alcohol's effect on judgment may lead drivers to start taking curves a little faster, following a little closer, or trying to pass with a little less room.

Alcohol and Reaction Time

While judgment is affected with only one drink in the system, reaction time, and fine muscle control will be affected shortly thereafter. All people's reactions slow and fine muscle control begins to be impaired by the time there are 3 drinks in the system.

- In this condition, the muscles will take longer to obey the messages sent by the brain, and they will have more difficulty executing those messages (actions) properly.
- They may also start slowing for a turn a little too late or steering for a curve a little too late.
- Their driving performance will be noticeably affected.

Alcohol and Vision

People with about 5 drinks in their system will start having trouble seeing well (in addition to having problems with judgment and reactions).

- They may not be seeing double (yet). But they will have trouble focusing their eyes to have a really clear picture of what's on or near the roads.
- They will have an especially hard time seeing clearly if it's dark: night vision's the first visual function affected by alcohol.

Alcohol and Muscle Control

With about 6 drinks in the system, muscle control is messed up, along with balance and coordination.

- At this point, the effect on driving is obvious.
- Erratic speeds, quick stops, sudden lane changes, weaving--all are typical of drivers at this stage of intoxication.

Alcohol and Crash Risks

Study after study shows that as a driver's BAC increases, so do the chances of an accident.

- Young drivers are more at risk than others, because they are more likely to have an accident at lower BAC levels than older drivers.

--At BAC of .03%, drivers in the 20-25 age group are 3 times more likely to have an accident than the general driving population

--At same (.03%) BAC drivers aged 16-20 are 9 times more likely to be involved in a crash.

--Put another way, with only 1 or 2 drinks in their system, young drivers are half again as likely to have a crash as other drivers at the legal level of intoxication (.10% BAC).

- Young driver's susceptibility to crashes at relatively low BAC levels is one reason they are involved in twice as many fatal alcohol related crashes as older drivers (the other key factors are that they tend to crash at higher speeds, without being in seat-belts).

- One study found that over half of the young drivers involved in alcohol related crashes had BAC's of .02% or less. Only 20% of the young drivers had BAC's of .10% or above.

- One reason so many crashes occur at low BAC levels ishat newly acquired skills are affected earlier and more severely than more established functions, such as the ability to walk. Because many safe driving performances are not yet "routine" for less experienced (younger) drivers, alcohol very quickly interferes with their ability to drive safely.

Alcohol and the Law

Because alcohol plays such a major role in traffic fatalities and injuries, drinking and driving is treated as a very serious offense. In fact it is a criminal offense.

- Persons convicted of OWI can be sent to jail for 48 hours for the first offense, a week for a second conviction. They also may be fined $300 to $1,000.

- People stopped for drinking and driving who refuse to take the breath test for BAC can have their licenses revoked for eight months on the first offense.

- For a second offense, these drivers will lose their licenses for one and a half years.

- Drivers who take the breath test and fail can lose their license for anywhere to 6 months to a year, depending on the record.

Underage Drinking/Driving

Because drinking itself is illegal for anyone under 21 years old, and because any amount of drinking drastically increases the crash risks for young people, anyone caught drinking and driving under the age of 21 will:

- Lose their license for a full year or until they reach age 18--whichever is longest.

- Before these drivers can reclaim their licenses, they must present proof of insurance. The typical insurance rate for young people convicted of OWI is $3,500 to $5,000 each year.

- Insurance rates will stay in that range for at least 3 years, even if the driver maintains a perfect record throughout that period.

Reducing Alcohol Crash Risks

The best way for drivers to reduce alcohol crash risks is to not drink at all. The best way for passengers to reduce their risks is to avoid riding with drivers who have been drinking. After all, that's the whole idea behind the drinking age law.

If young people are going to break the drinking age law, however, they should do it in such a way that it will not increase their alcohol crash risks. To avoid the risks of drinking/driving, people must separate drinking from driving. This can be done in one of two ways:

- Select the right driver -- Make sure that the only person taking the wheel is one who has not been drinking

- Provide a cushion of time -- Allow enough time after drinking stops but before driving begins to allow the liver to eliminate all alcohol from the system.

Techniques to Separate Drinking from Driving

1. Select/use non-drinking driver.

- Don't drive to party, and decline requests to drive once have started drinking.
- Ride with non-drinker.
- Ride with drinker who agrees not to drink that night (designated driver). Make sure driver sticks to agreement.

2. Limit distance to drinking location.

- If possible, keep within walking distance.
- In any event, the shorter the distance, the better (less exposure on road).

3. Separate drinking from driving with time.

- Reserve first part of party for responsible drinking.
- Leave remainder for sobering up.

4. Recognize when too impaired to drive.

- Many people have a "signal" that tells them when they have had too much--e.g., may feel warm, giggly, excited, tired.
- If can "feel" drink at all, judgment is significantly impaired.

5. Delay departure when impaired.

- Stay put until have not "felt" drinks for about an hour.
- Get involved in other, non-drinking activity so won't be tempted to drink during delay.

6. Ride with others when impaired.

- Leave car behind. (can pick up next day.)
- Make sure driver is not impaired, either.

7. If impaired and no sober driver available, don't go. Stay overnight and go home in the morning.

Alcohol Myths

Many people are reluctant to use these separation techniques because they don't understand how alcohol affects their bodies and their driving. Instead they believe in myths.

Sobering Up

Some people mistakenly believe they can speed up the "sobering up" process. Frequently recommended "remedies" include:

- drinking coffee,
- taking cold showers,
- walking to get fresh air,
- doing exercises.

None of these remedies works, because none of them have any bearing on how fast the liver can burn off the alcohol. Exercising may cause a person to breath more heavily and sweat more freely, slightly increasing the amount of alcohol that is discharged through these avenues. However, since only a small fraction of alcohol can be eliminated this way, such activities will not measurably hasten a decrease in BAC.

Immunity

Others think that some people can drink a lot and not be affected. No one is immune to the effects of alcohol.

- Experienced drinkers may hide the effects better, because they have learned that alcohol will affect them.

--To mask these effects, they will move more slowly (e.g., to reduce the risk of knocking over another lamp).

--But reacting more slowly to events on the road only increases risks.

- Sometimes people will not feel the effects of alcohol as quickly as they normally would. For example, a person who is very excited about something, may not feel the affect of the depressant (relaxation, drowsiness) until 1 or 2 drinks later. However, just because a person doesn't <u>feel</u> the physical effects of alcohol does not mean they are not there.

<u>Food in Stomach</u>

Other people feel that if they fill their stomach with food or coat the stomach lining with milk before drinking, they won't get drunk.

- These practices will slow the speed with which alcohol can pass from the stomach into the bloodstream, but it will not stop the alcohol from getting into the bloodstream. Eventually, all the alcohol will pass into the bloodstream.

- Consequently, the effect of drinking on a full stomach is to stretch out the amount of time over which drinks "hit" the drinker. <u>BAC's will rise and keep rising for a longer period of time after drinking has stopped.</u> In this situation, the drinker's BAC may peak when the drinker is on the road.

Limiting Drinking

If will drink and drive:

1. Set a limit on how much will drink, and

2. Stick to the limit.

The Difficulty With Limits

- Because judgment affected by first drink, is temptation to stretch the limit once it's reached ("I feel fine; one more won't hurt.")

- By the time can actually "feel" the drinks, are way over a reasonable limit.

Setting Limits [Visual 25 (Alcohol Table) may be used here.]

Limits must be set before drinking begins.

- Estimate how long will be drinking and, based on weight, figure how many drinks can have during that period without sending BAC over .03%.
- For most people, this means no more than one drink per hour.
- Larger people may stretch it to one drink every 45-50 minutes.

Teenagers must remember that sticking to these limits does not mean they will be safe to drive

- Will still be more than twice as likely to crash as if sober.
- Will still be more likely to crash than older drivers who are over the legal OWI limit

Techniques for Sticking to Limit

1. Know What They're Drinking

- Limits set for "regulation" drink of .6 oz. alcohol
- If drinking "tallboys" or from an 18-oz. mug, count each as more than one drink.
- If drinking liquor, measure booze with a shot glass (1.5 oz.).

--Don't "eye-ball" it. (May end up pouring double or more.)

--Don't let someone else mix the drink (No way of knowing how much they put in).

- Drink wine from glass (5 oz serving), not from bottle.

2. Space the drinks so will remain at or below limit at all times.

- If plan to be at party for four hours and have set a four-drink limit, don't have all four drinks in one hour.
- If drink too fast early, impaired judgment will encourage drinker to ignore limit.
- If have drunk "too slow" early on, don't try to catch-up at end of party--will put driver on road as BAC hits peak.

3. Drink at own pace.

- Don't try to "keep up" with others.
- Avoid drinking games; their real purpose is to get people drunk fast.

4. Put drinks down, and do something other than drink.

- When drink is constantly in hand, is tempting to sip it constantly.
- Dance, eat, play (non-drinking) games--anything that keeps people active and their minds and hands off drinks. (Prevents nervous or bored sipping that can take people over their limits.)

5. Taper off early.

- Mix drinks a little weaker, or switch to non-alcoholic drinks as the party wears on.
- This gives body time to lower BAC (by elimination) before drinker gets behind the wheel.

Intervention in Others' Drinking/Driving

When in a drinking situation, teenagers can help others reduce their risks of involvement in al cohol-related crash. Can intervene successfully, whether have been drinking or not.

Why Intervene

Impaired person needs help

- Can't drive safely in that condition
- Doesn't realize can't drive safely because judgment impaired.
- Doesn't appreciate risks involved in attempting to drive:

--Crash risks

--Arrest (OWI) risks

--Family sanctions (e.g., grounding) if shows up drunk.

If doesn't intervene, and crash, arrest or family sanctions occur, person who could have helped but didn't will feel guilty.

Principles of Effective Intervention

1. Can intervene at three stages:

- Before drinking begins (planning)
- During drinking
- After drinking, but before driving begins.

2. Intervention is easier, and more likely to succeed, the earlier action is taken (before drinkers get out of hand)

3. Intervene to control as many factors as possible--amount of alcohol available, rate of consumption, proximity of drinking to driving.

4. Have alternatives to address problems. If first effort fails, don't give up. Take another tack.

5. Don't need to "go it alone."

- Usually others will be concerned about the same situation.
- Enlist their help in intervening (build peer pressure).
- Just don't be afraid to be the one to raise the topic or make the first move. (Someone has to be first.)

Intervention Techniques

To intervene successfully, people must learn to recognize clues indicating the potential for unsafe drinking/driving situations and respond appropriately to diffuse the problems.

Before Drinking

Clues to look for:

- Too much alcohol--Talking about getting a keg for 20 people or having everyone chip in $5 for booze.
- No planned activities--No one talking about dancing, non-drinking games, etc. Only apparent purpose is to get bombed.
- Bad Location--Will be held in middle of nowhere, leaving long drive back. Or held where impossible to do anything other than drink.
- Too many drivers--Most everyone attending will drive solo or with only one other person. Means greater number of potential drunk drivers and smaller pool of "spare" sober drivers to draw upon.
- Wrong drivers. Drinkers will be driving non-drinkers, rather than vice versa.
- Known Problems. Class drunk, the "walking liquor store," or someone who always starts drinking games will be there.

Intervention Actions:

- Select appropriate drivers--Make sure non-drinking drivers use their cars. Place drinkers as passengers. If not enough non-drinkers, get agreement not to drink from designated drivers.
- Limit alcohol supply--Suggest trim back on supplies/contribution amount. Suggest use some of money for non-alcohol purposes (snacks, mixers, etc.)
- Arrange non-drinking activities--Make sure someone will bring music, games, etc.
- Suggest alternative location--One closer to home, with enough room to allow non-drinking activities.

During Drinking

Clues to look for:

- Too much alcohol--e.g., someone brought an "extra" case.
- Wrong people drinking--Non-drinker or designated driver starts drinking.
- Uncontrolled rate or amount--Someone starts drinking game. Drinking from non-regulation containers, bottle. Not using shot glass to measure liquor. Someone starts drinking more, faster as end of party approaches.
- Nothing but drinking--No other activity going on.
- Suspicious behavior--Someone always has drink in hand or stays close to liquor supply, makes frequent trips outside (for "supplies"), acts out of character (shy person becomes gregarious, outgoing person becomes withdrawn), moodiness, talks unusually fast, slow or loud, tongue-tied, spills drinks, knocks things over, unsteady.
- Suspicious appearance--pale, flushed, sweaty.
- Unknowns--Stranger drops in (can't tell if out of character or not. Person arrives with drink in hand (don't know how much has already drunk).

Intervention Actions:

- Limit Amount--Suggest extra case be returned to car (save for "next time"). Offer to serve as bartender (mix drinks properly).
- Control rate--Try to divert drinker's attention to other activities. Start dancing, games, talking about something that interests the drinker. If that fails, communicate concern: mention risks and try to persuade the drinker to stop drinking or at least slow down.
- Arrange alternate transportation--Try to get drinker to agree that will let someone else do driving. (Have the drinker hand over keys now, if possible)
- Get help--Communicate concern to others. Get their agreement to help intervene.

After Drinking, Before Driving

The same clues of appearance and behavior cited "during drinking" are clues to a driver in trouble. At this stage, intervention options are limited:

- Try to persuade to stay put or let someone else drive

  --less likely to succeed than earlier

  --drinker may feel "curfew pressure" as well as suffer from poor judgment, may be belligerent.

  --best chance to succeed if group tries to persuade.

- Prevent drinker from driving--Disable car (e.g., let air out of two tires). Take keys and hide them.
- Threaten to call parents, police if insists on driving.

  --If necessary, do it (remember crash risks).

  --Don't give up.

OTHER DRUGS

A drug is any substance taken by a person in hopes of achieving a better mental or physical state.

- Most people are multiple drug users
- Drugs frequently used and often combined include caffeine (coffee), nicotine (tobacco) and alcohol.

Virtually any drug can affect the mental or physical skills necessary for safe driving. Drivers need to be aware of the effects of drugs and the risks drug use can create.

Sources of Drugs

Prescription Drugs

- May be purchased only with doctor's approval.
- Directions (dosage amount and frequency) must be followed exactly to (1) accomplish medical purpose and (2) limit dangerous, undesirable side effects.

Over-the-Counter Drugs

- May be purchased without doctor's prescription.
- Generally less potent than prescription drugs (e.g., cough and cold syrups, lozenges tablets).
- Though weaker, not harmless.
- By law, must provide adequate directions for use.
- Read label carefully for both directions and warnings about driving.

Illegal Drugs

- Most dangerous source of drug because no quality control.
- User cannot be sure of potency--wide variation between buys.
- User cannot be sure of content--may be completely different drug from what advertised; may be cut with second drug or even poisonous substance.

Drug Effects

Drugs produce two effects:

1. wanted (desired) effects
2. unwanted effects (side effects)

Most drugs act on the central nervous system:

1. stimulants speed it up
2. depressants slow it down
3. hallucinogens affect nervous system and the way the user sees things.

Common Types of Drugs

Stimulants

1. Amphetamines:
   - Speed up nervous system ("uppers")
   - Often used to flight drowsiness ("pep pills")
   - Make user feel more alert, self-confident
   - When effect wears off, user may suddenly feel exhausted, depressed.
2. Cocaine:
   - A stimulant
   - In small doses, user feels joy, delight, happiness
   - Moderate doses may induce violent stimulation, hallucination.

Depressants

1. Tranquilizers:

- Slow down nervous system ("downers")
- Used to deal with nervous, emotional problems.
- Cause drowsiness--especially when first taken

2. Barbiturates

- Slow down nervous system
- Used to calm nervousness
- When wear off, depression often follows

3. Narcotics:

- Depress the central nervous system
- Examples--morphine, opium, heroin
- Side effects vary widely--incoherency, dizziness, nausea, vomiting

Hallucinogens

1. Marijuana:

- A mild hallucinogen
- Effects vary widely (can act as stimulant or depressant)
- Often produces drowsiness, difficulty in judging time and space, fascination with (concentration on) one object.

2. PCP, LSD, Peyote:

- Strong hallucinogens
- Affect nervous system variously
- Change mood, behavior, perceptions

Synergistic Effects

Combining drugs can produce extremely strange and strong results.

Combining one depressant (e.g., quaalude) with another (e.g., beer) can yield effect greater than the total effect of each taken separately. Example:

- One lude may effect a person like three beers
- If that person washes down the lude with a beer, the combination may "hit" with the effect of seven or even 10 beers, not "just" four (3 + 1) beers.

This "new math" effect, created by mixing drugs, is known as synergistic effect.

Drugs Effects on Driving

Amphetamines

- Increase willingness to take risks (because of false feeling of alertness, self-confidence.
- Often used to keep awake, can keep driver from realizing how tired driver really is.
- If wear off while on the road, driver can nod off before realizing it.

Tranquilizers

- Can induce sleepiness, decrease alertness.
- Impair seeing, coordination, reaction time.

Barbiturates

- Can make thinking difficult, affect emotions, cause drowsiness.
- May reduce alertness, attention, judgment, reaction time for hours.

Hallucinogens (marijuana)

- Alters attention, vision, perception of time.
- Slows reactions, can affect mood.

Guidelines for Drug Use

1. Avoid excessive drug use. Don't take drugs unless you need them. Don't take except for medical purposes.

2. Avoid illegal drugs.

3. Read the label--for both prescription and over-the-counter drugs.

4. Ask if it will affect driving. If doctor or pharmacist doesn't volunteer the information, ask them.

5. Avoid taking others' drugs. Prescription drugs should be taken only by the person for which they are prescribed.

FATIGUE

Drivers perform best when well rested.

When tired, drivers find decisions harder to make so they make them more slowly. They also get upset more easily.

Avoiding Fatigue on Long Trips

Fatigue can often become a major factor in driver performance on long trips. To reduce the risk of fatigue on long trips, drivers should plan their trips so as to:

- Maintain their normal schedule. They should not try to drive during times when they would normally be sleeping. The body has its own internal clock which starts to "shut down the system" when the normal sleeping period arises.

- Break up the trip. On extended journeys, drivers should schedule frequent rest stops--one for each two or three of behind-the-wheel. Drivers should also be sure to make all planned rest stops even if they have made unscheduled stops in the interval.

- Have a companion. The best companion is one who can share the driving duties, alternating driving every 2 or 3 hours. But a non-driving companion is better than going it alone.

Warnings of Fatigue

Both driver and passenger should be alert to clues that fatigue is beginning to set in. These clues include:

- Boredom
- Sleepiness
- Vehicle drifting
- Staring (no eye movement)
- Slow response to other's actions or remarks
- Irritation
- Poor concentration.

Coping Techniques

When any of these clues appear, the best thing to do is get some rest. Drivers will be better off pulling off the road and sleeping in the car, than trying to continue on and ending up in a crash.

However, if it is impossible to rest, the driver can do some things to help fight fatigue:

- Shock with cold. In cold weather, open the vents or roll down the window. In warm weather, turn on the air conditioner. Warmth exacerbates a feeling of drowsiness.
- Get involved with activities. Engaging in a conversation or singing along with the radio will force the driver to be a little more alert.
- Start commentary driving. The best option, because it keeps driver's mind on driving.

EMOTIONS

Emotions can have a major effect on driver performance.

Emotions that can affect performance: worry, excitement, fear, anger, depression.

Emotions and Driving

Major problem is preoccupation.

- If worried or excited about something, may not pay attention to driving task. Driver may not notice emergency situation developing.
- If angry or elated, tendency to take needless risks increases. Driver may try to "get back" at other driver, forgetting that scaring or intimidating others reduces his margin of safety as well.
- If depressed, may accept unreasonable risks because "just doesn't care."

Controlling Emotions

Emotions are hard to control. Some guidelines:

- If angry or excited, take time to cool off. Take a walk or run. Scream. But stay off road until calm down.
- If worried or depressed, try to take mind off the problem. Listen to the radio. Listen to someone else's problems.
- If impatient, give extra time. Leave a few minutes early to reduce temptation to speed, run lights or stop signs, etc.

VEHICLE MAINTENANCE

A poorly maintained vehicle is an impaired vehicle. Just as impaired drivers are at greater risk of accident, so are impaired vehicles. It is the driver's responsibility to assure that his or her vehicle is maintained in safe operating condition.

Legal Requirements

Iowa law establishes certain "performance standards" for vehicles.

Lights

- Vehicles must have two working headlights (one on right side, one on left), and one back red light.
- The red (brake) lights must be visible for at least 500 feet.
- The law also requires a white light to illuminate the rear license plate.

