

**OPERATING THE CAR EFFICIENTLY**

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# *Leader's Guide*

**4-H**

**AUTOMOTIVE PROJECT**

**CARE AND SAFETY**



**UNIT 3**  
**OPERATING THE CAR EFFICIENTLY**  
**LEADER'S GUIDE**  
**4-H**

**AUTOMOTIVE PROJECT IN CARE AND SAFETY**

This educational material has been prepared for 4-H Club use by the National 4-H Automotive Program Development Committee, composed of representatives of the State and Federal Extension Services, the Automotive Safety Foundation, the National 4-H Service Committee and The Firestone Tire and Rubber Company.

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## 4-H AUTOMOTIVE PROJECT

### UNIT 3 LEADER'S GUIDE

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## UNIT 3 LEADER'S GUIDE

## OUTLINE OF UNITS

As a volunteer leader the opportunities are unlimited for you to help train youth in "learning by doing." You are one of the thousands of volunteers giving generously of your time and talent to help 4-H members "Make the Best Better." Each leader has one of the most important jobs in the world today—leading young men and women toward the goal of better citizenship.

The 4-H Automotive Program is designed to help older youth achieve and enjoy the fullest opportunities as safe and efficient automobile drivers. Training opportunities, together with many local resource people willing to help, and the 4-H Automotive Project literature, provide a strong force to assist you in your 4-H leadership.

Following is an outline of the contents of the three Units:

### Unit I: The Car and the Highway

- Section I. You and the Automobile.
- Section II. Highway Safety.
- Section III. Group Activity—Highway Hazard Hunt.
- Section IV. What Makes a Car Go! and Stop!
- Section V. The Engine in General—Simple Principles of Internal Combustion.
- Section VI. Carkeeping.
- Section VII. Car Costs and Record Keeping.
- Section VIII. Traffic Code and Your Future Responsibilities.
- Section IX. Car Inspection—Safety Checking a Car.

### Unit II: Maintenance and Operation

- Section I. The Engine as a Power Unit.
- Section II. The Engine Needs Clean Air.
- Section III. How the Fuel System Works.
- Section IV. Igniting the Air-Fuel Mixture.
- Section V. Career Opportunities.
- Section VI. Group Activities — Safety Lane and Braking Demonstration.
- Section VII. How Engine Temperature is Controlled.
- Section VIII. General Lubrication.
- Section IX. Tires and Their Care.
- Section X. Handling a Car Safely on the Road.

### Unit III: Operating the Car Efficiently

- Section I. What Does It Cost to Own and Operate a Car?
- Section II. How Power is Transmitted by the Engine.
- Section III. What Makes for a Smooth, Safe Ride.
- Section IV. Selecting Lubricants.
- Section V. The Electrical System.
- Section VI. What to Look For in Buying a Used Car.
- Section VII. Operating Your Car Efficiently.
- Section VIII. How to Make Your Community a Safer Place to Drive.
- Section IX. Group Activities — Economy Run and Driving Skill.



## 4-H AUTOMOTIVE PROJECT

### UNIT 3 LEADER'S GUIDE

#### INTRODUCTION

You and your 4-H Club members are about to explore a more profound phase of the 4-H Automotive Care and Safety Project. The topics in Unit 3 are designed for young people who have completed Unit 1 and 2, or for those who have had adequate driver training courses.

One overall objective of the Unit is to provoke the interest of older club members. An effort has been made to go beyond the fundamentals covered in Units 1 and 2. The intent is to combine the information of those Units into practical, directly applicable topics.

Preparation is the key to success in teaching this Unit. For example, in Section I, "What Does It Cost To Own and Operate a Car?", it would be helpful to have some sample costs ready to show the members. Maybe you could even ask a local dealer to discuss this topic in further detail. Be on the lookout for a cut-away transmission to show the members in Section II. Check with your local junk yards. They may have some parts they could loan to you for this meeting. Section III, "What Makes For a Smooth, Safe Ride", could be scheduled for a garage or well equipped service station where the members can see, first hand, what is meant by "camber", "toe-in", and the like. These are but a few examples of some possibilities for putting a little extra effort into this third and last Unit. Your members are going to be mature, sharp-thinking individuals who can tackle some real challenges. By planning well in advance and taking advantage of the resources in your local area, you can complete a well rounded 4-H Automotive Project. But along the way, keep safety in mind at all times, and be constantly alert for chances to help remind teenagers of their responsibilities.

Each of the sections usually can be covered in one meeting. But in some cases it may be advisable to schedule more than a single session for a particular topic.

The 4-H facilities, available resources, and time will have a bearing on your schedule. At the first meeting members should have an opportunity to look at all topics, schedule meeting dates, and make most of the major decisions regarding the club program.