Tires

- All tires must have tread that is at least 1/32 inch deep (the Lincoln penny test).
- Motorists may also be ticketed for driving without appropriate tires (snow tires, radials or chains) in snow. The tread on regular tires is not deep enough and properly designed to provide adequate traction to drive in snow.

Catch-all

The "operating an unsafe vehicle" law is a catch-all regulation to assure adequate vehicle performance.

- It can be applied to any number of vehicle equipment problems--misaligned headlights (that fail to give driver a good view of the road or blind oncoming traffic even at a low setting), faulty exhaust systems (which may leak carbon monoxide into the vehicle, as well as create a noise nuisance), etc.
- Faulty equipment can also lead to tickets if they contribute to an accident. For example, if faulty brakes contribute to a crash, the driver can be ticketed for "operating an unsafe vehicle" as well as "failure to stop."

Equipment Checks

Drivers can help assure optimal performance from their vehicles by making regular equipment checks.

Every Trip

Checks that should be made every time a driver gets in the car include:

- Windows and windshields -- Check for scratches and cracks (they interfere with vision and may cause glass to explode from impact with any object).
- Brakes -- Check pedal pressure (when fully applied, pedal should stay well above the floor). Listen for scraping or squealing noises when stopping (indicates brake lining needs replacement). Be alert to car pulling to the side when brakes applied.
- Steering -- If steering wheel moves 2 inches without changing the car's direction, it has too much play.
- Exhaust -- Listen for loud noise or rattles.
- Engine -- Be alert to signs of less power (lugging), or hard starting. (Indicates need for tune-up).

Every Tankful

Other checks should be made whenever the driver is stopping to fill up with gas:

- Headlights, brake lights and turn signals -- Check for burned out bulbs and dirty lenses (lenses should also be cleaned after have been driving on wet or muddy roads).
- Windows and windshields -- Check to make sure all glass is cleaned, inside and out.
- Tires -- Check air pressure to assure proper inflation (should be at maximum psi indicated on tires).
- Engine -- Gas mileage shouldn't be allowed to drop more than 2 miles per gallon. If it does, it may indicate need for tune-up.

Other Regular Checks

Other checks that drivers can easily make:

- Exhaust -- Look for signs of rust or holes in the muffler and tailpipe before and after the winter season.
- Suspension -- Drivers should be alert to the car bouncing too much or trouble in controlling the car. (Car not holding the road well on turns). To check suspension, push down hard on the front and rear of the car. If the car bounces more than twice before stopping, new shocks are in order.

Additionally, drivers should have their cars inspected by professional mechanics every six months.

BEHIND-THE-WHEEL LESSON PLANS

This section contains lesson plans for the following Behind-the-Wheel exercises:

<u>Off Street</u>
- **Starting and Shutting Down Engines**
- **Stop Line**
- **Putting the Vehicle in Motion**
- **Serpentine**
- **Figure 8**
- **Development of Shifting Skills**
- **Parallel Parking**

<u>On Street</u>
- **Street Operation: Low Density Environment**
- **Street Operation: Moderate Density Environment**
- **Search Activity: Low Density Traffic**
- **Instructions for Commentary Driving**
- **Search Activity: Moderate Density Traffic**
- **Communication Activity**
- **Managing Space**
- **Application of Operating Procedures**
- **Hazard Recognition**

<u>Off Street</u>
- **Emergency Stop**
- **Evasive Steering**

Exercise sections will contain the following information:

Purpose -- What the exercise is intended to teach.

Location -- Whether this exercise is designed for off-street or on-street implementation.

Routes -- For On-Street exercises, a description of the type of route necessary for proper implementation of the exercise.

Directions -- Procedures for setting up and running the exercise.

Observation -- What the instructor will look for to make certain that the exercise is being performed as intended.

Evaluation -- Criteria against which the students performance on the exercise is measured.

STARTING AND SHUTTING DOWN ENGINES

Purpose

The purpose is to demonstrate and practice starting and shutting off an engine.

Location -- Off Street

Directions

1. Instructor will demonstrate the start up and shut down techniques using procedures outlined in classroom activity and based on manufacturers instructions. Verbal explanation of technique should be given simultaneously.

2. In instructor must be in the car with each student as he practices in order to correct errors in procedures as they occur.

Observation

The instructor will observe for failure to perform the following procedures properly:

- Set parking brake,
- Place transmission in PARK. (Automatic transmission)
- Disengage clutch and move gearshift to neutral (Manual transmission)
- Keep clutch disengaged until engine is running (Manual Transmission)
- If cold engine, press accelerator to floor and release.
- If engine warm, press accelerator no more than half way to floor.
- Insert ignition key and turn clockwise until starter kicks in.
- Release key as soon as ignition catches.
- Check all gauges. Make sure all indicator lights are off

<u>Turning off engine</u> (See manufacturer's instructions also)

Place transmission in park (automatic transmission) or neutral (manual transmission)

Turn wheels to the proper position and set parking brake

Turn switch key to off position.

Evaluation

Student performance will be evaluated against the compliance with prescribed procedures.

STOP LINE

Purpose

The purpose of this exercise is to develop student ability to stop at a predetermined point.

Location -- Off Street

Stop line should be marked at beginning and ending point of all other off street exercises

Line may be marked with two cones, spaced wider than the vehicle, the line being an imaginary line between the two. Line may also be marked with chalk. A chalk line should be at least 2 inches wide and at least 5 feet long

Directions

1. Incorporate exercise into all other exercises.

2. Instructor demonstrates exercise at least once when demonstrating other exercises

3. Students will attempt to stop 12 inches from stop line before entering and exiting each exercise layout

Observation

The instructor should observe and correct the following error:

The student approaches the stop line too fast or the student begins to decelerate too soon.

Evaluation

Student performance will be evaluated against the following criteria:

Smoothness of stop, i.e., no nose rebound, vehicle movement that indicates quick stop

Ability to stop within 12 inches of each stop line and not go over

PUTTING THE VEHICLE IN MOTION

Purpose

The purpose of this lesson is to provide students with practice in putting the vehicle in motion.

Location -- Off Street

Directions

1. Place three markers (e.g., cones) in a straight line, one every 50 feet (approximately).

2. Instructor explains and demonstrates exercises

- Put vehicle in motion
- Travel approximately 50 feet and stop at the first marker
- Begin motion again, travel another 50 feet and stop at the second marker
- Begin motion again, travel the remaining 50 feet and stop at the final marker cone.
- Back in straight line to beginning of exercise

    Put vehicle in reverse

    Turn to look out rear window

    Back in straight line to second marker and stop

    Put the vehicle in motion once more, backing to beginning exercise marker and stopping

3. Student performs the exercise according to procedures listed above

Instructor remains in the car during exercise to give instruction and assistance

Observers (if any) must be instructed to move clear of the driver's view out the rear window during the backing portion of this exercise.

Observation

The instructor will observe for failure to perform the following procedures properly:

Putting the Vehicle in Motion

Apply brake with right foot.

Disengage the clutch and shift to first gear (manual transmission). Shift to DRIVE (automatic transmission).

With right foot still on brake, release parking brake.

When ready to move, place right foot on accelerator and press down slowly. (automatic transmission)

When ready to move, place right foot on accelerator and press down slightly to race engine. (manual transmission)

Lift left foot slowly until clutch reaches friction point. (manual transmission)

Engage clutch slowly until vehicle is moving and clutch is fully engaged. (manual transmission)

When clutch is engaged press accelerator down slowly. (manual Transmission).

<u>Stopping</u>

- Release accelerator pedal
- Depress brake pedal
- As the vehicle begins to slow, decrease brake pedal pressure
- Stop vehicle smoothly by releasing brake pressure in relation to vehicle stopping rate
- As vehicle halts, release pedal completely (manual transmission)
- Disengage clutch as vehicle halts (manual transmission)
- After halting, place gearshift lever in neutral and reapply brake just enough to keep vehicle stationary (manual transmission)
- When vehicle has come to a complete halt reapply brakes to keep vehicle from moving (automatic transmission)

Backing in a straight line

- Put vehicle in reverse
- Back slowly
- Don't ride clutch or brake
- Constantly check behind by turning to look out rear window

Evaluation

Student performance will be evaluated against the following criteria:

1. Puts vehicle in motion smoothly (no lugging, stalling, or overrevving)

2. Stops smoothly (no stalling, jerking, nose rebound, locking up of wheels)

3. Backs in straight line properly with decreasing need to correct drift

SERPENTINE

Purpose

The purpose of this exercise is to give students initial practice turning over a course with gentle curves and wide dimensions.

Location -- Off Street

Directions

Set up four markers (e.g., cones) in a straight line approximately 50 feet apart.

1. The instructor describes and demonstrates the exercise to students

2. Students weave among the markers. The approach to the first cone is alternated, right side, left side, etc.

3. Once the vehicle has passed the final marker the driver stops, puts the vehicle in reverse and follows the same path back through the markers to the starting point

4. Instructor remains in car during exercise to give instruction and feedback and to regulate degree of difficulty by approach speed.

5. Observers (if any) remain in the vehicle except one observer who stays outside to keep count of, and reset, markers that are struck. Observers must be instructed to stay clear of the drivers rearward field of view during the backing portion of the exercise.

Observations

The instructor will observe for failure to perform the following procedures properly:

Line the vehicle up before beginning each run through the serpentine course

Maintain a speed limit that permits the course to be completed as quickly as possible with mini mum sway or the need to brake in turns

Make turns at the appropriate point to maintain the straightest possible course without knocking over the markers

When stopping and backing up, do so smoothly with proper braking and shifting

Keep eyes focused on the far end of the course rather than the marker immediately in front of the vehicle

Evaluation

Student performance will be evaluated against the following criteria:

1. Time to complete each run
2. Number of markers struck
3. Ability to maintain a constant speed and as straight a course as possible

FIGURE 8

Purpose

The purpose of this exercise is to give students an opportunity to practice driving in a restricted area with more difficult curves than in the Serpentine exercise.

Location -- Off Street

Direction

1. Set up six cones in two rows of three cones each. Cones within a row should be approximately 30 feet apart. The two rows should be approximately 100 feet apart.

2. The instructor describes and demonstrates the exercise as described below.

- At the starting point the car faces the two rows of three cones (perpendicular to the rows). Approximately one car length from the closest row and midway between the left most and center cone.
- Enter the exercise between the left-most and center cones of the nearer row.
- Turn to the right and pass through the second row between the center and right-most cones.
- Turn around the center cone and reenter the space between the two rows.
- Exit the space between the two rows between the left-most and center cones.
- Swing to the right around the center cone and return to the starting position. The figure eight is complete

3. Students perform the exercise as described above two times then reverse direction after which they alternate direction after each trial.

4. Instructor remains in car during exercise to give instruction and feedback and to regulate degree of difficulty by encouraging students to raise or lower speed.

5. Observers remain in vehicle except one observer who stays outside to keep count of, and reset, markers that are struck.

Observation

The instructor will observe for failure to perform the following procedures correctly:

Make smooth, constant radius turns at each end of the figure 8

Begin each turn at the appropriate point to permit a constant radius turn

Operates at a speed that allows the exercise to be completed as quickly as possible without excessive vehicle sway.

Keep eyes focused upon the next marker rather than the one being negotiated.

Make each change of direction in a smooth, continuous motion.

DEVELOPMENT OF SHIFTING SKILLS

Purpose

The purpose of this exercise is to provide students with practice upshifting and downshifting a vehicle with a manual transmission

Location -- Off Street

Directions

1. Set up markers to represent start and stop lines, approximately 300 feet apart

2. Instructor reviews and demonstrates shifting techniques

   - Instructor starts at one line, drives a straight path of travel beginning in first gear, accelerating, shifting into second then decelerating and downshifting first gear.
   - Stops vehicle at end marker at opposite end of course.
   - Backs the vehicle into original starting position.

3. Student (accompanied by the instructor and observers, if applicable) performs the above exercise

4. Additional practice should be allowed for students that are slower to learn.

Observation

The instructor will observe for failure to perform the following procedures properly:

Starting the engine
Braking/stopping
Upshifting
Downshifting
Speed control
Straight line backing
Securing vehicle properly before getting out

Evaluation

Student performance will be evaluated against the following criteria:

Overrevving
Lugging
Excessive rpm drop
Missed shifts

PARALLEL PARKING

Purpose

The purpose of this exercise is to demonstrate and practice parallel parking.

Location -- Off street

Directions

1. Form a "parallel parking spot" by setting two lines of cones approximately 30 feet apart connected along one side by another line of cones. If possible use large cones in the corners of the space with dowel rods inserted in them so that drivers can see the corners of the parking spot from inside the car.

2. Instructor demonstrates parallel parking maneuver for students

- Stop car with back end even with back of vehicle in front of parking spot, with approximately 18" of space between the vehicles
- Check for left front fender clearance and clearance behind
- Back slowly, turning steering wheel to the right so as to aim back of car toward the front of the car parked behind the slot
- As front wheels come even with rear wheels of car parked ahead, begin to straighten steering wheel
- When right front fender clears rear of car ahead, turn steering wheel sharply left while continuing to back slowly
- Continue backing until car almost touches vehicle behind (if space is large enough, driver may have to straighten wheels earlier to keep back end from heading out into traffic lane)
- Straighten wheels and pull forward until car is centered in parking space.
- Put car in PARK (automatic transmission) or second gear (manual transmission) and set brake
- Get out and determine if the car has been parked according to the criteria listed in the Evaluation section.

3. Instructor demonstrates pulling out of parallel parking spot.

- Get back in the car, start it and put it in reverse.
- Back to the rear of the space turning the wheels slightly to the right as you go.
- At the rear of the space put the car in forward and cut the wheels hard to the left to pull out of the space.
- Once out of the space, back to a point upstream of the space. Stop and secure the car. The car is now in position to begin another parallel parking exercise.

4. Student performs the above exercise. Observers (if any) rotate between watching the exercise from inside and outside the car. Observers in the car must be instructed to stay clear of the rearward field of view of the driver.

Observation

The instructor will observe for failure to properly perform the procedures listed above.

Evaluation

Student performance will be evaluated against the following criteria:

1. Does not hit any course markers or cross the boundaries of problem

2. No more than three pullups permitted

3. Parks 12" to 15" from curb

STREET OPERATION: LOW DENSITY ENVIRONMENT

Purpose

The purpose of this lesson is to allow students to transfer basic operating skills acquired within an off-street area to the highway traffic environment. It provides students an opportunity to gain the proficiency and confidence needed before they can begin to apply the safe operating practices taught later in this Curriculum.

Location -- On Street

Routes

The routes selected for this lesson should provide students an opportunity to practice basic vehicle operation with a minimum of stress from roadway and traffic conditions. The following requirements should be fulfilled to the extent possible.

Environment -- Suburban areas are generally most appropriate. Rural areas are acceptable if accessible to the school. Urban areas with heavy traffic, should be avoided at this stage.

Density -- This lesson should begin on routes with virtually no other traffic, progressing to routes that provide a limited amount of traffic.

Situations -- The routes selected should expose drivers to controlled and uncontrolled intersections, freeway interchanges, hills and long grades.

Directions

Duration -- The duration of actual driving should be limited to 10 minutes at first. Most students will be nervous about operating in traffic and will therefore tire quickly. Where possible rotate students every 10 minutes in the beginning to maintain the highest possible level of learning.

Maneuvers -- Students should be directed to perform the following maneuvers:

- Left and right turns
- Lane changes
- Negotiating curves

Observers -- Observer students (if any) should be required to fill out The Basic Control Checklists provided.

Critiques -- Instructors and observers will provide critiques of the driver's performance.

Assistance -- To allow students to concentrate their attention upon vehicle handling, instructors should provide assistance to the students by:

- Reminding them to shift gears if necessary
- Reminding them to signal and cancel signals
- Warning them as to potential hazards, excess speed, insufficient clearance and safety margins
- Directing them around areas of congestion, low overhead or lateral clearance, reversible traffic lanes, and potential hazards from other road users

Weather -- Students should experience their first street lesson under favorable weather conditions.

Observations

Instructor and student should note and record errors in basic vehicle control using checklists provided. Errors to be recorded are as follows:

Acceleration -- Jerky, abrupt accelerations, both from a standing start and when increasing speed.

Braking -- Lurching as the vehicle comes to a stop.

Stopping Point -- Coming to a stop beyond the stop line or other designated stopping point.

Upshifting (manual transmission)

- Stalling
- Operating out of the designated rpm range
- Lugging
- Slipping the clutch
- Waiting too long to shift up
- Overrevving between gears
- Delayed shift between gears (losing too many rpm)
- Missed shift (having to drop back into original gear)
- Gear clash

Downshifting (manual transmission)

- Allowing engine speed to exceed or fall short of designated rpm range
- Gear/engine mismatch resulting in lurch as clutch is released
- Delayed shift
- Gear clash

Uphill Operation

- Lugging (failure to shift soon enough) (manual transmission)
- Excessive loss of speed
- Rolling back when starting on an incline
- Stalling the engine when starting on an incline (manual transmission)
- Excessive clutch slipping, particularly at high RPM when starting on an incline (manual transmission)

Downhill Operation

- Starting down the hill in too high a gear
- Failing to maintain steady brake pressure (e.g., fanning)
- Building up excessive speed due to gravity

Speed Adjustment/Curves -- Excessive speed in entering turn or at an intersection, is indicated by:

- Sharp lateral acceleration
- Braking while in the curve or turn

Lane Keeping/Straight -- Touching or crossing lane marking when operating in a straight line.

Lane Keeping/Curve -- Touching or crossing lane marking while in curve.

Lane Keeping/Turn -- Operating outside of the designated lane while in a turn.

Right Turn

Left front wheel touching or crossing lane marking

Right rear wheels cutting across curb or road edge

Left Turn

Beginning left turn too early (cutting across lanes approaching from the left)

Right front wheel crossing lane marking

STREET OPERATION: MODERATE DENSITY ENVIRONMENT

Purpose

The purpose of this lesson is to permit students to acquire confidence and proficiency in coping with the highway-traffic environment under conditions of moderate traffic.

Location -- On street

Routes

The routes selected for this lesson would be similar to those used in the previous lesson except that the areas and hours of the day would be selected to create a moderate amount of traffic.

Directions

The procedure employed in this lesson is identical to that of the previous lesson except for the following:

Duration -- The duration of each behind-the-wheel session may be increased to 15 minutes.

Assistance -- While instructors should be prepared to provide the type of assistance described in the earlier lesson, the student's need for it should decrease.

Observation

The observation made in this lesson and the checklist used would be the same as those of the previous lesson.

BASIC CONTROL CHECKLIST

If a driver makes a driving error in one of the categories blow, place a ally mark in the box.

BASIC CONTROL ERRORS	Driver **#1**	Driver **#2**	Driver **#3**
Acceleration *(jerky, abrupt. From standing or while moving)*			
Braking *(lurching to a stop)*			
Stopping *(Overshooting stop line)*			
Upshifting*(Stalling, lugging, overrevving, missing shift etc.)*			
Downshifting (*Gear/engine mismatch, clashing gears, etc.*)			
Uphill Operation *(Roll back, stalling, excessive speed loss, etc.)*			
Downhill Operation *(Building up excessive speed)*			
Speed Adjustment/Curves *(Entering too fast, braking in turn)*			
Lane-keeping/Straight *(Touching or crossing lane marking)*			
Lane-keeping/Turn *Operating outside designated lane)*			
Lane-keeping/curve *(Touching or crossing lane marking)*			

SEARCH ACTIVITY: LOW DENSITY TRAFFIC

Purpose

The purpose of this activity is to allow students to apply search practices in a street environment relatively free from other traffic.

Location -- On street

Route

The route to be employed in this lesson should expose the student to a broad range of roadways under low density traffic conditions. The student's relative lack of experience in operating on-street, in the presence of other traffic, could produce distraction and anxiety. Since practice of search activities is not dependent upon the presence of other road users, the lack of traffic will not prevent attainment of objectives. At a minimum, the route should include the following:

Path obstructions that force a change in speed or direction, and which are observable at a distance (e.g., traffic lights, lane drops, barricades).

Intersections at which right/left turns may be made.

Blind intersections (side traffic concealed by trees, buildings, etc.) at which the driver both has and must yield the right-of-way.

Multi-lane streets that permit lane changes to be made.

Freeway interchanges, including weave-type interchanges (used to enter, exit, and traverse).

Lane turns, such as alleys or driveways.

Directions

In addition to the general practices for on-street sessions described in the Introduction, this lesson will employ the following procedures:

- The students will operate for no more than twenty minutes at a time. Because of their lack of on-street experience and the intensity of the activity involved, long periods behind the wheel are likely to be fatiguing.
- For each twenty-minute session, driving students will devote from 1/4 to 1/2 the time employing commentary driving techniques to describe potential hazards. The instructor and observer students will use the information to assess the driver's search pattern.
- Instructions involving changes of speed or direction will be given well in advance of a maneuver in order that the instructions themselves will not serve as a cue for required search behavior.
- The instruction will direct the students to perform the following specific maneuvers at various points along the route:
  - Lane change: This is best done by alternating turns onto and off of a multi-lane road, e.g., a left turn followed by a right turn. The instructor should not have to request a lane change, thereby cueing search behavior.
  - Tight turn: The student should be instructed to turn into a driveway or alley in order to force a speed reduction where following traffic would not ordinarily expect it.
  - Right and left turns, at controlled and uncontrolled intersections, both having and yielding right-of-way.
  - Entering, leaving, and traversing freeway interchanges.

Observations

The instructor and observer students will observe and record driver errors in basic control and search activity using the checklists provided. Each error will be recorded by placing a checkmark next to the behavior that was performed incorrectly.

Since the driver's search behavior cannot be observed directly, it must be inferred from one or more of the following:

Commentary -- Student descriptions of potential hazards should be used only as a way of determining where students are looking, not what they are seeing. For example, a student preparing to make a left turn may correctly identify on-coming vehicles as a potential hazard but be in error for not searching the path to the left.

Eye/Head Movements -- Search behavior that requires movement of the driver's eyes and/or head may be observed by the instructor and observers through an eye-movement mirror. If there is no mirror available, or if observers cannot see the mirror, their observations would be restricted to those students behaviors that require head movement.

Speed/Direction Changes -- The driver's response to a situation in the path ahead that requires a change in speed and/or direction is an indication that the situation has been observed. Failure to respond does not necessarily indicate driver error since driver may have observed the situation and not recognized it as requiring action. However, it should be treated as a possible error to be discussed later in the critique of student performance.

The error categories described on the instructor and student checklists are as follows:

Distance Scanning -- Failure to respond to a visible requirement for a speed or direction change, at least 12 seconds in advance. Situations would include the following:

- Red light
- Lane drop
- Red flashing light
- Barricade or other obstruction
- Warning sign
- Parked vehicle (in travel lane)

Turn Path -- Failure to search the path ahead in a right or left turn.

Roadside Scanning -- Failure to respond to signs over or alongside the road, including:

- Posted speed limits
- lane control signs and signals
- Warning signs

Blind Intersection, Privileged -- Failure to slow and search for cross traffic when approaching a blind intersection as the "privileged" vehicle (having the right-of-way).

Blind Intersection, Burdened -- Failure to move to a position where cross traffic can be seen when stopped at a blind intersection as the "burdened" vehicle (the vehicle that must yield the right-of-way).

Mirror Usage, General -- Failure to observe rear-view mirror at least every ten seconds.

Mirror Usage, Slowing -- Failure to check rear-view mirror before slowing where following drivers would not anticipate it (e.g., tight turn, parallel parking).

Mirror Usage, Lane Change -- Failure to use the rear-view and check blind spot in the direction the lane change is to be made before initiating the lane change.

Mirror Usage, Merge -- Insufficient or excessive monitoring of mirrors prior to merging onto a highway from an access or acceleration lane.

INSTRUCTIONS FOR COMMENTARY DRIVING

- Identify any hazard, i.e., any road condition or road user that is a potential threat and which requires a response.
- Describe the hazard in a few words, identify it by nature and location--e.g.:

  "Child in the street on the left."

  "Yellow Volkswagen on the right."

  "Pavement in the shade of that culvert."
- Identify in a few words what makes it a hazard--e.g.:

  "Is looking the other way."

  "Is going to back up."

  "Is likely to be very slippery."

  "May be forced into my lane."
- Identify only those hazards which require some type of response. If no response is required, it is not a hazard. Students need not describe how they are responding.
- When there is no hazard, say nothing. There is no need to announce the absence of a hazard, e.g., "clear path."
- In conflict situations, students need only comment on the vehicle in conflict with their vehicle. They do not need to comment on the situation or third vehicle that puts the vehicle in conflict with their vehicle.

Examples

Driver Looking to the Side

"Oncoming driver may turn across my path"

Anticipatory Movement

"Car on right may enter my lane"

Merge Conflict

"Car on right may be forced into my path"

Intersecting Conflict

"Car ahead may be forced to stop quickly"

SEARCH ACTIVITY: MODERATE DENSITY TRAFFIC

Purpose

The purpose of this activity is to allow students to apply search practices under traffic conditions requiring a moderate degree of attention-sharing.

Location -- On street.

Route

The route employed in this lesson should expose students to the same range of conditions described in the previous activity. However, the routes selected should be characterized by moderate volume of traffic. At this point in the curriculum, high density (e.g., rush hour) traffic should be avoided in order to not to impose a burden with which the student is not yet prepared to cope, and in order to avoid long traffic delays.

Directions and Observations

The procedures employed in carrying out the activity, and the observations of driver performance to be made are the same as those described in SEARCH ACTIVITY: LOW DENSITY TRAFFIC. The same instructor and student checklists may be used

VISUAL SEARCH CHECKLIST

If a driver makes a driving error in one of the categories below, place a tally mark in the box.

BASIC CONTROL ERRORS	Driver #1	Driver #2	Driver #3
Acceleration			
Braking			
Stopping			
Upshifting			
Downshifting			
Uphill operation			
Downhill operation			
Speed adjustment/curves			
Lane-keeping/straight			
Lane-keeping/turn			
VISUAL SEARCH			
Distance scanning			
Turn path search			
Roadside scanning			
Blind intersection, privileged			
Blind intersection, burdened			
Mirror usage, general			
Mirror usage, slowing			
Mirror usage, lane change			
Mirror usage, merge			

An explanation of errors on the Visual Search Checklist is provided on the next page.

EXPLANATION OF DRIVER ERRORS ON VISUAL SEARCH CHECKLIST

Distance Scanning -- Failure to respond to a visible requirement for a speed or direction change, at least 12 seconds in advance. Situations would include the following:

- Red light
- Lane drop
- Red flashing light
- Barricade or other obstruction
- Warning sign
- Parked vehicle (in travel lane)

Turn Path Search -- Failure to search the path ahead in a right or left turn.

Roadside Scanning -- Failure to respond to signs over or alongside the road, including:

- Posted speed limits
- Lane control signs and signals
- Warning signs

Blind Intersection, Privileged -- Failure to slow and search for cross traffic when approaching a blind intersection as the privileged vehicle (having the right-of-way)

Blind Intersection, Burdened -- Failure to move to a position where cross traffic can be seen when stopped at a blind intersection as the "burdened" vehicle (the vehicle that must yield the right-of-way).

Mirror Usage, General -- Failure to observe rear-view mirror at least every ten seconds.

Mirror Usage, Slowing -- Failure to check rear-view mirrors before slowing where following drivers would not anticipate it (e.g., tight turn, parallel parking).

Mirror Usage, Lane Change -- Failure to use the rear-view and side view mirror and check blind spot in the direction the lane change is to be made before initiating the lane change.

Mirror Usage, Merge -- Insufficient or excessive monitoring of mirrors prior to merging onto a highway from an access or acceleration lane.

COMMUNICATION ACTIVITY

Purpose

The purpose of this activity is to allow students to apply communication practices within the highway traffic environment.

Location -- On street.

Route

The route chosen for this lesson should permit the maneuvers described in earlier street lessons. However, a greater number of turns and lane changes should be called for in order to provide opportunities for both greater use of turn signals and practice in performing turning maneuvers. Alternating right and left turns onto and off of multi-lane roads provides opportunities to turn and neces sitates lane changing maneuvers.

Directions

No special procedures beyond those described in the Introduction are required.

Observations

Student and instructor should observe and record errors in carrying out basic control, search and communication behaviors using the checklists provided. Communication errors are as follows:

Signaling Turns -- errors in signaling right and left turns at intersections

None -- Failure to activate the signal at any point in the turn

Late -- Failure to activate the signal before reaching the intersection

Early -- Misleading other road users by an early signal

Lane Changing -- Errors in signaling lane changes.

Signalling

None -- Failure to activate the signal at any point in the lane change

Late -- Failure to activate signal soon enough before starting lane change

Inappropriate -- Signaling a lane change when there is no gap to move into and enough time to wait for a gap to appear.

Position -- Failure to use vehicle position to communicate intention to change lanes

Canceling signal -- Failure to cancel a signal properly

Late -- Canceling more than 5 seconds after a lane change is completed

Early -- Canceling the signal while still in the process of changing lanes

Flashers -- Failure to activate emergency flashers when slowing or stopped as provided for by State law (see code of Iowa, sec.321.317(5))

Brake Lights --Failure to flash brake lights when slowingor stopping unexpectedly, including:

- Stalled traffic ahead
- Mid-block (e.g., alley)
- Prior to parallel parking

Use of Horn -- Errors in using horn

Insufficient -- Failure to use horn under appropriate circumstances

Improper -- Using the horn improperly (e.g., to express anger)

Interpreting Communication -- Errors involving recognition and interpretation of communication from others.

Receiving -- Failure to react and adjust to communications of others

Misinterpreting -- Misinterpreting communications from others reacting accordingly

Students should also note signalling lapses of other drivers as they occur, and comments upon the hazard they represent to other road users.

COMMUNICATIONS CHECKLIST

If a driver makes a driving error in one of the categories below, place a tally mark in the box.

BASIC CONTROL	#1	#2	#3
Acceleration			
Braking			
Stopping			
Upshifting			
Downshifting			
Uphill Operation			
Downhill Operation			
Speed Adjustment/Curves			
Lane-Keeping/Straight			
Lane-Keeping/Turn			

VISUAL SEARCH	#1	#2	#3
Distance Scanning			
Turn Path Search			
Roadside Scanning			
Blind Intersect.,Priv.			
Blind Intersect, Burd.			
Mirror Usage, General			
Mirror Usage, Slowing			
Mirror Usage, Merge			
Mirror Usage,Lane Ch.			

COMMUNICATION	#1	#2	#3
Signaling Turns: None			
Late			
Early			
Lane Changing: Signaling			
None			
Late			
Inappropriate			
Lane Changing: Position			
Late			
Early			
Lane Changing: Canceling			
Late			
Early			
Flashers			
Brake Lights			
Use of Horn:			

An explanation of errors of the Communications Checklist is provided on the next page.

EXPLANATION OF ERRORS ON COMMUNICATIONS CHECKLIST

Signaling Turns -- errors in signaling right and left turns at intersections

None -- Failure to activate the signal at any point in the turn

Late -- Failure to activate the signal before reaching the intersection

Early -- Misleading other road users by an early signal.

Lane Changing -- Errors in signaling lane changes.

Signaling

None -- Failure to activate the signal at any point in the lane change

Late -- Failure to activate signal soon enough before starting lane change

Inappropriate -- Signaling a lane change when there is no gap to move into and enough time to wait for a gap to appear.

Position -- Failure to use vehicle position to communicate intention to change lanes

Changing signal -- Failure to cancel a signal properly

Late -- Canceling more than 5 seconds after a lane change is completed

Early -- Canceling the signal while still in the process of changing lanes

Flashers -- Failure to activate emergency flashers when slowing or stopped as provided for by State law.

Brake Lights -- Failure to flash brake lights when slowing or stopping unexpectedly, including:

- Stalled traffic ahead
- Mid-block (e.g., alley)
- Prior to parallel parking.

Use of Horn -- Errors in using horn

Insufficient -- Failure to use horn under appropriate circumstances

Improper -- Using the horn improperly (e.g., to express anger).

Interpreting Communication -- Errors involving recognition and interpretation of communication from others

Receiving -- Failure to react and adjust to communications of others

Misinterpreting -- Misinterpreting communications from others reacting accordingly.

MANAGING SPACE

Purpose

The purpose of this activity is to allow students to apply space management practices within the highway traffic environment.

Location -- On street

Route

The route chosen for this lesson should permit the maneuvers described in earlier street lessons. However, greater traffic density is both permitted by the amount of street operation the student has had prior to this lesson and needed in order to provide opportunities to apply space management principles. The driving environment should include urban areas with traffic or moderate density as well as suburban, rural, and expressway driving.

Directions

In addition to the general procedures used for on-street lessons the following procedure should be used during this lesson:

> Following Distance Illustration -- At various points along the route, the instructor should direct the driver to adopt following distances of 2-4 seconds in order to illustrate the ability to maintain adequate following distances without having large number of other vehicles intrude upon the gap.

In order to avoid hazard to instructor and students and to avoid liability to the school, the instructor must intervene whenever the student's action presents a clear and present danger. Specifically, students should be warned if they are:

- About to accept an inadequate gap.
- Entering a lane from which they are prohibited by law.
- In danger of cutting off another vehicle by a premature lane change.
- In danger of placing the vehicle where it will obstruct traffic.
- Continuing to follow closer than permitted by law.

Observations

Student and instructor should observe and record errors in carrying out basic control, search, communication, and space management behavior using the checklists provided. Space management errors are as follows:

Separation

> Following distance -- Not maintaining a minimum two second following distance
>
> Lateral separation -- Failure to adjust lane position in response to hazards on the right, e.g., parked vehicles, or hazards to the left, e.g., being passed by oncoming or overtaking vehicles.
>
> Passing distance -- Changing lanes too quickly in front of a vehicle that has been passed.

Gaps

> Too close -- Attempting to cross or enter an insufficient gap.
>
> Too far -- Passing up an acceptable opportunity to cross or enter traffic.

Merging

Barging -- Causing a vehicle to alter speed/direction in order to avoid an accident during a merge attempt.

Stopping -- Slowing or stopping when an earlier speed adjustment would have permitted a continuous merge.

Traffic Adjustments

Compromising -- Passing two potential hazards simultaneously when a speed adjustment would have allowed them to be passed in sequence.

Adjacent Operation -- Unnecessarily prolonged operation alongside an adjacent vehicle or vehicles.

SPACE MANAGEMENT CHECKLIST

If a driver makes a driving error in one of the categories below, place a tally mark in the box.

BASIC CONTROL	#1	#2	#3
Acceleration			
BrakingTurn			
Stopping			
Upshifting			
Downshifting			
Uphill Operation			
Downhill Operation			
Speed Adjustment/Curves			
Lane-Keeping/Straight			
Lane-Keeping/Turn			

VISUAL SEARCH	#1	#2	#3
Distance Scanning			
Path Search			
Roadside Scanning			
Blind Intersect.,Priv.			
Blind Intersect, Burd.			
Mirror Usage, General			
Mirror Usage, Slowing			
Mirror Usage, Merge			
Mirror Usage,Lane Ch.			

COMMUNICATION	#1	#2	#3
Signaling Turns: None			
Late			
Early			
Lane Changing: Signaling			
None			
Late			
Inappropriate			
Lane Changing: Position			
Late			
Early			
Lane Changing: Canceling			
Late			
Early			
Flashers			
Brake Lights			
Use of Horn:			
Insufficient			
Improper			
Interpreting Comm.:			
Receiving			
Misinterpreting			

SPACE MANAGEMENT	#1	#2	#3
Separation:			
Following Distance			
Lateral Separation			
Passing Distance			
Gaps:			
Too Close			
Too Far			
Merging:			
Barging			
Stopping			
Traffic Adjustments:			
Compromising			
Adjacent Operation			

An explanation of errors on the Space Management Checklist is provided on the next page.

EXPLANATION OF ERRORS ON SPACE MANAGEMENT CHECKLIST

Separation

Following distance -- Not maintaining a minimum two second following distance

Lateral separation -- Failure to maintain a center lane position when passing parked vehicles, or being passed by oncoming or overtaking vehicles.

Passing distance -- Changing lanes too quickly in front of a vehicle that has been passed.

Gaps

Too close -- Attempting to cross or enter an insufficient gap.

Too far -- Passing up an acceptable opportunity to cross or enter traffic.

Merging

Barging -- Causing a vehicle to alter speed/direction in order to avoid an accident during a merge attempt.

Stopping -- Slowing or stopping when an earlier speed adjustment would have permitted a continuous merge.

Traffic Adjustments

Compromising -- Passing two potential hazards simultaneously when a speed adjustment would have allowed them to be passed in sequence.

Adjacent Operation -- Unnecessarily prolonged operation alongside an adjacent vehicle or vehicles.

APPLICATION OF SAFE OPERATING PROCEDURES

Purpose

The purpose of this lesson is to provide students with an opportunity to (1) develop vehicle handling skills within the street environment, and (2) apply safe operating practices, including search, communication, speed management, space management, and hazard recognition.

Location -- On street.

During this lesson, student should be exposed to the fullest possible range of operating conditions, including the following:

Roads--Students should operate over urban and suburban streets, rural highways, and expressways.

Traffic Conditions--In the first few sessions, traffic density should be relatively low. However, as the lessons continue, students should be exposed to increasingly heavy traffic, including (1) rush hour traffic on main arteries, and (2) midday traffic in urban areas.[1]

Environment--Following the completion of Unit 2.5, students should begin driving under the fullest possible range of environmental conditions.

- Operating on snow or ice, where safe, should be allowable after student has achieved a reasonable amount of on-street experience.
- Weather conditions that are so hazardous as to cause discontinuation of normal driving should also result in stopping on-street training.
- If off-street areas are available, they should be utilized during extremely bad weather to provide practice in maneuvering under conditions of limited traction.

Direction

The general procedures for street lessons, as listed in the Introduction, should be employed with the following exceptions:

1.Instructor and observers should critique driver's while they are driving. By this time, the drivers' vehicle handling skills should be sufficiently developed to permit them to listen to the instructor and observer commentary without adverse affect upon their driving.

2.Extreme care should be exercised to make sure that this lesson does not degenerate into "joyriding" sessions. Without effort by the instructor to keep observers involved, they will not remain actively involved in the driving process. If they are not involved, they will not be learning. And, if they are not learning, there is no point in their being in class.

Observations

The driver performance observed in this lesson should include the total range of behavior dealt with in all other street lessons.

[1] **While students should have an opportunity to experience driving in very dense traffic, not much time should be devoted to it as it doesn't provide much opportunity for learning.**

SPACE MANAGEMENT CHECKLIST

If a driver makes a driving error in one of the categories below, place a tally mark in the box.

BASIC CONTROL	#1	#2	#3
Acceleration			
BrakingTurn			
Stopping			
Upshifting			
Downshifting			
Uphill Operation			
Downhill Operation			
Speed Adjustment/Curves			
Lane-Keeping/Straight			
Lane-Keeping/Turn			

VISUAL SEARCH	#1	#2	#3
Distance Scanning			
Path Search			
Roadside Scanning			
Blind Intersect.,Priv.			
Blind Intersect, Burd.			
Mirror Usage, General			
Mirror Usage, Slowing			
Mirror Usage, Merge			
Mirror Usage,Lane Ch.			

COMMUNICATION	#1+	#2	#3
Signaling Turns: None			
Late			
Early			
Lane Changing: Signaling			
None			
Late			
Inappropriate			
Lane Changing: Position			
Late			
Early			
Lane Changing: Canceling			
Late			
Early			
Flashers			
Brake Lights			
Use of Horn:			
Insufficient			
Improper			

SPACE MANAGEMENT	#1	#2	#3
Separation:			
Following Distance			
Lateral Separation			
Passing Distance			
Gaps:			
Too Close			
Too Far			
Merging:			
Barging			
Stopping			
Traffic Adjustments:			
Compromising			
Adjacent Operation			

HAZARD RECOGNITION

Purpose

The purpose of this exercise is to expose students to common road and traffic hazards in order to give them an opportunity to assess and broaden their hazard recognition capability.

Location -- On street

It is almost impossible to select routes specifically in terms of the great array of hazards characterized in highway traffic environment--particularly when the majority of them are dependent upon traffic and weather conditions that vary from one moment to the next. However, the following conditions, over all, should provide ample exposure to common hazards:

Road--A variety of road surface conditions and configurations, including:

- Narrow Roads
- Degraded surfaces
- Deteriorating roadside conditions
- Intersections

Traffic--High density traffic conditions, including:

- Parked vehicles
- Pedestrian traffic in the road
- Merge points
- Congested areas
- Buses and taxis

Because of the number of on-street lessons preceding this one, the student should be able to cope with the road and traffic conditions giving rise to common hazards.

Directions

In addition to the general procedures described in the Introduction, the following procedures should be used in this lesson;

Duration--The intensity of effort involved in observing hazards, particularly during commentary driving, can be somewhat fatiguing. Therefore, it is wise to limit each behind-the-wheel stint to 15-20 minutes.

Commentary Driving--Five minutes out of each behind-the-wheel stint should be devoted to use of commentary driving techniques. These procedures will have been introduced in the preced ing lesson, but should be reviewed with students prior to starting the lesson. Instructions for commentary driving are provided at the end of the exercise. "Search Activity: Low Density Traffic".