The past experience of 4-H leaders has shown that far too little time is spent in planning the whole program. So it is not inconceivable that two meetings could be spent on the development of a program. Dates, times, places, resource personnel and materials, and members' responsibilities should be spelled out carefully at the outset.

This Leader's Guide has been prepared to make your job of supervision easier and more effective, thus more satisfying. In each of its sections is a "Purpose:" a brief summary of reasons for including the subject matter. This is followed by "Subject Matter and Activity," in which appear suggestions on emphasis, teaching methods and resources. "Looking Ahead to Section ....." points out specific things to be accomplished before commencing the next section. Materials, equipment, facilities, personnel and reading references are mentioned here. Another part of each section in the Guide, beginning with Section II, is the "Progress Report." Because meetings sometimes are held one to two months apart, often making it difficult to relate topics, the Progress Report is suggested as a continuity guide. It is not mandatory that it be rigidly adhered to, however.

In the project booklet for Unit 3, a great many group activities are included as part of "Let's Do," or as part of the contents. Many "Let's Answer" sections appear in Unit 3, too. The questions therein are not intended to be of an examination type, but are to be used as a measuring stick to effectively cover the material. Possible ways to answer the questions are: (1) By individual testing (probably the least desirable); (2) As guides to small group discussions; (3) In general question-answer periods; (4) In investigation and later reporting to the club; (5) As a review to supplement the Progress Report.



## UNIT 3, SECTION I WHAT DOES IT COST TO OWN AND OPERATE A CAR?

### Progress Report

You are about to begin the third 4-H Automotive Care and safety Unit. Will it be interesting, worthwhile, and fun for your members? Take some time to recall and evaluate a few highlights of other Units. Call on members to review some of the topics and answer questions from parents, who may be visiting. Arrange to have an exhibit of a few things that have been used throughout the project, such as air cleaners, oil filters, spark plugs, thermostats, etc. Here is another opportunity for members to assist in setting up exhibits and demonstrations.

### Purpose

Delays, breakdowns, and failures are both costly and exasperating. Adequate records can help avoid these inconveniences. Section I treats both the "whys" and "hows" of practical record keeping. It also provides help in the interpretation and use of these statistics. Reference will be made frequently to the owners' manuals, service station maintenance charts, and different driving conditions.

The approach and philosophy in the discussion is pitched toward realistic and practical maintenance. It combines both dollars and "sense." In addition to the saving of money it emphasizes safety, convenience, and performance. Recordkeeping takes on a new meaning and is no longer just a chore.

### Subject Matter and Activity

Enlist the talents and services of a reliable service station attendant or garage operator. Ask him to present some tangible evidence in support of keeping records. The operator's manual provides a good outline to use in this section.

Present damaged or neglected parts one at a time. Discuss the needed care and maintenance, plus the type of record needed. Items such as neglected air cleaners, dirty oil filters, clogged crankcase breather caps, dead batteries, rotten radiator hoses, ruined thermostats, worn tie-rod ends, and uneven tires will help to tell the story vividly.

Schedule adequate time to review the three different charts in the "Let's Do" section. Encourage members to compare the records previously prepared. This provides stimulus for good discussion. Emphasize the value of "Record of Car Use," and "Chart of Seasonal Servicing and Tips."

Arrange to show several different types of record books that may be carried in the glove compartment or on the dashboard of the car. Many oil companies provide these as a free service to their customers. Several commercial concerns prepare specific records for company cars. Copies of these sheets also may prove valuable.

### "Let's Answer and Let's Discuss"

Incorporate the suggestions in these two sections as part of the general meeting. Include some of these items along with the purpose of subject matter discussion. The "Let's Answer" items lend themselves very well to small group discussions. You may wish to assign different topics to the groups and ask them to provide some reasons for deciding whether they are true or false.

### Looking Ahead To The Next Section – Power Transmission

Following is a list of the remaining sections included in the third unit. Discuss them with the members to give a picture of the opportunities in the meetings to come:

- How Power Is Transmitted by the Engine.
- What Makes for a Smooth, Safe Ride.
- Selecting Lubricants.
- The Electrical System.
- What To Look for In Buying a Used Car.
- Operating Your Car Efficiently.
- How to Make Your Community A Safer Place to Drive.
- Group Activities — Economy Run and Driving Skill.



## TO BE DONE BEFORE NEXT MEETING

Review subject matter thoroughly and decide whether it can be presented more accurately during two or more meetings rather than one, since four phases are involved: clutch, transmission, differential, and axle. Secure help of an automotive engineer who understands and can explain the important parts and their functions in the power train. Also, arrange to hold part of the meeting at a place where these parts are available; have mock-ups or complete charts to aid the members in visualizing their importance. Junior leaders can help with visual aids, demonstrations, props, etc.