Identification of Hazards--The instructor should not call students' attention to hazards during driving since it will tend to distract their attention from identification of other hazards. The obvious exception is when a threat to safety exists.

Recording Performance--In contrast with previous street lessons, instructor and observers should record correct responses as well as those that are incorrect. Identification of correct responses will benefit student observers who may not have noticed the hazard or the student's response.

Method of Observation--The driver's recognition of a hazard must be inferred from one of the following observable responses:

Commentary--During the commentary driving phase, the driver's recognition of a hazard will be inferred from the driver's oral commentary.

Control Response--During driving without commentary, instructor and observers can infer hazard recognition by one or more of the following:

___ Changing Speed--Removing the foot from the accelerator, covering the brake, or applying the brake.

___ Changing Direction--Changing lanes or position within lane away from the hazard.

___ Signaling--Tapping the horn or flashing lights.

Observations

The instructor will observe for failure to identify and/or react to hazards. Any potential threat to the safety of the vehicle qualifies as a hazard. The number of hazards is far too large to be identified in this lesson plan or on the Hazard Recognition Checklist. The instructor is referred to the classroom lesson plan for examples of common hazards.

HAZARD RECOGNITION CHECKLIST

During commentary driving, place a tally mark under "Yes" if the driver correctly identifies and describes a hazard. Place a tally mark under "No" if the driver does not correctly identify and describe a hazard.

During on-street driving without commentary driving, use the checklist to indicate whether or not the driver responds correctly to a hazard.

HAZARD RECOGNITION	YES	NO
Road Characteristics		
Surface		
Configuration		
Road User Characteristics		
Obstructed Vision		
Distraction		
Confusion		
Low Speed		
Incapacity		
Road User Activities		
Driver Movement		
Vehicle Movement		
Pedestrians/Cyclists		
Conflicts		
Obstructions		
Merging		
Intersecting		

An explanation of hazards on the Hazard Recognition Checklist is provided on the next page.

EXPLANATION OF CATEGORIES OF HAZARDS ON HAZARD RECOGNITION CHECKLIST

Road Characteristics--Characteristics of the road that provide hazard clues, including:

Surface--Clues to potentially dangerous road surface conditions including slippery surfaces, loose gravel and uneven road surface.

Configuration--Clues to potentially dangerous roadway configuration including sharp curves, dangerous ramps, blind intersections.

Road User Charracteristics--Characteristics of road users that identify them as potential hazards, including:

Obstructed Vision--Clues indicating the inability of a road user to see the student vehicle.

Distraction--Clues indicating that another road user may be distracted and, therefore, unable to devote attention to the student vehicle.

Confusion--Clues that another road user may be confused and, therefore, a candidate for some unexpected action.

Low Speed--Clues indicating that a vehicle ahead is traveling at a speed that would cause the student vehicle to overtake very quickly.

Incapacity--Clues that another driver is unable to respond appropriately to the student vehicle because of intoxication, fatigue, or some other incapacity.

Road User Activities--Activity on the part of any road user that indicates a potentially hazardous course of action, including:

Driver Movement--Any motion on the part of the driver that signals an impending change in speed or direction.

Vehicle Movement--Any motion on the part of the vehicle that signals an impending change in speed or direction.

Pedestrian/Cyclists--Any motion on the part of a pedestrian, bicyclist, or moped rider that signals an impending change in speed or direction.

Conflict--Any vehicle that is on a collision course with an object or other road user, signaling an impending change in speed or direction, including conflicts with:

Obstructions--Roadway configurations with fixed objects in the path of the other vehicle.

Merges--Vehicles merging into the path of the other vehicle.

Intersections--Vehicles intersecting with the road user.

EMERGENCY STOP

Purpose

The purpose of this exercise is to develop the student's ability to bring the vehicle to a quick, controlled stop during an emergency situation.

Location -- Off street

Directions

1. Place markers to form an alley, that is 10 feet in width and at least 100 feet in length along which the vehicle can be brought to a controlled stop. At the entrance to the alley should be a "braking point", consisting of a flag or clearly identifiable traffic cone, to signal the point at which brakes are to be applied.

2. Drivers will approach the maneuver area (alley). Upon reaching the Braking Point they must apply the brakes and bring the car to a stop.

3 .Each session with a student will consist of five emergency braking stops each at 10 mph, 20 mph, and 30 mph for a total of fifteen emergency stops

If the student does not perform the maneuver correctly at a certain speed, repeat that same entry speed until maneuver is completed.

4. If there is more than one student, the students will rotate from BTW to posts on the range to observe wheel movement. The instructor should instruct observer students to observe the braking technique employed by the driver (by observing tire rotation) and its effect upon stopping distance.

5. The Instructor will ride in the vehicle to monitor exercise entry speed and braking technique.

6. If the student achieves minimum braking distance prior to the end of the 5 runs for each speed, the additional time may be given to students who are slower to learn.

7. Discuss with student(s) the loss of control and longer stopping distances associated with full lockup. If any student is unconvinced, demonstrate a full lockup at 10 mph.

Observation

The instructor will observe for failure to perform the following procedures properly:

- Apply brakes quickly
- Apply brakes to just short of lockup
- Release brake pressure to keep wheels just short of lockup until vehicle has come to a complete stop

The instructor should watch for the following problems:

1.Too strong an application--Student continually brakes to the point of lockup

2.Stiffening at the wheel--Using a "Whoa Nellie" grip on the wheel resulting in inability to turn wheel quickly enough.

3.Cheating on maneuver--Approaching too slowly or braking too soon.

4. Underapplication--If stopping distance does not decrease after repeated runs, students may not be applying maximum braking pressure.

Evaluation

Student performance will be evaluated against the following criteria:

1. Uses minimum stopping distance consistently.

2. Maintains control of vehicle.

EVASIVE STEERING

Purpose

The purpose of this exercise is to develop students ability to perform evasive steering maneuvers. Several different maneuvers will be practiced, including: left and right evasive steer; evasive steer and stop; and controlled brake, evasive steer, brake.

Location -- Off street

Directions

1.Layout a course consisting of two parallel rows of cones, 100 feet long and 30 feet apart. The center 10 feet of the entrance to the alley created by the cones will be blocked by cones so that vehicles entering the alley will have to enter at the left or right of the alley. The left and right entrances will both be 10 feet wide.

One cone will be placed approximately 50 feet in front of the entrance to the alley to mark the decision point.

2.Each session with a student will follow the pattern listed:

a.Maneuver 1 Evasive Steering Right or Left--During this maneuver, the instructor will direct each student to:

(1) On command of the instructor, accelerate to 30 mph moving toward the blocked center portion of the alley.

(2)At the decision point the instructor will command the student to steer either to the right or left around the barrier; with no braking.

(3)Perform the maneuver as smoothly and as quickly as possible.

(4)Return to start point, repeat until the time allotted the student has elapsed.

b.Maneuver 2 Evasive Steering with Controlled Brake and Stop--During the maneuver, the instructor will direct each student to:

Steps (1)-(4) of Maneuver 1 are to be followed, except:

(2)After steering right or left, bring the vehicle to a stop as quickly as possible (without locking the brakes).

c.Maneuver 3 Brake-Evasive Steer-Stop During the Maneuver--The instructor will direct each student to:

Steps (1)-(4) of Maneuver 1 are to be followed, except:

(2)As soon as the right or left command is given, the student should brake to reduce speed before evasive steering, release brakes and steer, reapply brakes to stop as quickly as possible.

3.If there is more than one student, the students will rotate from behind the wheel to a position on the range to observe evasive steering techniques.

4.The instructor will ride in the vehicle to monitor student performance.

5.Each maneuver will be performed at 30 mph.

Observations

The instructor will observe for failure to perform the following procedures properly:

Minimize turn

Start as early as possible
Turn only as much as needed

Turn quickly

Use hand-over-hand technique

Avoid braking in turn

Could lock wheel
Locking wheels during turn could result in loss of control

Countersteer

Must be prepared to countersteer quickly
Initiate countersteer as soon as front of vehicle clears obstacle

Brake to stop

Apply brakes quickly
Apply brakes to just short of lockup
Keep brake pressure just short of lockup until vehicle has come to a complete stop

Instructor should watch for the following common problems:

1.Turning the wrong way--Students who "guess" at the steer command will turn in the wrong direction about half of the time. Such students should be instructed to approach barrier at a lower speed until the maneuver has been performed correctly.

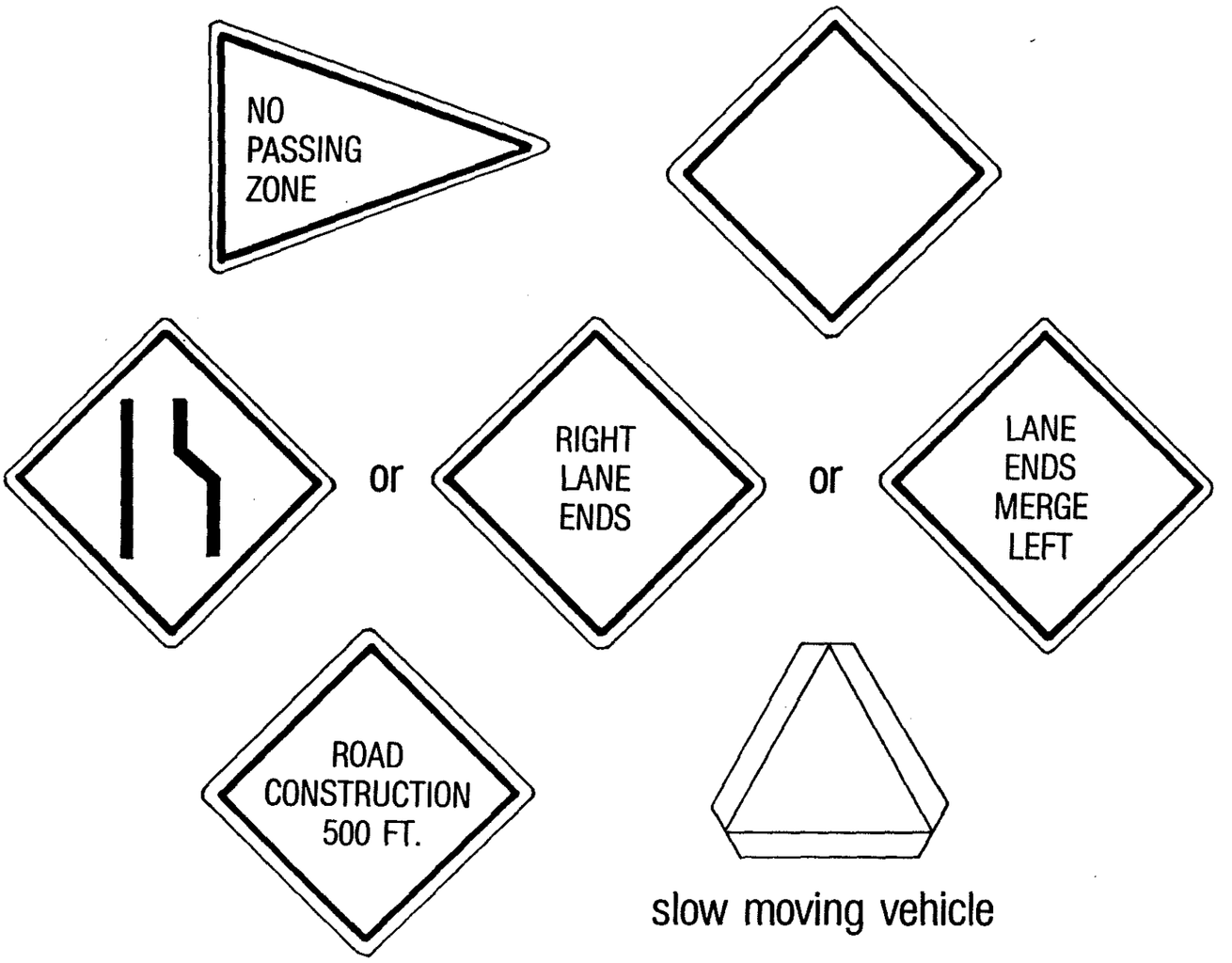
2.Failure to perform correctly--Students who continue to have problems with any exercise, should reduce the approach speed in 5 mph decrements. If this does not work, tell the student in which direction to start before approaching the decision point. After the student has mastered this evasive steering, return to the practice of withholding the direction of turn until the decision point has been reached.

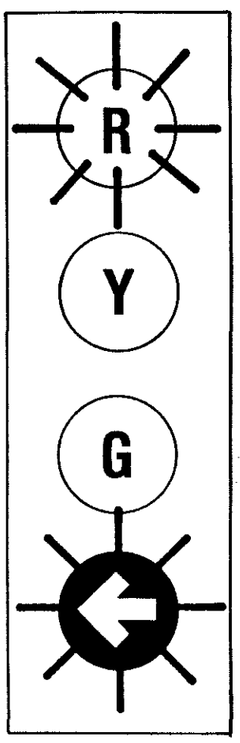
Evaluation

Student will be evaluated against the following criteria:

- Does not hit exercise markers
- Does not lock wheels during braking
- Steers in the correct direction on command

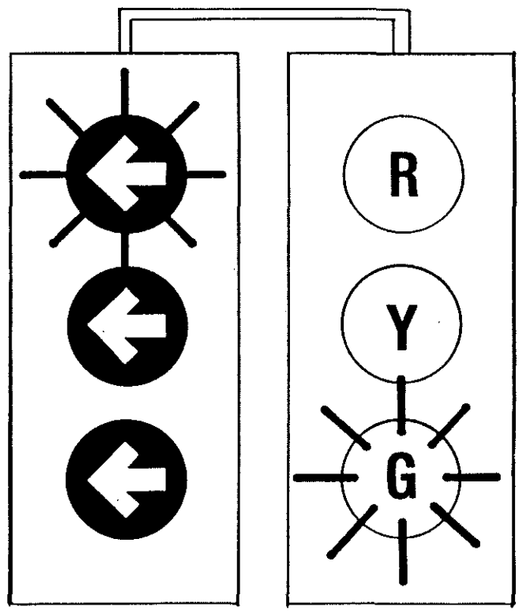
VISUALS

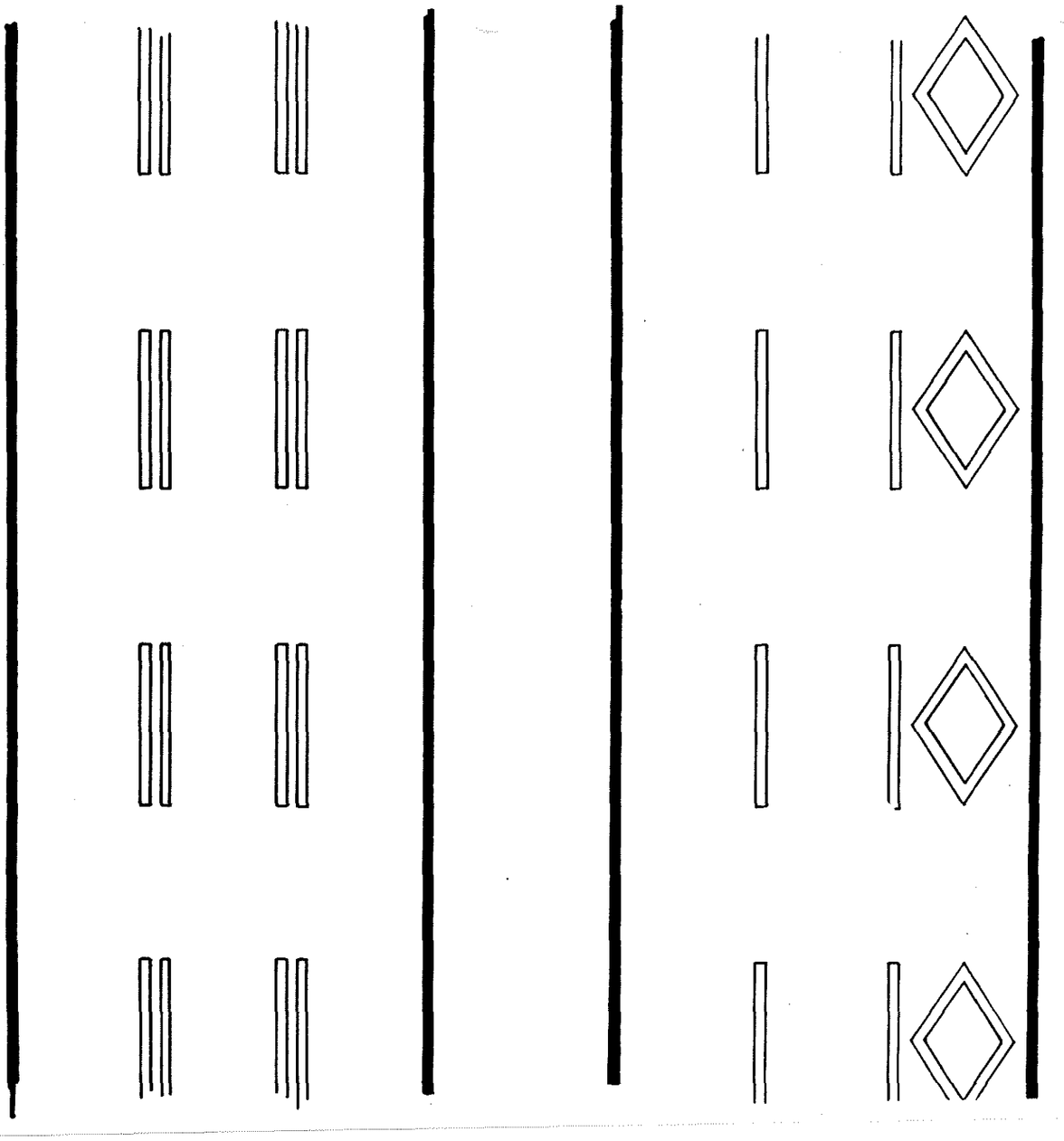

NO
PASSING
ZONE
or
RIGHT
LANE
ENDS
or
LANE
ENDS
MERGE
LEFT
ROAD
CONSTRUCTION
500 FT.
slow moving vehicle



green—Go.
Do not stop.

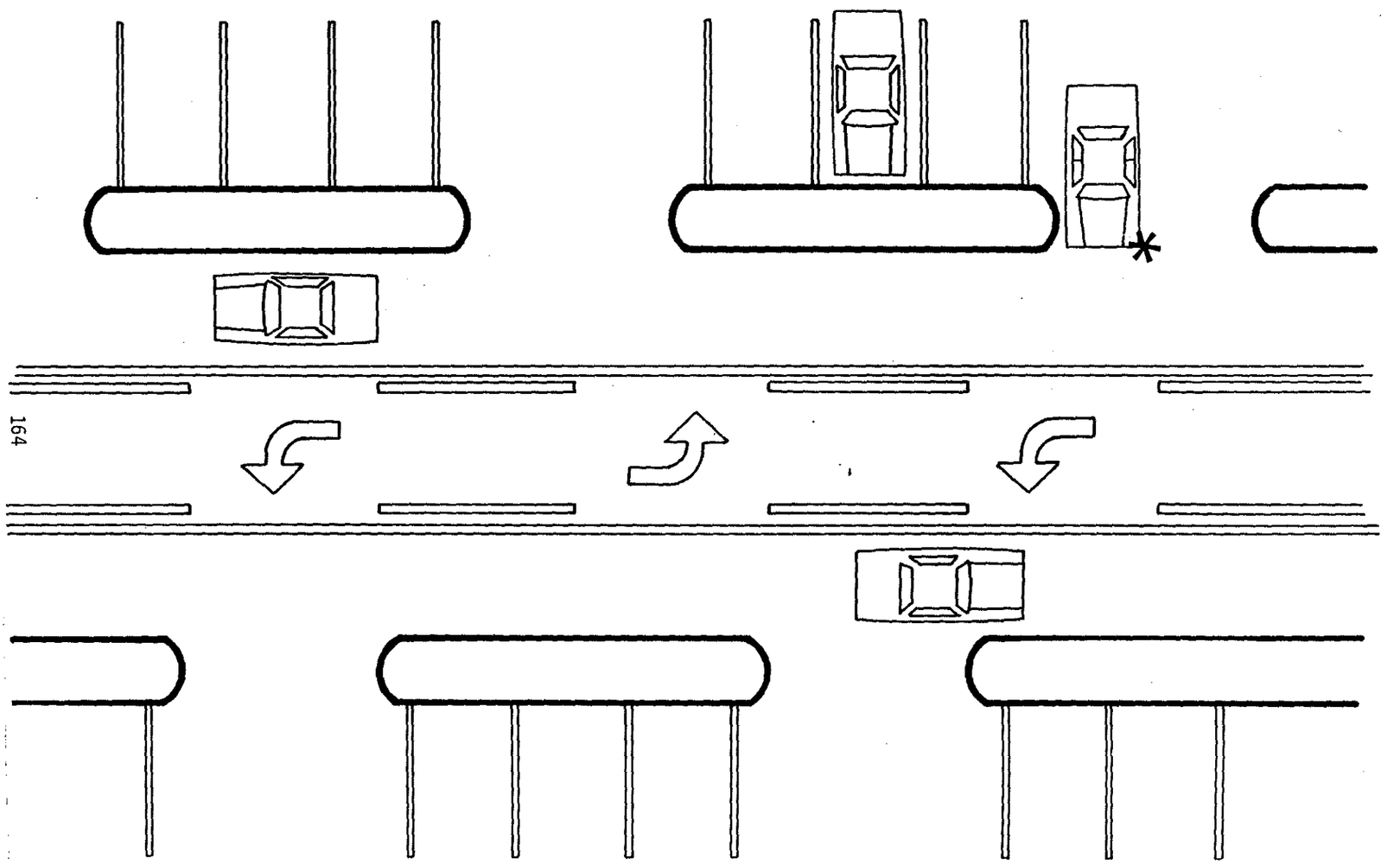
red—Stop.
Wait for green arrow.



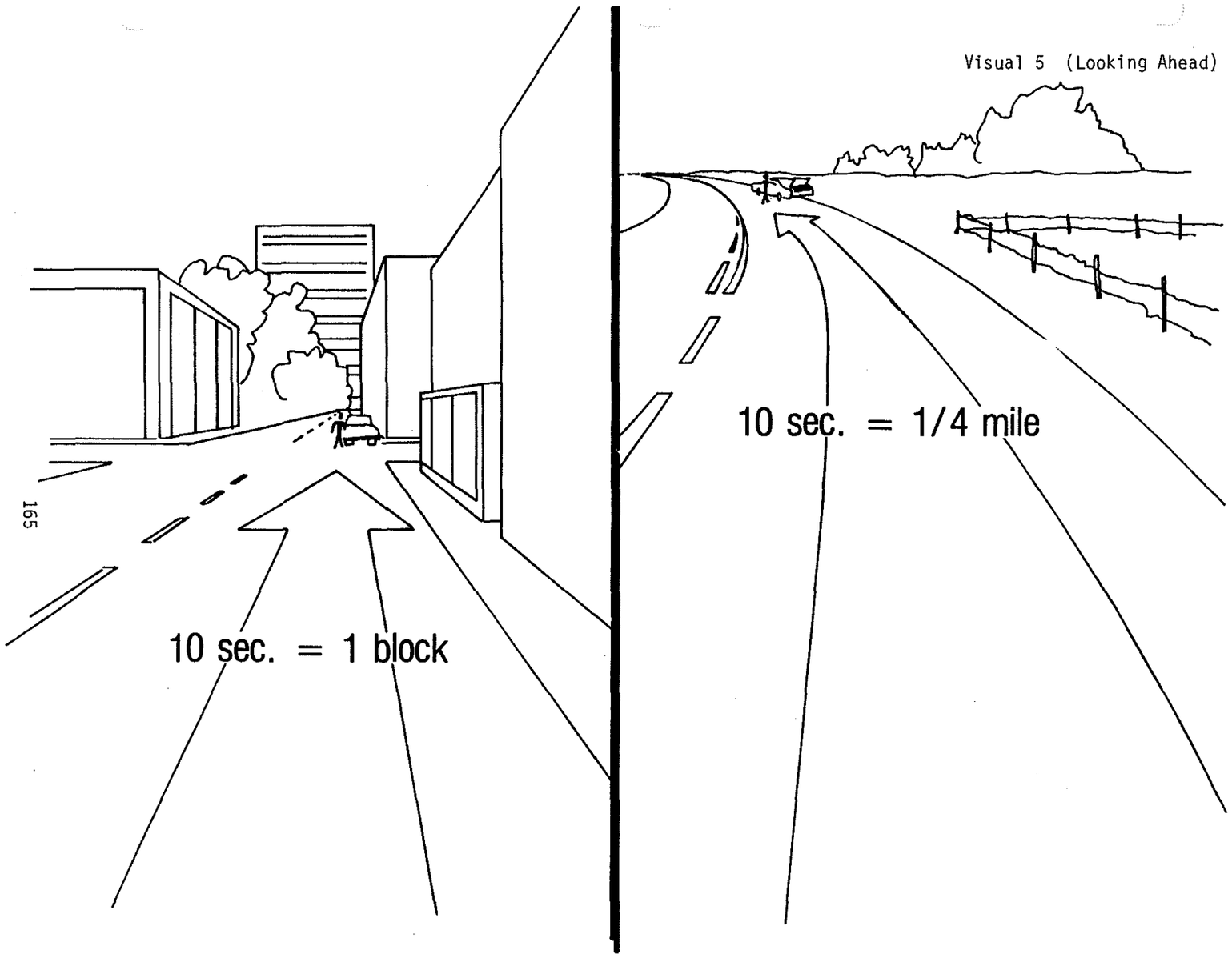


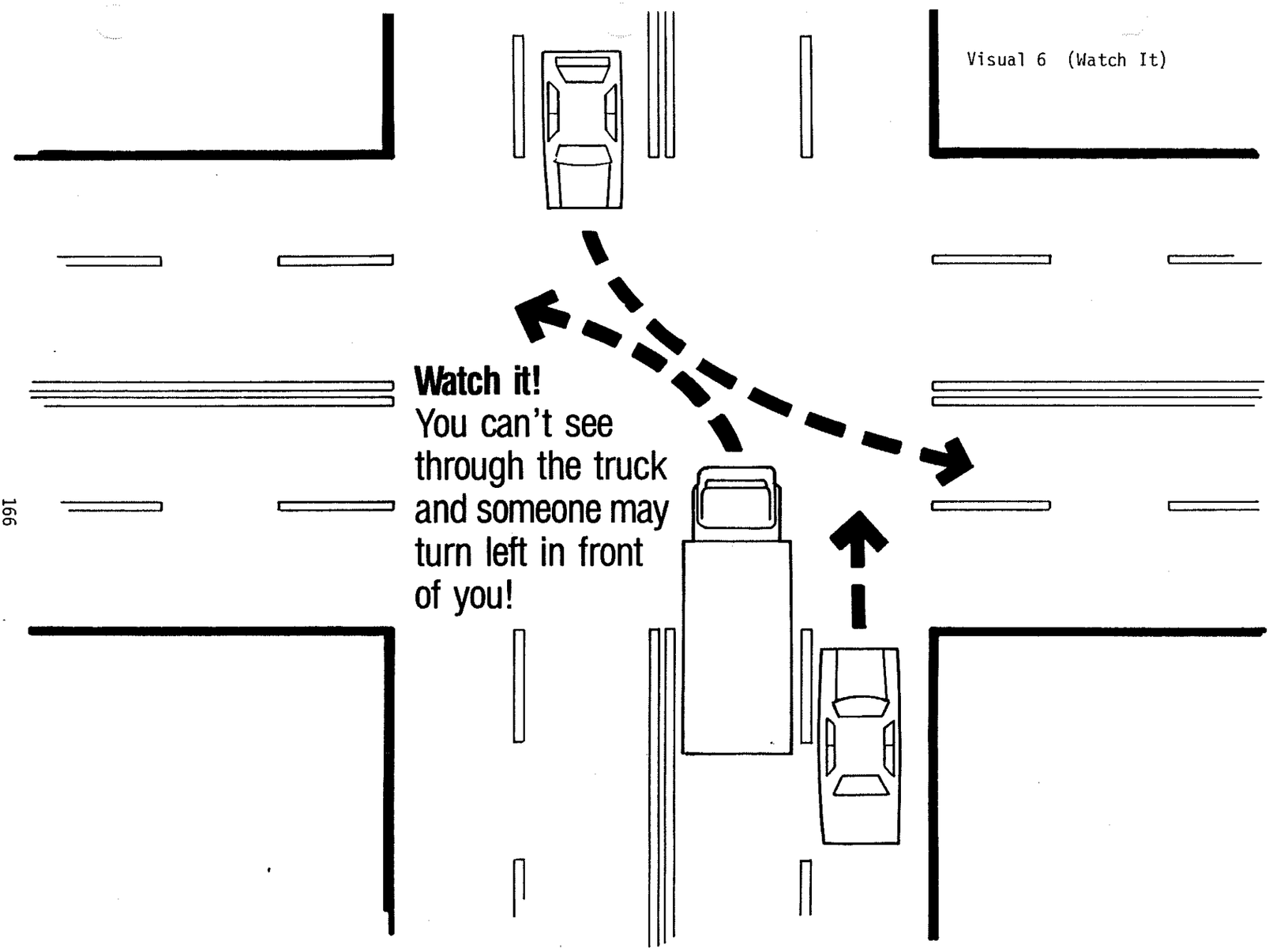
Visual 3
(Lane
Markings)

Visual 4 (Shared Left-turn Lane)

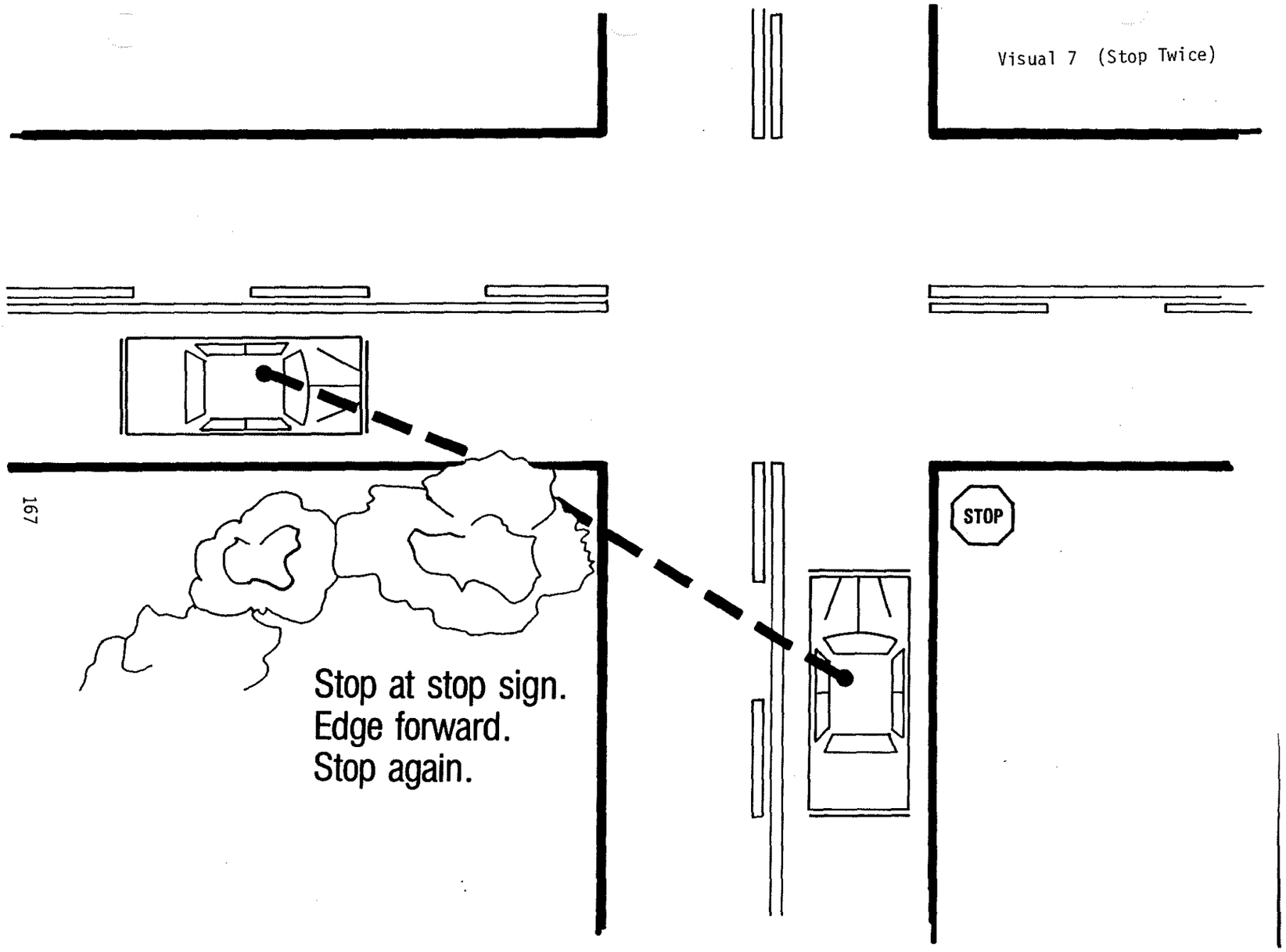


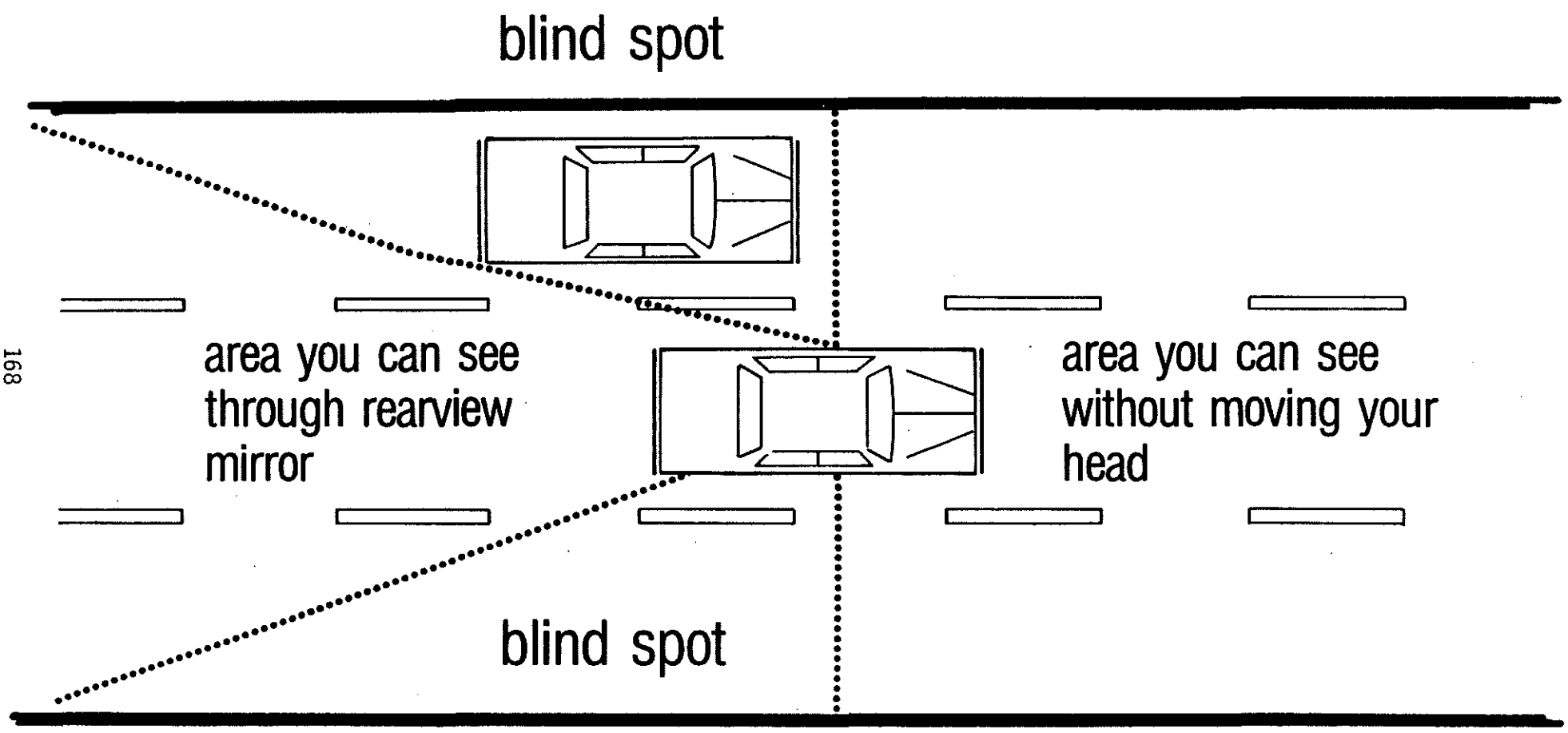
Visual 5 (Looking Ahead)

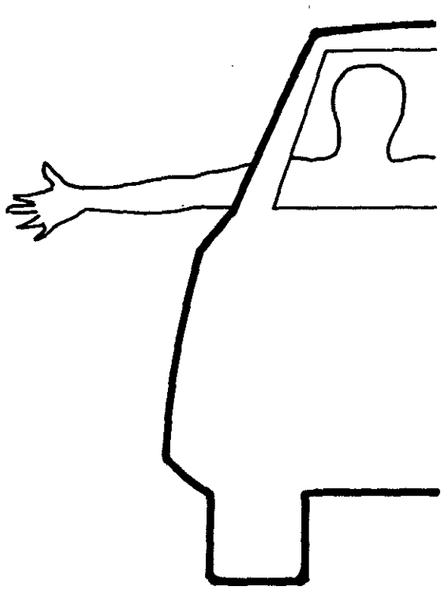



Watch it!
You can't see through the truck and someone may turn left in front of you!