## UNIT 3, SECTION II HOW POWER IS TRANSMITTED BY THE ENGINE

### Progress Report

At the start of the meeting take a few minutes to review and evaluate Section I. Encourage members to share their experiences about a particular highlight in the section which they especially remember. Allow time for questions. Try to remember important comments and/or criticisms which may arise during informal conversation.

### Purpose

"As long as the wheels turn, everything is fine," some drivers seem to feel. And many have little concern beyond that point. They may not appreciate nor understand the complicated processes involved in transferring power from engine to wheels. And this attitude sometimes is reflected in abuse of the car, or a complete disregard for its proper servicing.

Section II is presented for several major purposes. One, it is an attempt to explain in fairly common terms, a complicated mechanical process. Secondly, it is designed to illustrate the "whys" of the transmission of power. In addition, attention is given to sensible use and proper service. It may be necessary to subdivide this section into four phases; the clutch, transmission, differential, and axle. More than one meeting may be required to cover accurately all the information.

### Subject Matter and Activity

A person who understands and can explain clutches, transmissions, differentials, and axles is a prime requirement for your meeting on this section. He must understand automotive technical terms and be able to clarify them to members. Although most mechanics know the fundamentals of car service and repair, not everyone in the automotive field has a sufficient knowledge of science and physics to be able to explain the reasons behind them. Therefore it may be advisable to investigate the possibility of inviting someone to the meeting whose knowledge extends beyond that of a mechanic.

Actual working parts, models, charts, diagrams, and other visual aids are most important here. The co-operation of a car dealer or garage owner is a definite asset also. Either will be able to help in graphically illustrating the recent innovations in automatic transmissions, many of which are mentioned in the project booklet.

The ideal teaching aid for this section is a cutaway, stripped chassis. Such a unit exposes the interior of a transmission and differential and provides a realistic perspective of the power transmitting train. Some high schools and garages have such demonstration equipment. But if this combination is unavailable, it is possible to obtain used parts that may be separated, handled, and re-assembled. You may wish to contact a junk dealer. He may be willing to supply an old car engine for purposes of demonstrating the power train.

Junior leaders, those specially interested in auto mechanics, will gain valuable experience by assisting to introduce speakers, prepare visual aids, present demonstrations, lead discussions, and arrange materials. "Let's Drive Right," a textbook published by Scott, Foresman and Company and which is used by many high school driver education teachers, is one source of information for Section II. Another is, "How The Wheels Revolve," a free booklet available from General Motors Corporation, Public Relations Department, General Motors Building, Detroit, Michigan.

The key for the answers of "Let's Answer," Section II of the project booklet is as follows:

I. C; II. B; III. C; IV. B; V. B; VI. C; VII. A; VIII. A; IX. C; X. B; XI. A; XII. B.



## Looking Ahead To Section III

A well equipped service station is probably the best place to hold the meeting for Section III, "What Makes for a Smooth, Safe Ride."

## TO BE DONE BEFORE NEXT MEETING

It is a good idea to select and work closely with a trained, competent, cooperative service station operator. Supply him with a copy of the project booklet and ask that, under your guidance, he review main points to be emphasized at the meeting.

Encourage one or two members to cooperate with the station operator in selecting and preparing demonstrations to illustrate and substantiate information in the project booklet. If possible, select a service station that has plenty of space so that all members can observe and participate in the demonstration. Be especially safety-minded where pits are used rather than hoists.

## UNIT 3, SECTION III WHAT MAKES FOR A SMOOTH, SAFE RIDE

### Progress Report

Members are likely to have had some difficulty in understanding power transmission in relation to the functions of modern mechanical parts in the power train. Spend a few minutes at the start of the meeting to discuss why and how the various parts transmit power from the engine to the rear wheels, as a review of Section II.

Ask each member to give his opinion of the most interesting mechanical process or step in power transmission and explain it.

### Purpose

The car's frame, wheel suspension, and springs contribute significantly to its satisfactory riding qualities. Presented in Section III are details on the frame, its rugged nature, the need for adequate bracing, also methods of wheel suspension and types of springs.

Dependable brakes and a positive steering system contribute to ease of handling and a smooth ride, and are imperative to passenger safety. Study of those features in Section III should help members become aware of the need for periodic maintenance and proper care.

### Subject Matter and Activity

Investigate with members the underside of two or more automobiles atop safe hydraulic hoists. Identify and discuss; 1. Type of frame and bracing. 2. Wheel suspension—rear; front. 3. Type of springs and spring shackles. 4. Type of shock absorbers—rear; front. 5. Steering linkage—manual; power.

Visit a specialized brake center, or a garage employing a brake mechanic, to show members what occurs when brakes undergo constant use. Request that the procedure used in replacing brake lining, adjusting and bleeding lines, and rebuilding wheel and master cylinders be explained, also.

On a later visit to a wheel alignment shop ask the wheel specialist to explain and show the importance of proper wheel alignment, including: (1) Wheel toe-in and toe-out on turns; (2) Camber and king pin inclination; (3) Caster or backward tilt of king pin; (4) Tire wear due to faulty wheel alignment.

### "Let's Do"

1. Encourage members to inspect all four tires on their family cars for wear.
2. Visit a service station or garage equipped with a hydraulic hoist. Study the underside of two or more automobiles.
3. Arrange at a station to "pull" one of the front wheels of several autos. Observe the condition of brake linings and wheel drums.
4. Visit a brake center to study the braking system. Conduct a braking demonstration.
5. Visit a wheel alignment shop.



## "Let's Discuss"

Participation of an auto mechanic, brake specialist, or wheel alignment specialist will strengthen discussion of Section III. He can illustrate the importance of keeping brakes in tip-top working order, and of efficiently maintaining the steering mechanism to cause minimum tire wear.

## TO BE DONE BEFORE NEXT MEETING

Ask each member to check his personal or family car for the most recent service record including: (a) Chassis lubrication; (b) Oil change; (c) Oil filter change. Have them compare this record with recommendations in the operator's manual. Ask them to be ready with their report for the next meeting. Include the "Let's Do" of Section IV in the assignment for the meeting on lubricants.

Arrange for an exhibit of various motor oils for the meeting on Selecting Lubricants. Attempt to locate both new and used oils of varying grades and conditions.

Work with one or more older members in preparing a large chart for use in recording the information on service records made by the members. This chart may include mileage registered on the odometer; service rendered, including chassis lubrication, oil change, oil filter change, and other maintenance factors. This will be used as a basis for discussion in Section IV.

## UNIT 3, SECTION IV SELECTING LUBRICANTS

### Progress Report

At this meeting give each member a 3" x 5", or 5" x 8" index card and ask each to specify one highlight, safety factor, or mechanical adjustment covered in Section III, "What Makes For A Smooth, Safe Ride."

Then ask members to exchange cards so that none will have his own. Divide the Club into groups of 5 or 6 and instruct them to list three important reasons why their factors contribute to a safe, smooth riding car. Post the results and follow with a general discussion.

In this Unit, or in future ones, you may devise your own methods of obtaining a Progress Report, if desirable.

### Purpose

Friction is a major problem in automobile operation. Oil and grease are used to provide a cushion between metal parts. They prevent these metals from directly contacting each other. Lubricants tend to reduce resistance and allow parts to slide by one another with ease.

Study in this section centers around the specific jobs of oil as related to proper care and maintenance. It concerns the SAE viscosity numbers, and the API service classifications of oils, and how they meet the jobs intended for them. It outlines the importance of another vital area of car service. Understanding, demonstration, and application are especially well adapted to teenagers. Remember to point out that operation of the automobile would be impossible without the use of oils and lubricants.

### Subject Matter and Activity

Prepare exhibits of several different oils. Arrange to pour them from one container to another to help demonstrate viscosity and point up why oil is graded. For comparison and contrast, use both new and used oils.

Work with one or two older members in planning a presentation on the six major jobs of oil, using actual parts where possible. Explanatory charts and an actual engine pair up well for describing the parts of the lubricating system. Trace the oil through the engine from the oil pan and return. Emphasize the purpose of detergents, oxidation inhibitors, and other chemical additives in today's oils needed to help oil meet the extreme demands of modern powerful engines under all driving conditions.

Discuss SAE viscosity numbers, and API service classifications of motor oil for gasoline and diesel engines. Discuss the qualifications of heavy duty brake fluid, as they differ from those of ordinary lubricants.



## Suggested Demonstrations For Section IV

1. New versus used oils.
2. Different viscosities of oil in ranges and grades.
3. How oil additives neutralize acids formed in the burning process.
4. Service Classifications of motor oils for gasoline and diesel engines.
5. Servicing the oil filler cap.
6. Removing and replacing the oil filter cartridge.
7. Servicing the crankcase ventilation filter.

### "Let's Do"

Encourage all members to consider these points in regard to their personal or family cars. Highlight these points in group discussion. Raise questions with the members on reasons for differences among various makes and models of cars.

### "Let's Answer"

Answers to these questions should be readily available following the meeting. This exercise serves two purposes: (1) How well the members have grasped the information; and (2) How effectively the material was organized and presented.

## Looking Ahead To Section V

Section V, "The Electrical System," although complex in nature is not beyond the comprehension of most 4-H members studying Unit III. The help of an automotive technician or mechanic, competent in both theory and practice, is essential in explaining the electrical parts of the car.

## TO BE DONE BEFORE NEXT MEETING

Review with the automotive technician the main topics of the section and the purposes of the project well in advance of the meeting.