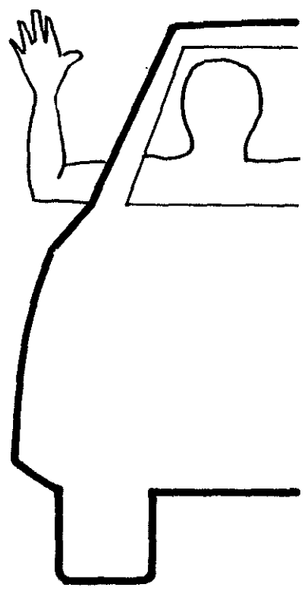
Visual 7 (Stop Twice)



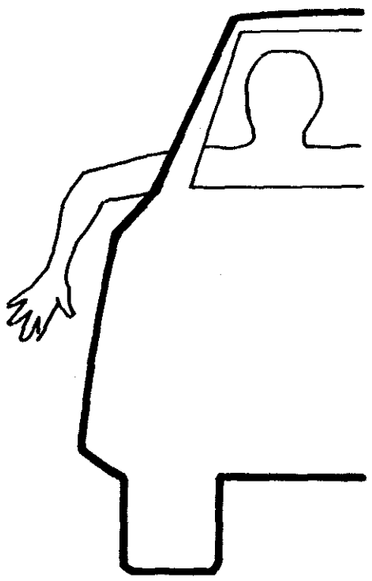

blind spot
area you can see through rearview mirror
area you can see without moving your head
blind spot



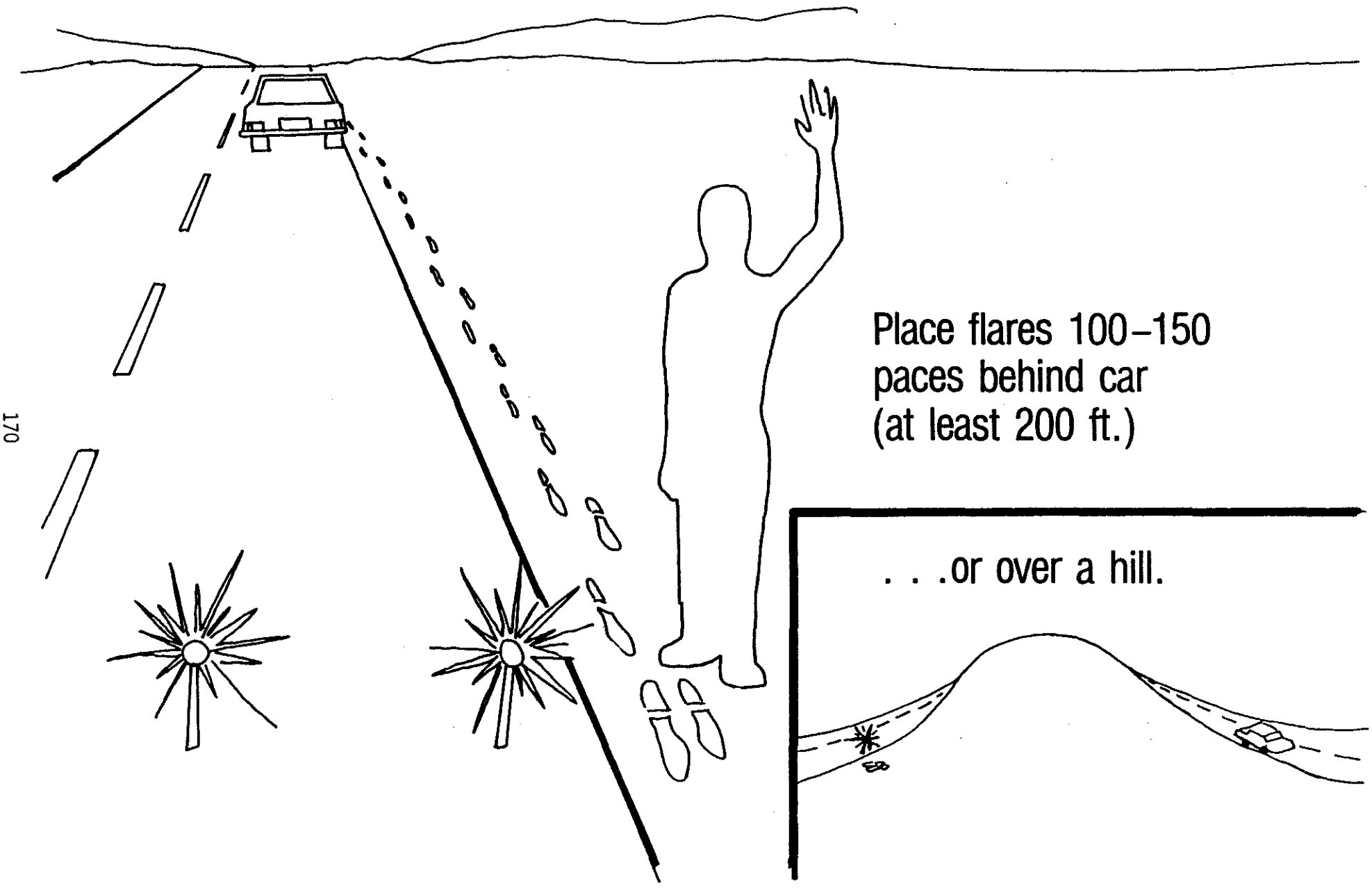
left turn signal



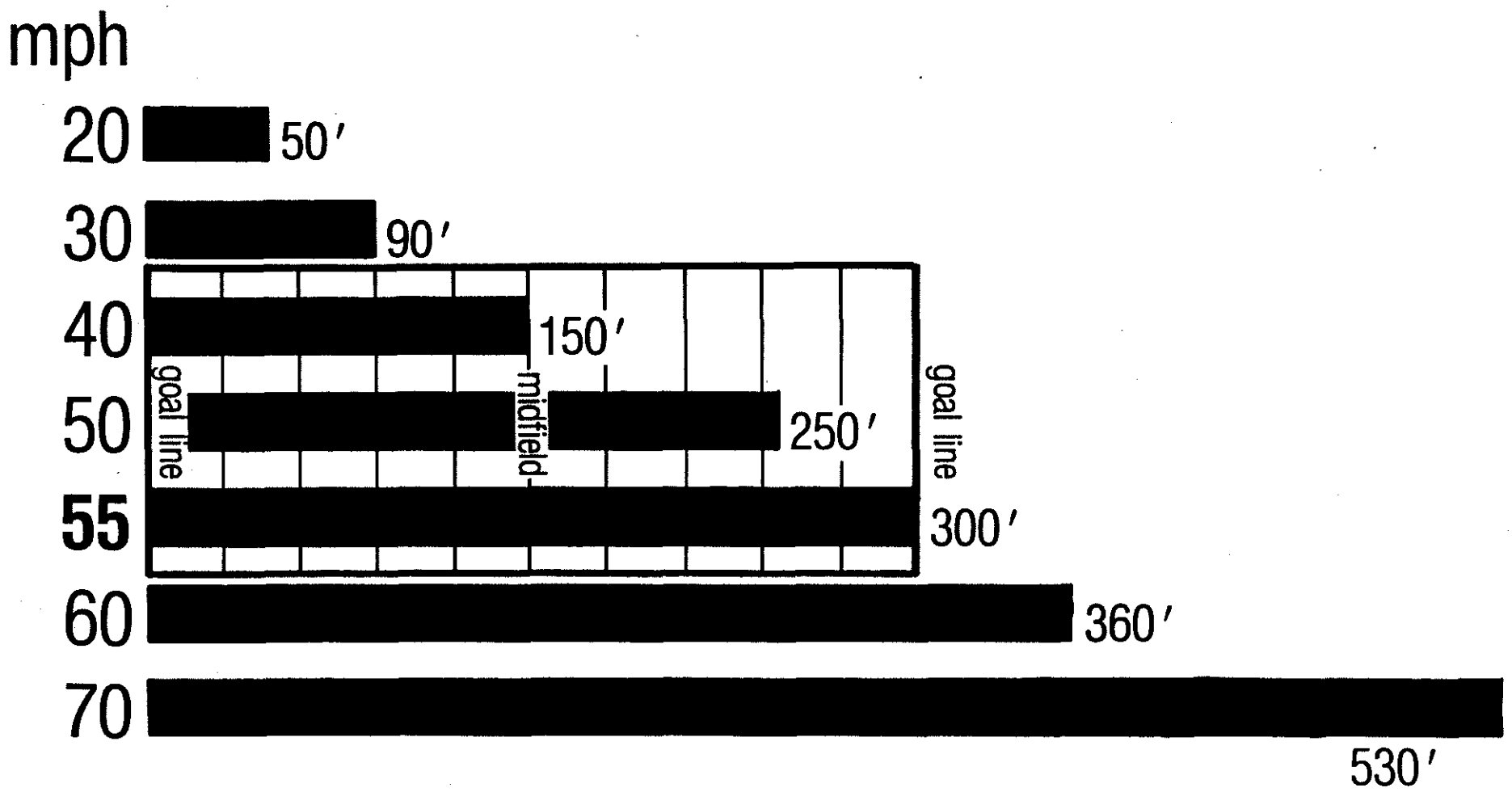
right turn signal

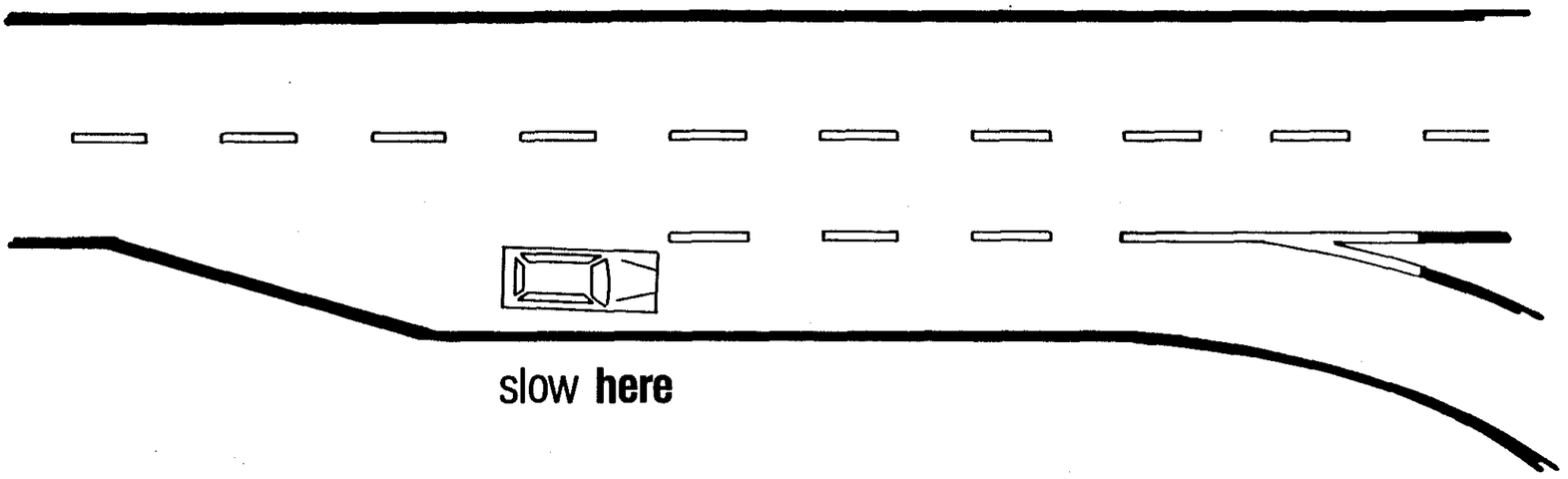


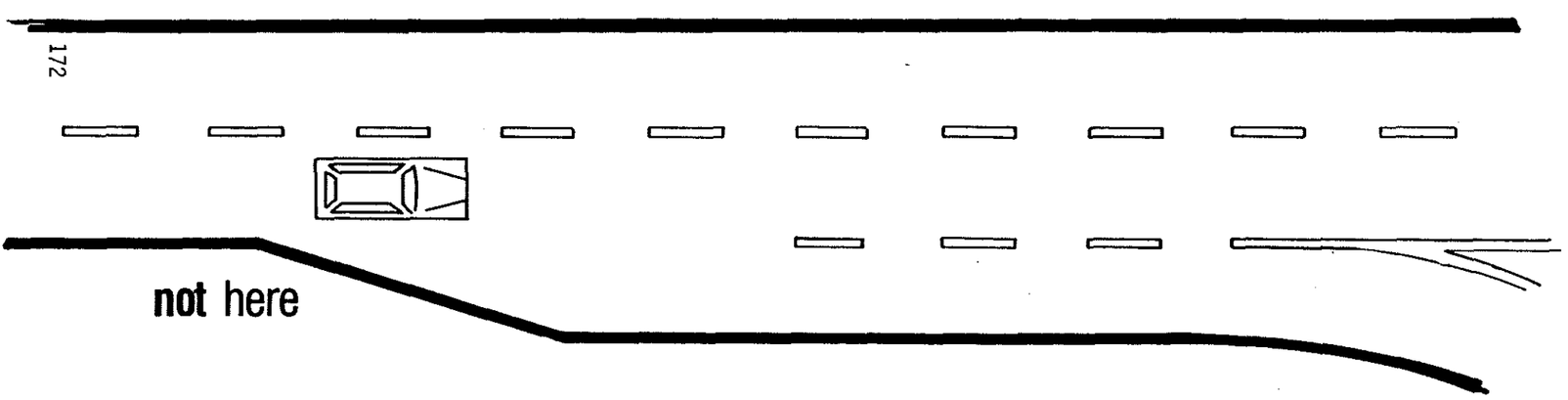
slowing down or stopping


Place flares 100–150
paces behind car
(at least 200 ft.)
. . .or over a hill.