Ask members to read Section V carefully before the discussion, noting technical phrases and words which they don't understand. Use the various visual aids to illustrate electrical parts. Enlist the services of a garage having adequate space for group participation to demonstrate testing equipment, etc.

## UNIT 3, SECTION V THE ELECTRICAL SYSTEM

### Progress Report

Call for a verbal report from members regarding the lubrication maintenance on their cars since the last meeting. Note whether any members indicate that they made changes in range or grade of the motor oil being used, following discussions during the last meeting. Point up these changes and answer any questions that the members may have regarding them. This can serve as a review of Section IV, "Selecting Lubricants."

### Purpose

The electrical system is a most vital part of automobile operation. Without it there would be no ignition, cranking, lights, or radio. Section V describes electrical energy in simple and understandable terms. Although the ignition system was discussed in Unit 2 briefly, this section of Unit 3 elaborates on the remaining uses of electricity in the automobile.

### Subject Matter and Activity

Many members will have some knowledge of the electrical system which they acquired in general science or physics courses in high school. Others may have had little or no contact with the terms or the processes. Before discussing main topics, ask members to record technical terms which are not clear. A blackboard or large sheet of paper can be used to list the terms, having a junior leader develop the list as members contribute. Refer to each term as it arises, making sure that all questions from members are fully covered.



Visual aids in the form of charts, pictures, and the real parts of a member's car will make Section V more interesting and effective. An automotive garage may have most of the necessary materials. Other possible sources are high school physics departments, battery companies, accessory dealers, and car service departments.

The instructor for this lesson needs to be quite familiar with the material. Following the sequence of the project booklet closely will help him to better explain the processes and define terms. Illustrated discussions, demonstrations, and exhibits are some of the best ways to present the technical information.

There may be a temptation to discuss individual parts, without relating one to another. In this regard a diagram will help to summarize the ignition and accessory parts of the total electrical system, but should not be present until all data in the member's book has been described and explained. Remember that some members will grasp information more quickly than others. Allow plenty of time for review and questions.

### Looking Ahead To Section VI

"What To Look For In Buying A Used Car" can be a most interesting meeting. Some of the older members may have had experiences of their own to tell about while accompanying a family member or a friend who was buying a car. Or possibly some member has bought a car of his own.

### TO BE DONE BEFORE NEXT MEETING

Arrange for one or two trips to used car lots, and the cooperation of the lot owners, or their car salesmen, to guide the members in what to look for when they are ready to buy a car. These trips can be made as the second part of the meeting, following the outlined discussion; or as the meeting opener to enable the members to take more part in the discussions.

Ask members to observe different types of automobile advertisements in the newspapers, describing used cars for sale.

## UNIT 3, SECTION VI WHAT TO LOOK FOR IN BUYING A USED CAR

### Purpose

As young people attain driving age and begin earning money of their own, they naturally look forward to buying a car. Because a prospective buyer has a limited budget, emphasis in this section is on choosing a good used car wisely.

Section VI raises pertinent questions, stimulates some serious thinking, and outlines the logical steps in selecting a used car. In addition, several danger areas are pointed out, so that the buyer knows what to look for in analyzing the condition of a car.

Information covered in the project booklet may involve more than one meeting, since adequate time is needed for members to look over a wide selection of cars.

### Subject Matter and Activity

Encourage all members to read Section VI very carefully. A re-reading may be advisable, perhaps necessary, especially for those who are not familiar with much of the terminology.

Prior to the initial meeting, collect automobile advertisements from different newspapers. Expose members to various methods of advertising. Ask them to observe the many ways newspapers describe used cars on sale. Suggest that each member select a particular make, model and year of car and check a daily newspaper for two weeks to observe variations in prices, descriptions and types of advertising of that car. This should help acquaint members with the current market, also with local car dealers.

Solicit the cooperation of a local service station or garage equipped with a hydraulic hoist. If possible, use a recently purchased car, preferably one owned by a 4-H member. After briefly reviewing the section, arrange to have the group inspect the car while it is up on the hoist. Ask older members to point out and discuss in detail, subjects such as: That First Look, Following Up The Power Train, Examining The Exhaust System. And after the car is lowered again, such subjects as: Opening The Doors, Under The Hood, etc. Allow ample time to give the car a thorough analysis. You may want to consider the possibility of having a dealer, salesman or mechanic work with each member individually.



## "Let's Do"

With the help of the local Automobile Dealers Association choose a used car dealer and ask his permission to have the club look over his selection of cars. This experience will provide a realistic background for eventual purchase of a car, especially after having covered the material in the section.

A discussion on installment buying makes an excellent conclusion. Ask the dealer to explain the procedure for obtaining relative values of a used car, of its age, condition and make.

Resources for information on cars and their various systems and parts can be had in such magazines as: Motor Life, Popular Science, Popular Mechanics, Mechanix Illustrates, Consumers Report, Changing Times, etc.

## Suggested Demonstrations For Section VI

1. How to check the frame for damage.
2. How to detect evidence of a wreck.
3. Different types of tire wear and associated causes.
4. Inspecting for radiator leaks.
5. Inspecting for exhaust system leaks.
6. Testing the clutch.
7. Checking front wheel suspension.
8. Determining the condition of the brakes.

## Looking Ahead To Section VII

"Operating Your Car Efficiently" has to do with three major areas including the driver, driving conditions, and the automobile engine. In this section you should work closely with a mechanic. He will be valuable as a source of information in demonstrating and discussing an engine tune-up.

## TO BE DONE BEFORE NEXT MEETING

Complete preliminary arrangements for the demonstration well ahead of time. Visual aids, of course, will boost interest in this section, so have as many available as possible.

## UNIT 3, SECTION VII OPERATING YOUR CAR EFFICIENTLY

### Progress Report

The club is well past the midpoint in Unit 3. Schedule a few minutes for members to answer these questions:

1. What do you like about Unit 3 of the project?
2. Do you have suggestions for improvement?
3. Are there additional features which you would like to see included?

Here is an opportunity for a junior leader to serve as discussion leader. Prior to the meeting spend some time with the junior leader on the method of securing answers to questions. Ask the club secretary to maintain a record of answers, a helpful aid in planning the program for another year.

### Purpose

Few drivers really know how much it costs to operate a car, and only a small percentage can account for the number of miles per gallon their automobile delivers. The purpose of this section is to help develop an understanding of the principles of efficient driving and engine operation. The information may be used to promote safe driving, too, for cautious and efficient driving go "hand in glove."

A number of subjects covering engine operation are correlated in this section, and the ignition, carburetion and cooling systems are reviewed.

### Subject Matter and Activity

Discuss the contents of the project booklet. Become familiar with and use as many actual parts as possible—dirty spark plugs, distributor points, batteries, air cleaners, carburetors, etc.



## Suggested Demonstrations For Section VII

Demonstrations and group activities should be utilized in presenting the information here. The written technical terms will take on new meaning as members observe vacuum gauges, timing lights, and other testing equipment.

1. Demonstrate how gas mileage is determined. (Equipment) Efficient driving can be demonstrated in a car equipped with a vacuum gauge. These gauges are available at all auto parts supply stores, and are used by garages to adjust the carburetor. To demonstrate place the vacuum gauge on the dash and attach the tube to the intake manifold vacuum connection. Don't use the windshield wiper vacuum line, for most cars with vacuum-operated wipers have a vacuum booster pump built in the fuel pump which causes the gauge to register too high. If the car is equipped with vacuum operated wipers, disconnect the wiper hose at the carburetor and attach the vacuum gauge tube to this connection. Be sure that the connection is made on the engine side of the vacuum booster pump.

(Procedure) Take members for a ride in the car. Call their attention to the fact that at cruising speeds the vacuum gauge shows, in inches, the approximate gas mileage of the engine. Travel at different speeds and stop frequently. Accelerate at varying speeds. Notice that poor gas mileage is indicated quickly when the accelerator pedal is depressed too far. *A low reading on the gauge indicates poor mileage; a high reading means efficient operation.*

2. Demonstrate with the help of a mechanic, the automatic timing advance.

(Equipment) Use a timing light.

(Procedure) Attach a power timing light to the power supply (battery or 110 volt outlet, depending on type of light), and attach the high tension lead to the No. 1 spark plug. With the engine idling, observe the timing mark. Gradually accelerate the engine to about 2,000 rpm, then observe the advance of the spark.

## "Let's Do"

Discuss the jobs described in the "Let's Do" portion of this section.

1. Gas Mileage—Instruct members in the practice of efficient driving. Have each member ask his family to practice efficient driving habits. Later ask them to observe any change in the gas mileage of the family car.
2. Remove and inspect spark plugs. Refer to owner's manual for the proper type of plug and its gap setting. When setting the plug gap, never bend the center electrode. Always use a round feeler gauge to check the gap setting.
3. Remove and clean the battery. Be careful in removing the battery since acid may cling to its exterior and can damage clothing. Use a solution of water and baking soda to wash the battery and the carrier. Continue washing until no foamy substance appears when soda water is applied. *Make sure none of the soda gets into the battery.* Clean battery terminals and cable connections with sandpaper, or by scraping with a pocket knife.
4. Inspect the distributor. Refer to the owner's manual and the contents of this section, and perform the steps as outlined.
5. With the timing light attached, as previously described in the spark advance demonstration, check the timing of the engine.
6. Refer to the owner's manual and answer questions on valves.
7. Clean the air cleaner (A) Oil Bath type: Wash the element in kerosene and let it drain. Wipe parts clean and fill with fresh oil to correct level. (B) Paper type: Inspect for excessive dirt. Clean by tapping it on a solid surface, then remove dust using compressed air. If it is excessively dirty, a new element should be installed.
8. Adjust carburetor idling as outlined in the project booklet. Attach vacuum gauge to the same connection as referred to in the efficient driving demonstration.