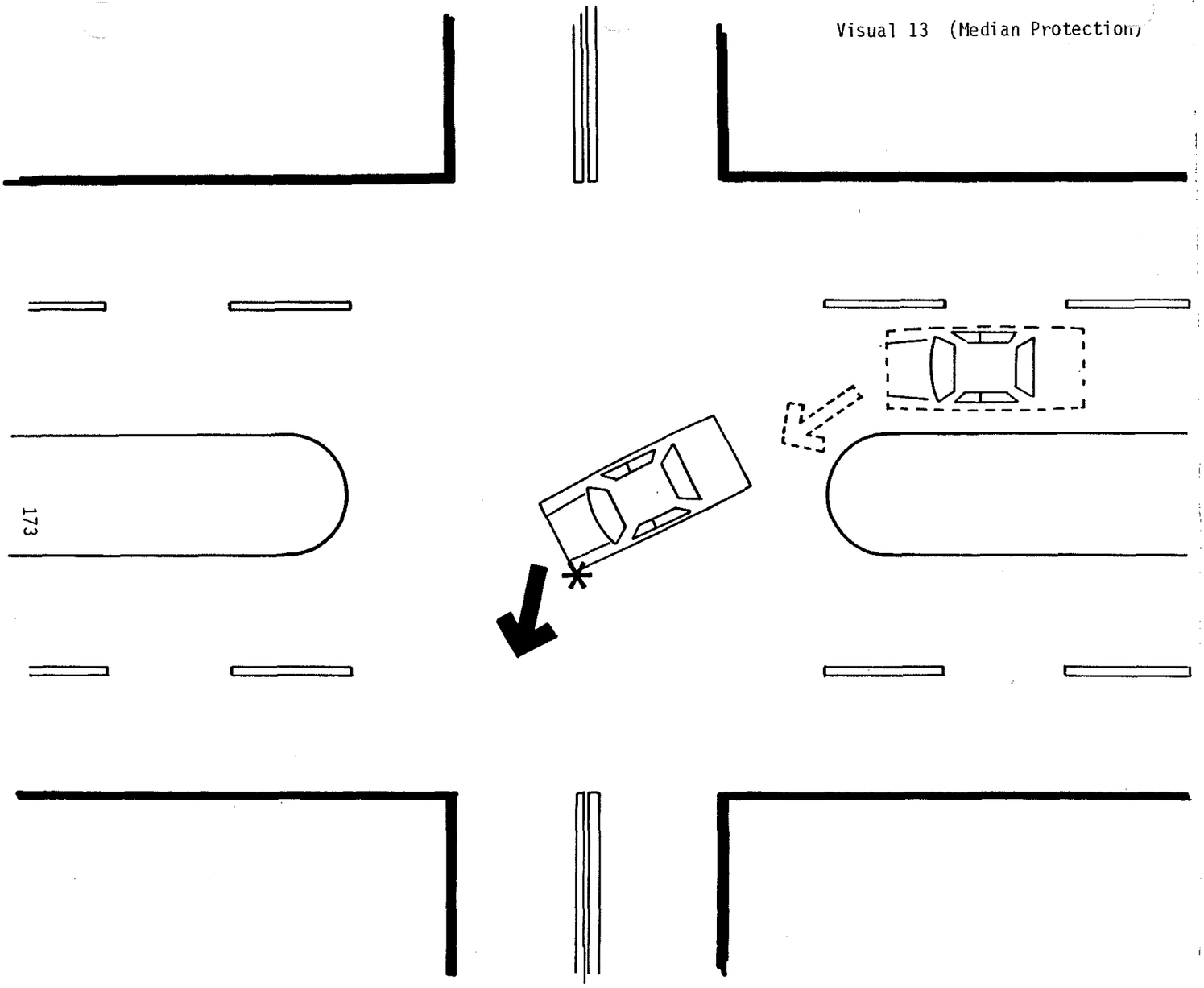
Average Stopping Distance



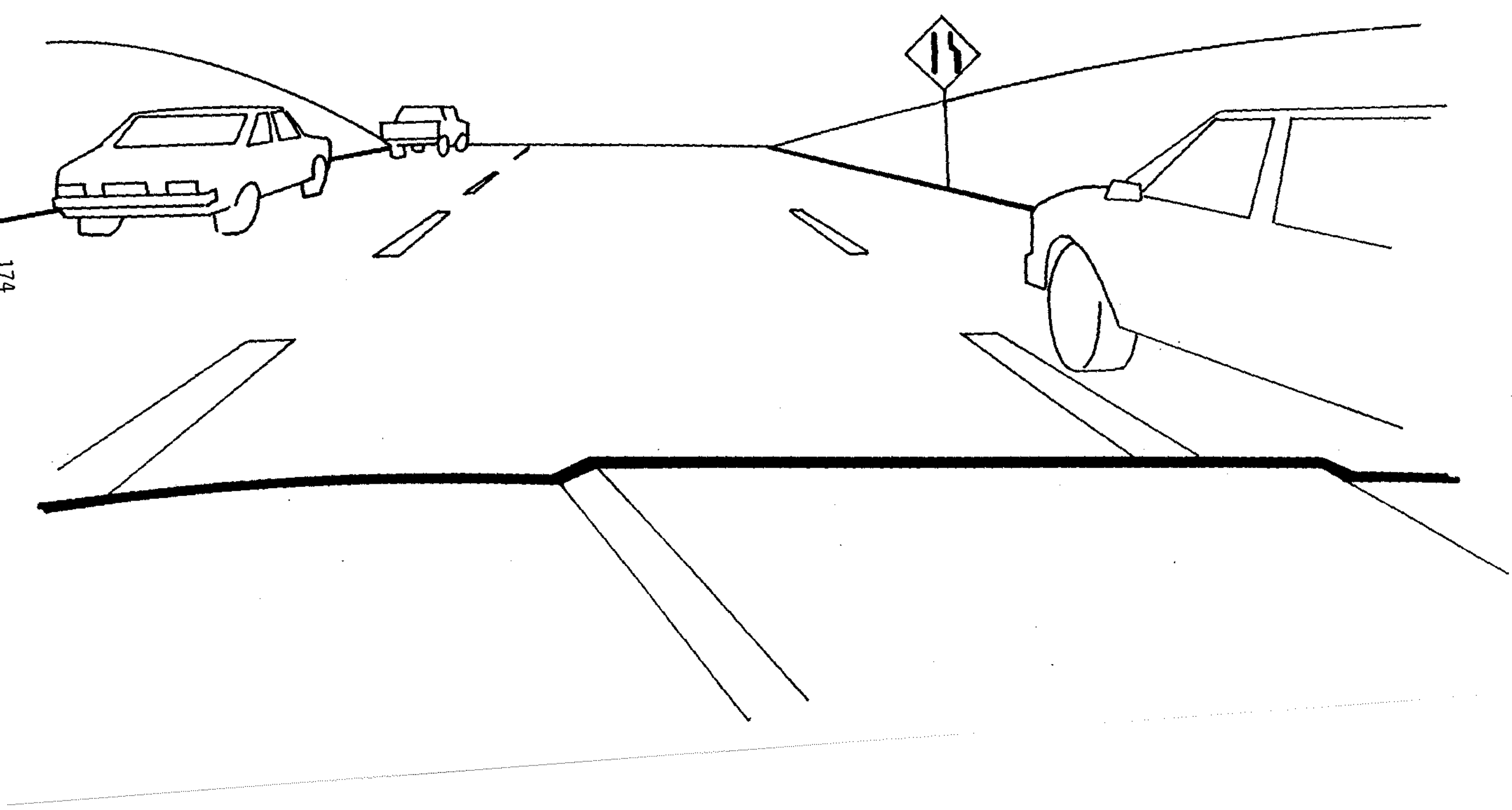

slow **here**

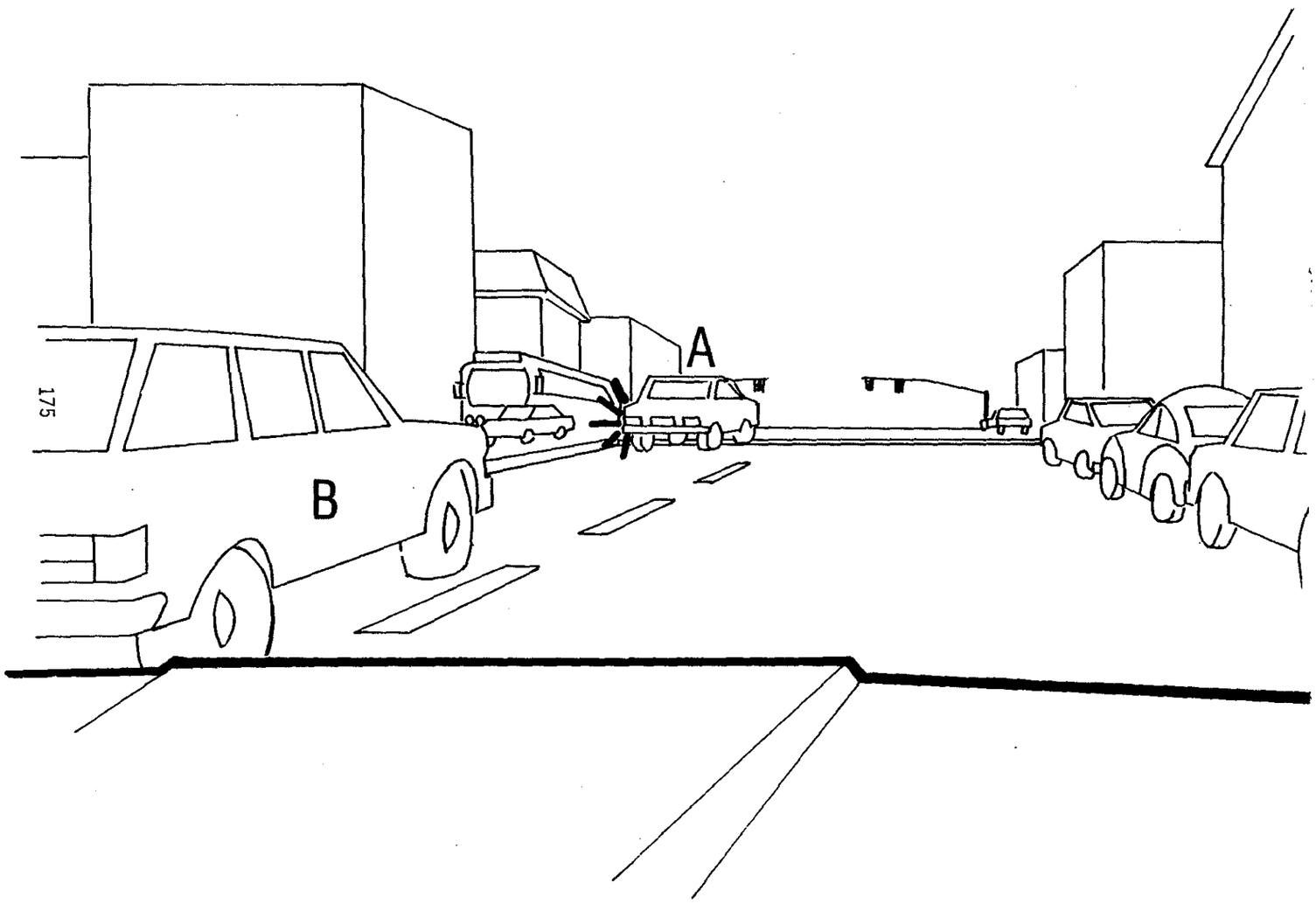

not here

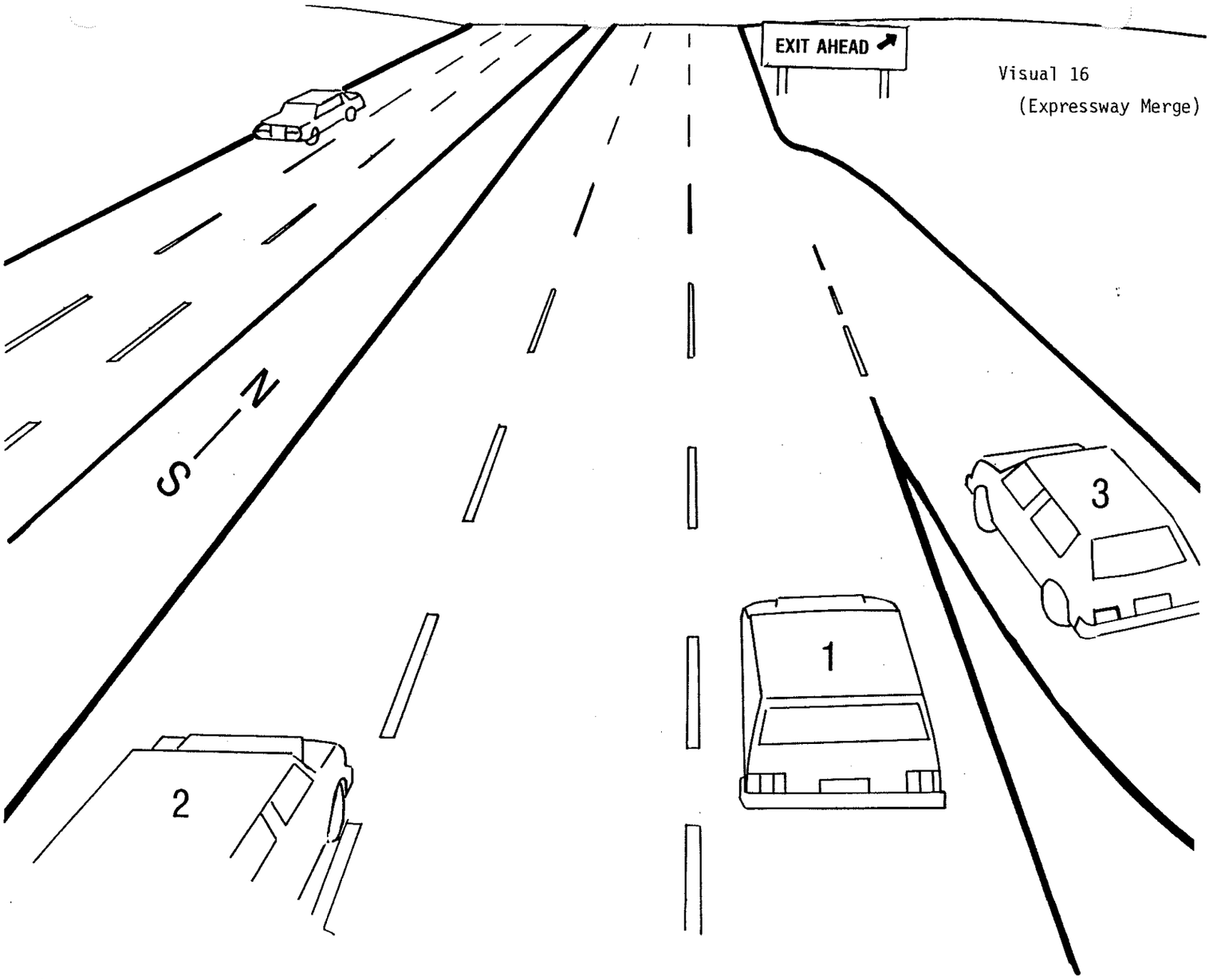
Visual 13 (Median Protection)



Visual 14 (Lane Drop)

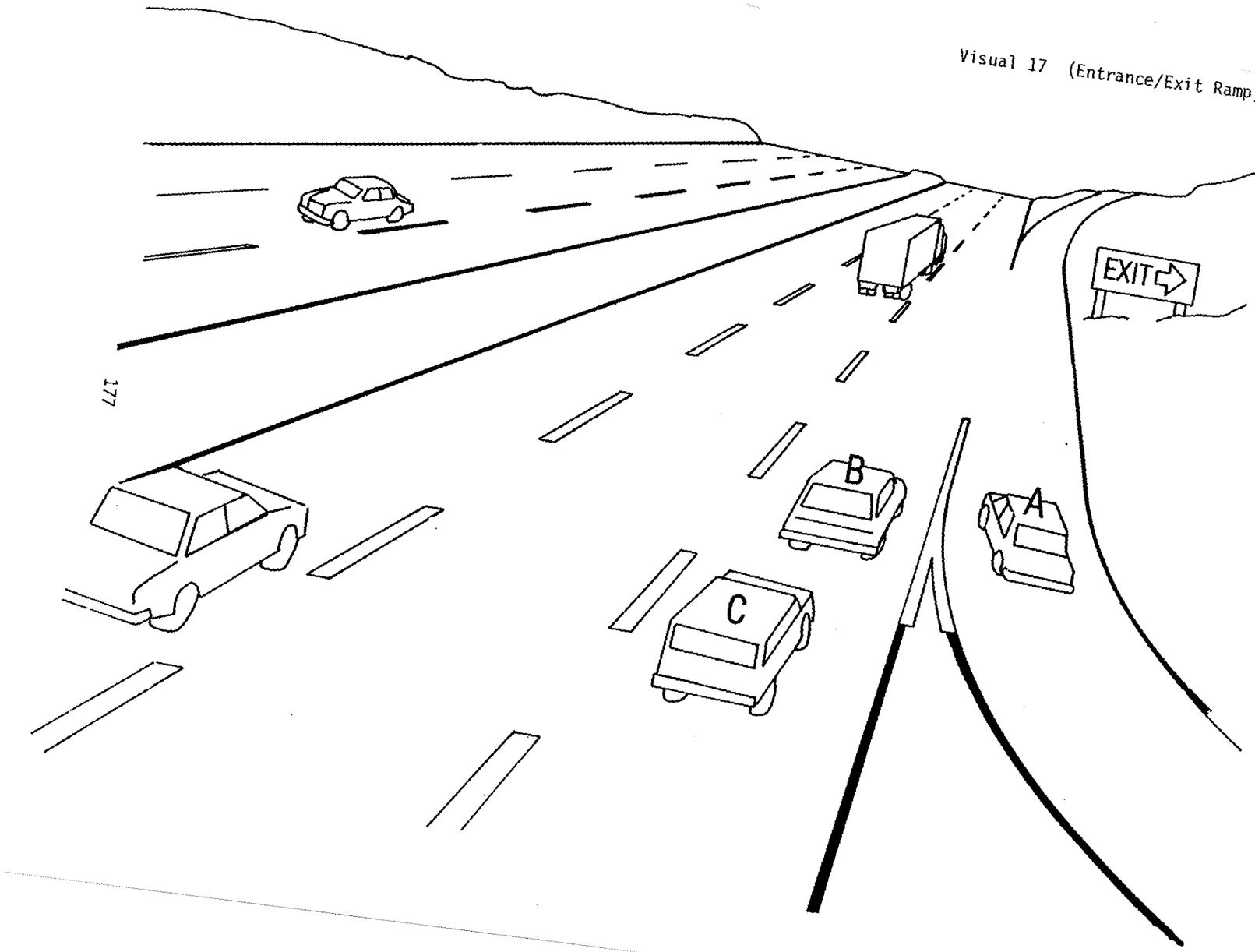


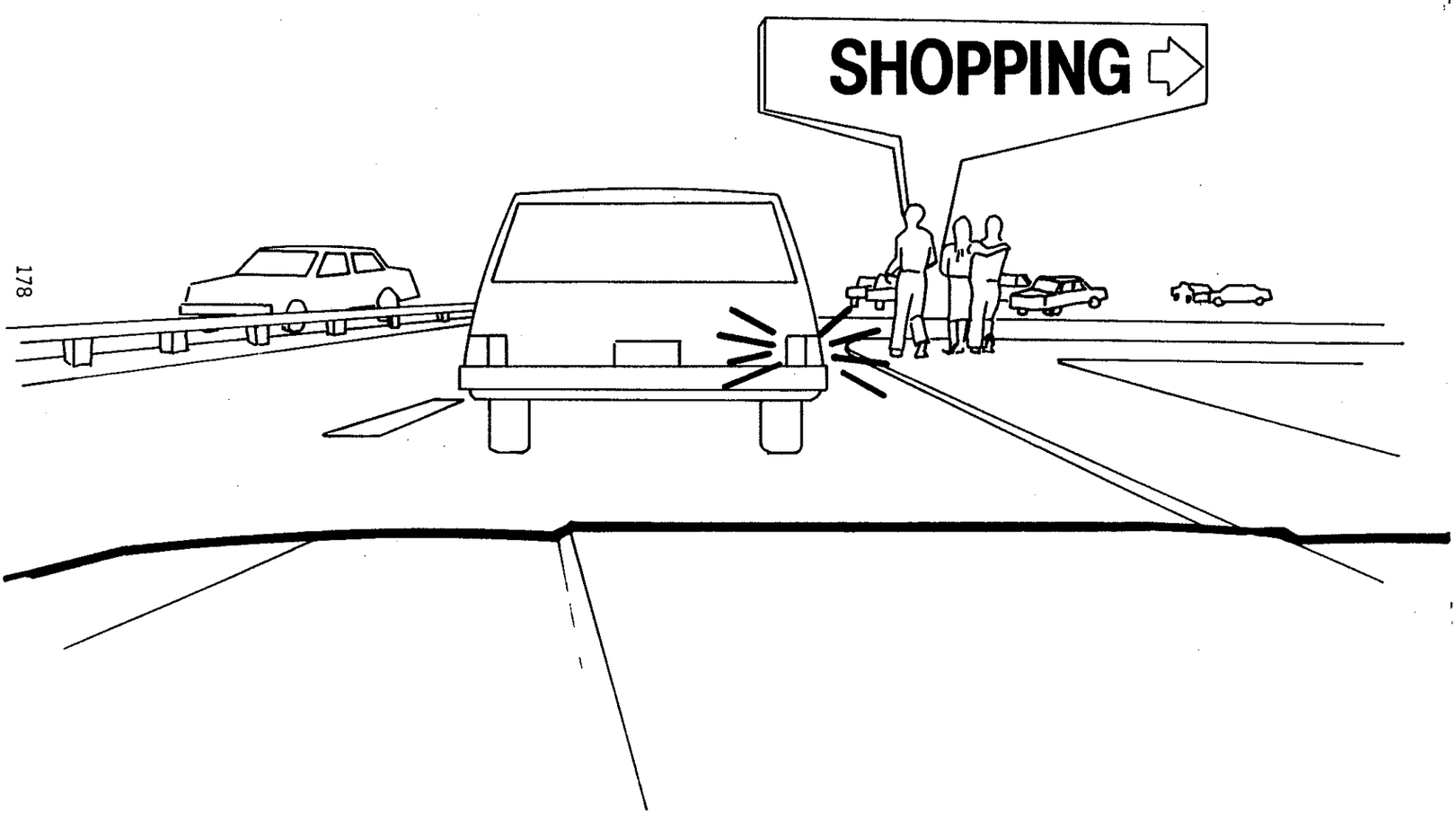

A
B

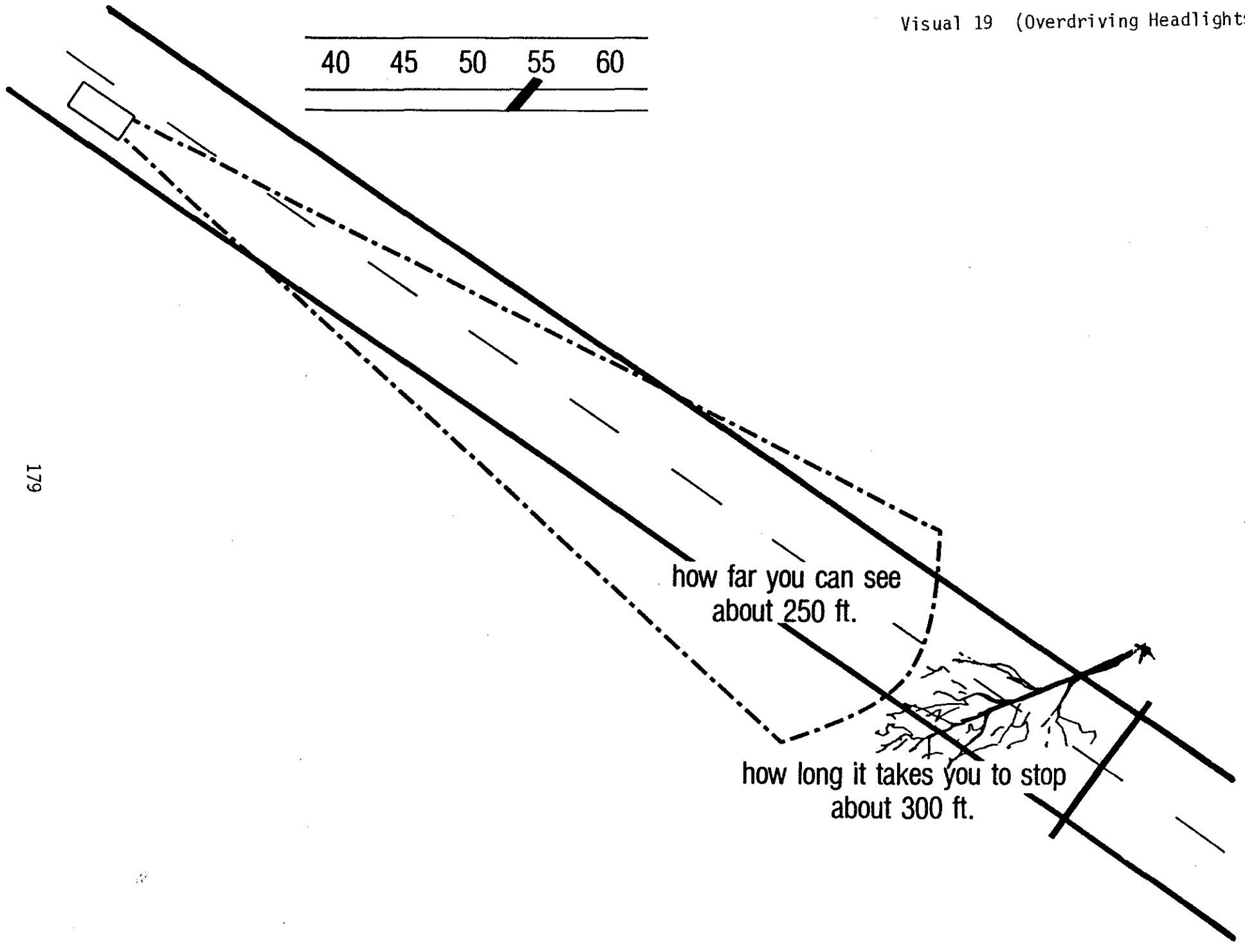


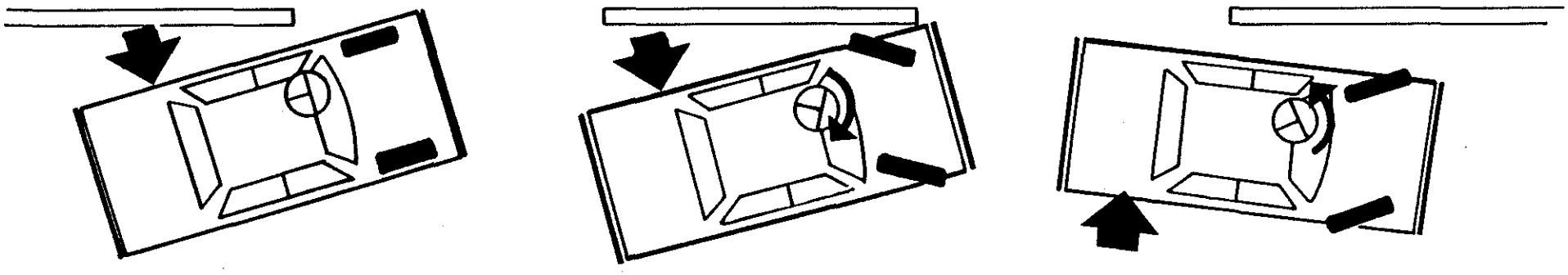
Visual 16
(Expressway Merge)

Visual 17 (Entrance/Exit Ramp)




SHOPPING


40 45 50 55 60
how far you can see
about 250 ft.
how long it takes you to stop
about 300 ft.

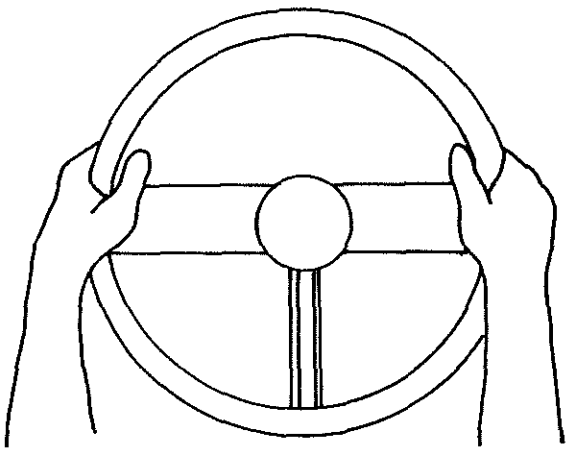


1. Stay off the brake. Braking will make the skid worse.

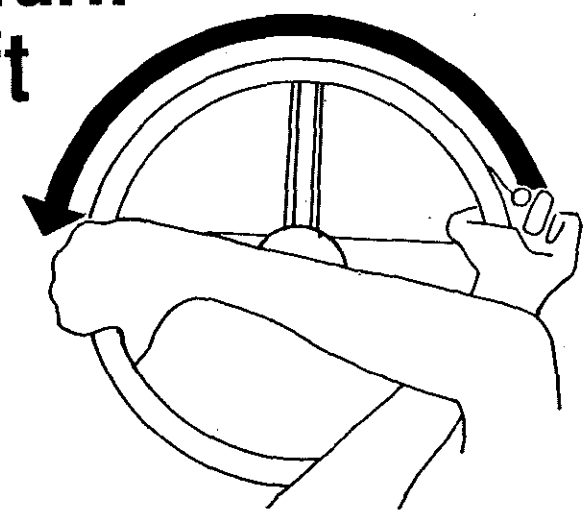
2. Turn the wheel quickly—in the direction you want to go. This lines up the front of the car with the back.

3. Turn back the other way—as soon as the car begins to straighten out. If you don't turn the wheel back, you'll start a new skid.