## Looking Ahead To Section VIII

Plan well in advance to secure adequate resources for "How To Make Your Community A Safer Place To Drive." Films, booklets and other information are listed in Section VIII of the Leader's Guide.

## TO BE DONE BEFORE NEXT MEETING

Cooperate with junior leaders and other members in preparing one or two demonstrations. This will involve additional planning before the meeting. Law enforcement officials can contribute to this meeting, and are usually happy to assist with demonstrations.

Ask members to be especially observant in their lookout for hazards. Emphasize the need for locating blind intersections, hidden entrances, and other areas where accident rates are high. Developing a traffic safety consciousness and a responsible attitude is important for all members advancing to Section VIII.

## UNIT 3, SECTION VIII HOW TO MAKE YOUR COMMUNITY A SAFER PLACE TO DRIVE

### Progress Report

Prepare a simple True-False test to review Section VII. "Operating Your Car Efficiently." Ten questions should be adequate to stimulate discussion. Following are examples:

- |                                                                  |      |       |
|------------------------------------------------------------------|------|-------|
| Fuel economy gets better as speed is increased.                  | True | False |
| The condenser always should be replaced when points are renewed. | True | False |
| When the engine is hot the automatic choke should be wide open.  | True | False |

### Purpose

There always will be an urgent need for enthusiastic volunteers in the fight to curtail death and injury on our highways. Through your work and that of the club, it is possible to contribute together in this job by setting a good example in traffic safety, and by supporting the work of local traffic officials.

This section is designed to further develop 4-H work in traffic safety through discussions, demonstrations and practical activities. In carrying out the activities as described in the project booklet, the aim is to help neighbors, as well as members, become safety conscious in their day-to-day driving and walking.

### Subject Matter and Activity

At the start to become acquainted with traffic safety work in your community, ask local traffic officials to visit your club to inform the members of their duties. Law enforcement agencies, at both the community and county level, will be willing to send representatives to one of your meetings to explain traffic regulations, and to describe local traffic safety needs.

Discuss the ideas contained in this section. Members probably will have additional thoughts on traffic safety which will be worthy of attention. You can evaluate their suggestions for suitability as possible future activities.

As you know, each county 4-H Club plans a full year's program, but work in traffic safety is not always included. In one county in Wisconsin a 4-H Club included specific traffic safety activities in its program. Maybe their approach will have a bearing on your plans:

1. Letters and resolutions were composed by 4-H to promote high school driver education. These were mailed to schools not conducting such courses. In addition the club followed up that activity by sponsoring programs for presentation to high school boards of education, at which the advantages of driver education were emphasized.
2. During National 4-H Club Week members devised traffic safety displays to be shown in local shop windows.
3. Over a seven-month period a 4-H Citizens Committee observed and reported traffic violations, as well as acts of courteous driving. Letters of commendation were mailed to the courteous drivers. Later their names were publicized via radio and newspapers.



4. Other activities carried out were: (a) A poster contest; (b) A contest to determine the best speech presented by members on traffic safety; (c) A 4-H sponsored community traffic safety night; (d) Winter driving demonstrations.

As described in the project booklet, the club may be interested in looking for, and correcting, neighborhood traffic hazards. If so, don't ignore the simplest activity of this kind: (a) Cutting tall weeds or brush which obstruct highway markers or intersections; and (b) In some rural areas it is necessary to cut corn or other crops near intersections, so that approaching traffic can be seen from all directions (here it is important to get permission of property owners before such steps are taken).

### **"Let's Answer and Let's Do"**

In "Let's Do" of the project booklet there are six suggested activities which are suitable for 4-H participation. This is merely a partial listing, however. You are encouraged to invite discussion among members about additional activities of their own creation.

After members have tentatively chosen an activity (an original idea, or one listed under "Let's Do"), the questions under Let's Answer should be completed. It is not necessary that all questions be answered in the affirmative for the activity to be suitable.

In determining if the tentative activity fulfills most of the qualifications in Let's Answer, ask one member to describe it, then have others ask questions. Another way to find out if the activity is suitable for your club's efforts is by a debate of its merits. Divide the club into two groups. Ask one to defend the activity, listing its advantages; ask the other to criticize it. Still another way of choosing the most appropriate activity is by a forum or group discussion, wherein members talk about advantages and disadvantages.