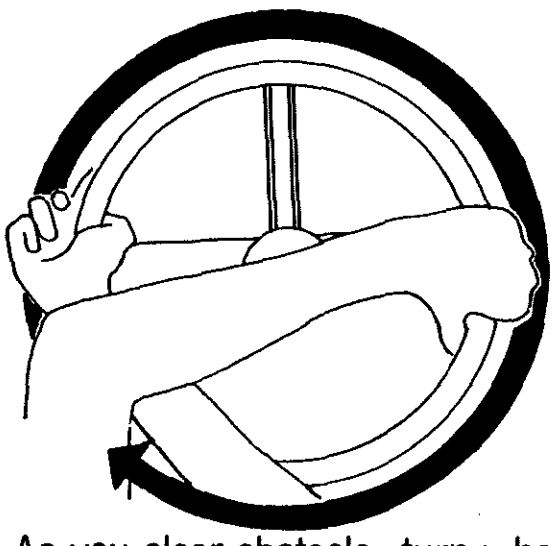
Emergency Turn to the Left



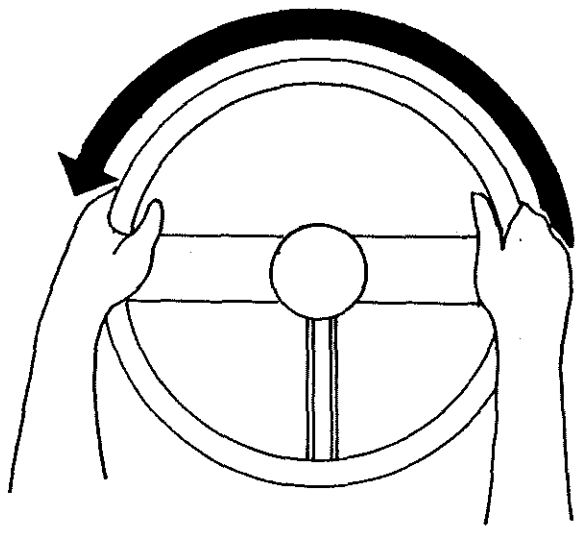
1. Normal hand position for driving.



2. Turn wheel half-circle to the left (to turn away from obstacle).

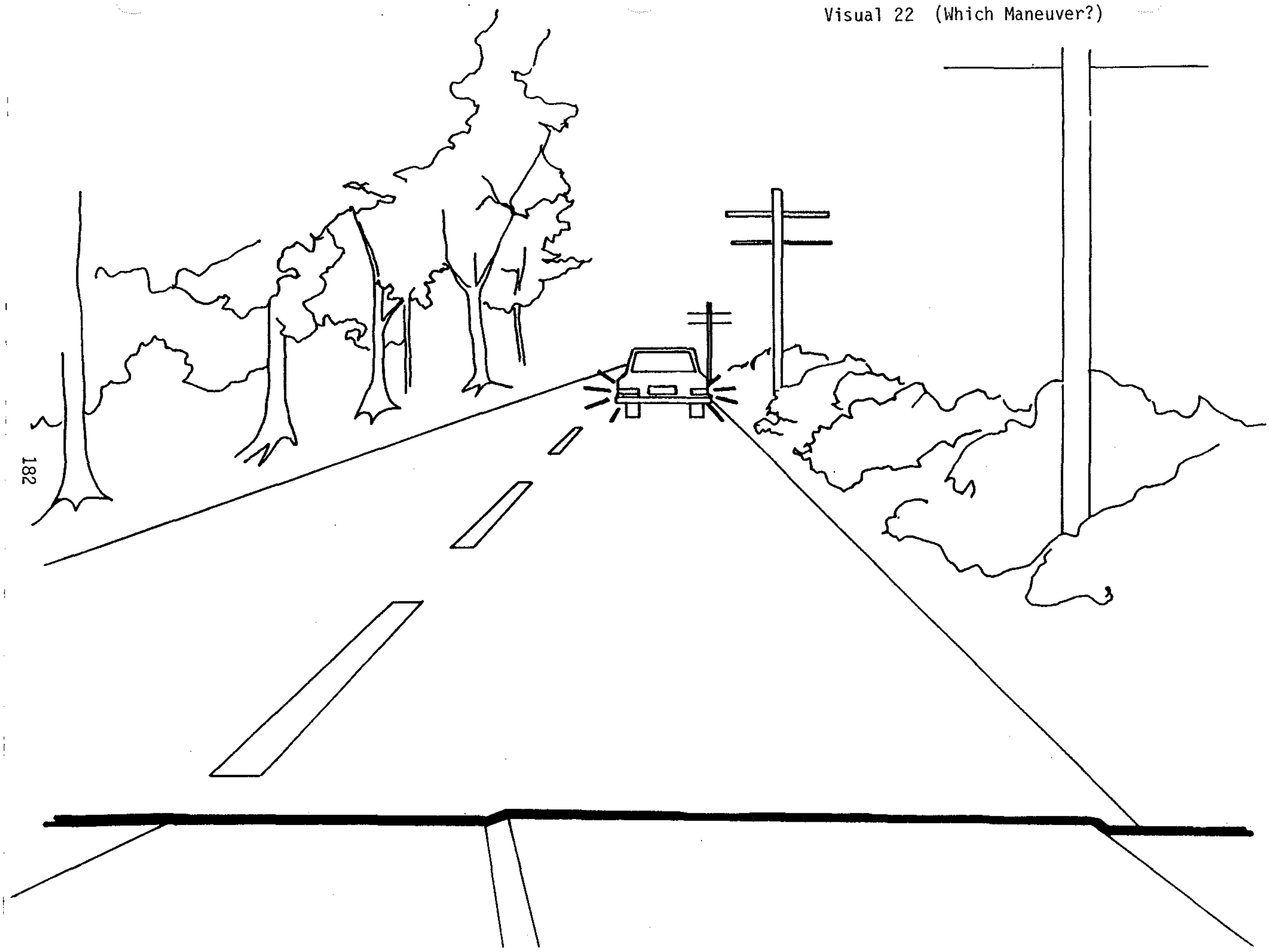


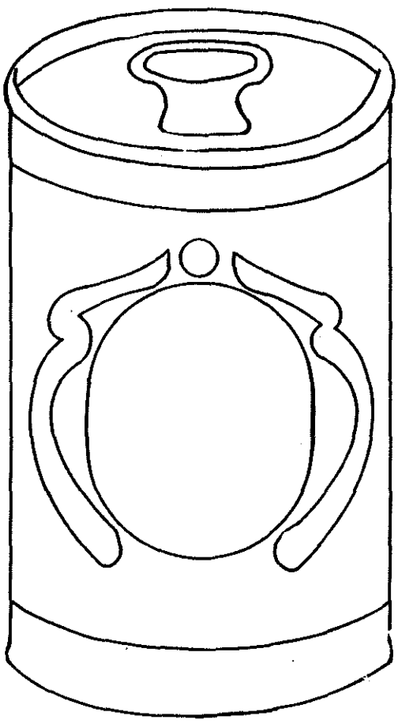
3. As you clear obstacle, turn wheel full-circle to the right (to get back in your lane).



4. As you return to lane, turn wheel left (to straighten out car).

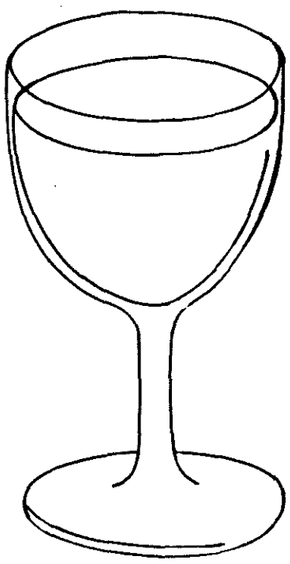
Visual 22 (Which Maneuver?)





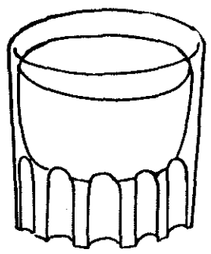
one can of beer

=



one glass of wine

=



one shot of hard liquor

BAC	condition
.01–.04%	affected
.05–.09%	impaired
.10%	intoxicated

Weight	accident risk increased affected .01–.04% number of drinks	accident risk 4 times greater impaired .05–.09%	accident risk 8 times greater intoxicated .10 +
100	1	2–3	4 +
120	1–2	3	4 +
140	1–2	3–4	5 +
160	1–2	3–4	5 +
180	1–3	4–5	6 +
200	1–3	4–5	6 +
220	1–3	4–6	7 +

your drink number (from shaded column) _____
number of hours you will be drinking + _____
your limit = _____

TITLE IV
DRIVER AND SAFETY EDUCATION
CHAPTER 6
DRIVER EDUCATION

670—6.1[257] Certification and approval.

6.1[1]The instructor in driver education must have a certificate valid for teaching in secondary schools in the state of Iowa.

6.1[2]To be approved the instructor must have 15 semester hours in the field of safety education including two semester hours in actual behind-the-wheel driving.

6.1[3]The instructor must have a valid Iowa operator's or chauffeur's license.

6.1[4]The instructor must have a satisfactory driving record verified by the state department of public safety.

6.1[5]The instructor must be free of any physical defects that would be a handicap in the teaching of driver education.

670—6.2[257] Time standards.

6.2[1]Minimum time. Schools shall provide for each student an absolute minimum of thirty class hours of sixty minutes each (or a total of eighteen hundred minutes) in classroom instruction, plus six class hours of sixty minutes each (or a total of three hundred sixty minutes) in supervised laboratory instruction, exclusive of observation time, in a dual control automobile.

6.2[2]Evaluation. In evaluating driver training courses for approval, consideration will be given to whether: The classroom and driving phases run concurrently; and the driver education course be organized on the full-semester basis. Time allotments for each phase of the program should be such that time spent in each, at any one time, is equivalent to the time allotment in other subject areas. Time allowances to take care of individual differences, and special occasions in each school should be provided over and above the minimums set forth in 6.1(1).

6.2[3]Scheduling class sessions. The following will serve as a guide for determining the number of sessions required for class periods of specified durations to assure thirty clock hours per student in classroom instruction:

Minutes per Class Period	Minimum Number of Sessions Required
40	45
45	40
50	36
55	33
60	30

6.2[4]" Scheduling practice driving. The following will serve as a guide for determining the number of sessions required for class periods of specified duration to assure six clock hours per student in practice driving instruction.

Minutes per Class Period	Minimum Number of Sessions Required		
	Two Pupils in Car	Three Pupils in Car	Four Pupils in Car
40	18	27	36
45	16	24	32
50	15	22	29
55	14	20	27
60	12	18	24
90		12	16
120			12

This rule is intended to implement section 321.178, The Code.

670—6.3[257]* Summer school. An approved course offered during the summer months shall continue for at least 30 instructional days. The program shall be so organized that the maximum daily behind-the-wheel instruction, applied toward meeting the required 6 clock hours of laboratory instruction, does not exceed 30 minutes per pupil per session and does not exceed 60 minutes per pupil per instructional day. Classroom instruction shall not exceed 2 clock hours per pupil per day. Up to 10 clock hours of classroom instruction may be scheduled to be given at the beginning of the course before the student receives any laboratory instruction. Laboratory instruction shall be given on a concurrent basis with classroom instruction each week for at least the period of time covered by the final 20 clock hours of classroom instruction.

670—6.4[257] Time on driving simulators. When simulators are used for part of the practice driving experiences, four hours of simulator experience shall be considered equal to one hour of practice driving in the car. Not more than three of the six hours required for practice driving may be simulator experience.*

670—6.5[257] Driving ranges. Special permission for programs on multiple-vehicle driving ranges must be secured from the department of public instruction.

670—6.6[257] Adult programs. Wherever possible adult programs will provide a basic course comparable in time and content to that of the secondary school.

670—6.7[257] Dual controlled cars.

6.7(1)Used on streets. Dual controlled automobiles shall be used in all cases involving driving on the street or highway.

6.7(2)Marking. All dual controlled automobiles should have identification signs, visible from the rear, showing that the automobile is being used for driver education. If the vehicle is being used for other than driver education, the identification signs should be removed or covered.

670—6.8[257] Insurance.

6.8(1)Liability and property damage. All dual controlled automobiles shall be adequately insured. The following policy limits are deemed adequate coverage: One hundred thousand dollars - three hundred thousand dollars on liability and fifty thousand dollars on property damage.

6.8(2)Medical payments. Liability insurance does not cover injuries received by students in accidents by other vehicles or from other causes not resulting from carelessness, on the part of the student or the instructor. Therefore, medical insurance of a least one thousand dollars per student shall be carried.

6.8[3]Uninsured motorist. It is hereby approved that all dual controlled automobiles be covered by uninsured motorist insurance.

670—6.9[257] Instruction permit. Students enrolled in an approved driver education program must meet the preliminary licensing provisions of the department of transportation.

This rule is intended to implement section 321.178, The Code.

670—6.10[257] Records. The necessary records for determining days of attendance for each student enrolled, in each phase of the driver education program, shall be maintained by each school in the district.

670—6.11[257] Minor's school license. The local school board or superintendent of the applicant's school shall assure that the following requirements are met prior to certifying a special need exists for the issuance of the minor's school license.

6.11(1) The applicant lives one mile or more from his or her school of attendance. Distance to the school of attendance shall in all cases be measured on the public highway only, starting in the roadway opposite the private entrance to the residence of the applicant and ending in the roadway opposite the entrance to the school grounds.

6.11(2) The applicant for the minor's school license is enrolled in instructional programs or involved in extra-curricular activities at the applicant's school of attendance that occur at such times that make it impossible to take advantage of the school transportation service, or that the school transportation service is not provided.

670—6.12(257) Motorized bicycle education.

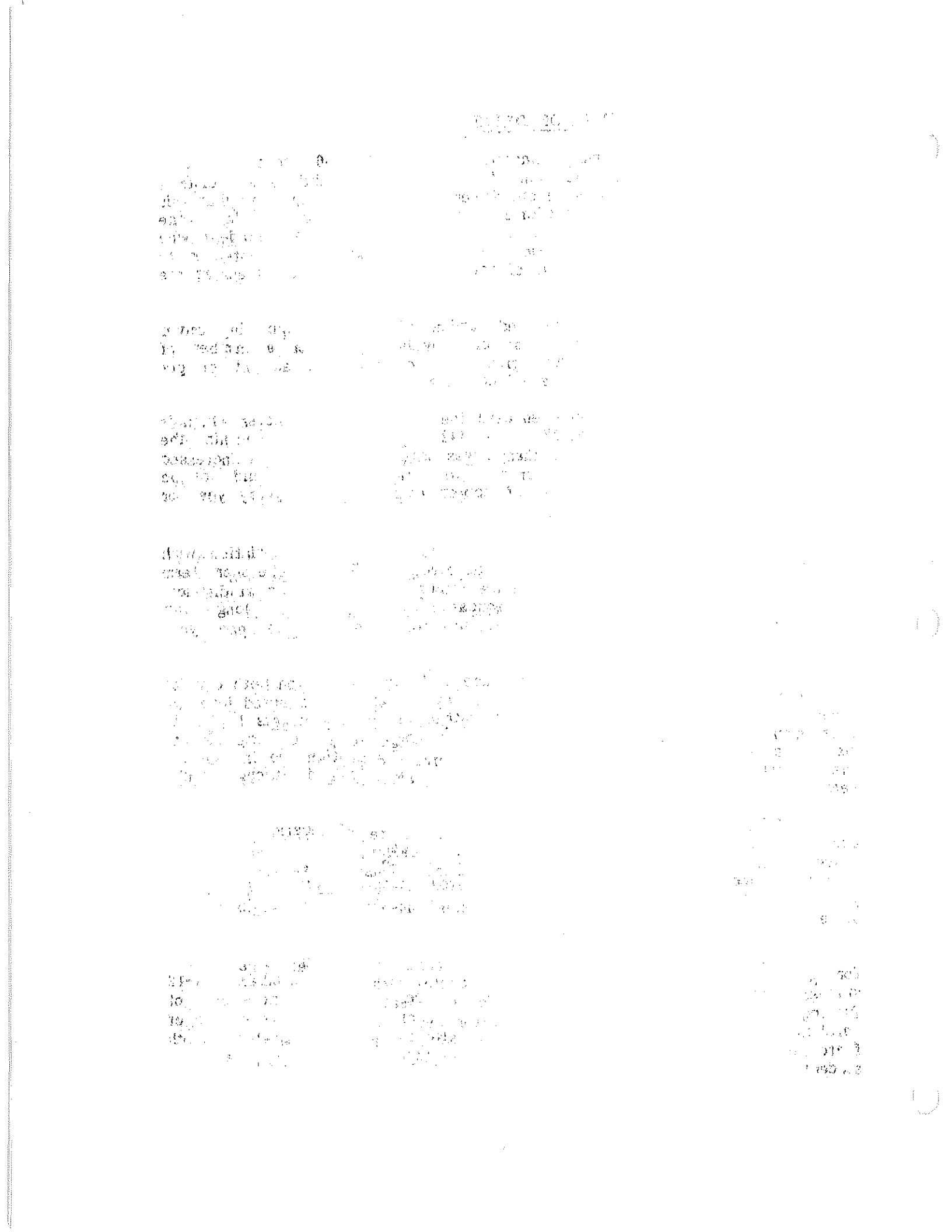
6.12(1) Course approval. An approved course shall consist of a minimum of six clock hours of classroom instruction or completion of a classroom course which includes the instructional components contained in 6.12(2).

a. Motorized bicycle driving experiences in addition to classroom instruction are permissible, but not required.

b. Any school district, area education agency, merged area school, other agency or individual planning to offer a motorized bicycle education course, must receive course approval prior to beginning. Application and analysis forms are provided by the department of public instruction.

6.12(2) Course content. The following instructional components shall be incorporated in every motorized bicycle education course.

a. Operator and motorized bicycle preparation.
(1) Knowledge of Iowa driving laws.
(2) Knowledge of vehicle registration requirements.
(3) Vehicle inspection.
(4) Protective clothing and devices.
(5) Risk assessment.
(6) Route selection.



FUNDING FOR DRIVER EDUCATION

The Iowa General Assembly enacted legislation in 1965 that created a statewide program of driver education. It required every public school district in the state to offer or make available driver education. Recognizing that this responsibility would involve additional expenses for school districts, the Legislature authorized reimbursement amounting to $30 for each student who completed an approved driver education program. This amount was intended to provide funding of 30 to 50 percent of the total cost which varied among the school districts.

Ensuing years produced an increased number of students completing driver education and also an increased cost of providing it. For a number of consecutive years consideration was given to increasing the amount of per student reimbursement, but without any increase resulting.

In 1975, the General Assembly enacted the foundation aid process which is still in effect. Sections 321.178 and 442.7 of The Code contain the modifications made that year. The change was based on the need for increased funding of driver education and a process was instituted that would not be dependent on repeated consideration of appropriation increases every year or two.

The change was made by increasing the foundation aid appropriation with driver education funding based on per student enrollment (K-12). The short term advantage was an immediate increase in the amount of funds that most districts received in support of their driver education programs. The long term advantage was an automatic increase in funding for driver education each year as the school aid formula was adjusted.

Other advantages were the simplified accounting procedures on both district and state levels because the funding provided by the state is directed into the general fund of each school district and instead of school districts having to wait until the school year and driver education programs were completed to make reimbursement application, payments for driver education are included in the general foundation aid that is provided on a quarterly basis throughout the year.

In 1975, the General Assembly increased the state foundation aid by .3 percent for driver education. This meant that a certain part of the general foundation aid was designated for driver education. This process has remained unchanged since then although the amounts have increased automatically each year. Initially the per student enrollment amount was $4.00. Since then it has systematically increased by more that 200%.

To calculate the approximate amount of the foundation aid that is generated for driver education expenses of the school district, multiply the number of K-12 students enrolled in the district by $8.92 which represents the current amount of funding. Consequently, funding is provided for each student for each year of enrollment which in most cases is 13 years. Next year the allowable growth factor of 3.592% will be applicable which will yield $9.24 per K-12 enrolled student.

Another favorable aspect of having the driver education funding included in the foundation aid is that even with declining enrollments, the dollar amount is increased. The following statistics illustrate this. The reason for the estimated figures is because they represent composites of all school districts in the state which individually have different allowable growth factors.

STATE AID FOR DRIVER EDUCATION - ESTIMATED

Year	Allowable Growth	$ Amounts
1975-76	10.700%	4.00
1976-77	9.823%	4.39
1977-78	7.840%	4.73
1978-79	9.422%	5.18
1979-80	9.484%	5.68
1980-81	13.592%	6.45
1981-82	5.000%	6.77
1982-83	7.000%	7.24
1983-84	6.103%	7.68
1984-85	2.540%	7.88
1985-86	5.325%	8.30
1986-87	3.843%	8.62
1987-88	3.469%	8.92
1988-89	3.592%	9.24
1989-90	3.850%	9.59