Suggestions in conducting activities in the project booklet:

1. Check with the local Extension Service or public library for a listing of motion pictures to supplement this activity. One suggestion is "A Day In Court," which may be secured through Modern Talking Picture Service, 45 Rockefeller Plaza, New York 20, N. Y.
2. Descriptive literature on the vehicle safety check may be obtained by writing to Vehicle Safety Check Program Kit, National Vehicle Safety Check Committee, 1200 Eighteenth Street N.W., Washington 6, D. C.
3. Some of the ideas which were conceived by 4-H in Wisconsin may be helpful in planning this activity. Note also the references at the end of this section. In conducting the activity members can create original safety messages for use by radio stations and newspapers. It is a good idea to contact editors from both those media to assist in this work.
4. Talk with officials of other rural organizations to ascertain information concerning their traffic safety endeavors. Cooperation is the keynote. Sources to consider are: FFA Chapters, Home Demonstration Clubs, older youth groups, young men's and women's organizations, and community groups of major farm organizations.
5. The 4-H Automotive Care and Safety Project lends itself well to demonstrating the various phases of Section VII. Three examples are given in the project booklet, which can be carried out as an individual or club activity. Valuable resources are:
  - (a) Safe winter driving. Film: "How To Drive On Snow And Ice," Seiberling Rubber Co., Public Relations Division, Akron 9, Ohio.
  - (b) Precautions in freeway driving. Booklets: "Expressway Driving Is Different," Allstate Insurance Co., Public Relations Department, 7447 Skokie Blvd., Skokie, Illinois. "Expressways Can Be Safeways," Accident Prevention Department, Association of Casualty and Surety Cos., 60 John Street, New York 38, N. Y.
  - (c) A personal safety check of your car. Literature: See Item 2.
6. Here is an opportunity for members to spread their creative wings a bit, figuratively. It is necessary to plan a 4-H exhibit well ahead of the event at which it will be displayed. Leave plenty of time for discussion and original contributions by members. A good reference to consult is: "Here's How—1,001 Traffic Safety Ideas," which can be obtained from the National Association of Automotive Mutual Insurance Cos., 20 North Wacker Drive, Chicago, Ill.



## General References

"Here's Safe Driving"  
Advertising Department  
Chevrolet Division  
General Motors Corporation  
Detroit 2, Michigan

A new booklet of safe driving advice and steps to safe driving habits.

"Tips to Teens"  
American Oil Company  
Public Relations Department  
910 South Michigan Avenue  
Chicago 80, Illinois

Safe Driving hints for teenagers.

"What Everyone Should Know About High School Driver Education"  
Association of Casualty and Surety Cos., Accident Prevention Department  
60 John Street  
New York 38, N. Y.

"Planned Pedestrian Program"  
AAA Foundation for Traffic Safety  
1712 G Street N.W.  
Washington 6, D. C.  
(Price: \$2.00)

Pedestrian accident problems; methods of protecting pedestrians; benefits of pedestrian safety programs.

"Driver's Manual"  
Local motor vehicle bureau  
or State Department of Motor Vehicles

## Looking Ahead To Section IX

A successful 4-H contest in economical and skillful driving will require a good deal of cooperation among members. Review the various jobs to be done and ask for volunteers to assume responsibility for them.

## TO BE DONE BEFORE NEXT MEETING

1. Investigate the possibility of local sponsorship of economy run or skilled driving contest.
2. Recruit technical help and guidance of the highway patrol.
3. Prepare entry blanks.
4. Enlist assistance in laying out the course.
5. Organize the five committees listed in Section IX.

In addition, ask for volunteers to organize a publicity committee. The group should be responsible for advance news releases via radio, television, and newspapers. The committee also should inform cooperating agencies: police, schools, county or community councils, automobile dealers, parts and accessories distributors, and service stations.



## UNIT 3, SECTION IX GROUP ACTIVITIES — ECONOMY RUN AND DRIVING SKILL

The previous section listed a variety of 4-H activities suitable for promoting safer and more efficient traffic in the community. Review those in which the club took part or will take part. Have the club's efforts produced positive evidence of safer travel in the community? Are there additional activities which could be carried out by the club for traffic safety?

### Purpose

This section is devoted to planning and carrying out two group activities which measure the ability of each member in economical and skillful driving. The project booklet covers all aspects of planning and conducting the activities as well as participating in the actual events. By their very nature these activities afford you an opportunity to request community leaders and their organizations to become a part of 4-H work.

### Subject Matter and Activity

1. Sponsorship for activities, if desired, may be sought from banks, civic clubs, merchants, farm organizations, or automotive businesses such as service stations, car dealers, and parts-accessories distributors.
2. A sponsor, in addition to providing gasoline for the events, may be willing to supply awards. A supper or picnic may be arranged at the conclusion of the activities, at which time recognitions can be made.
3. Additional technical help and guidance may be enlisted from automobile mechanics, traffic enforcement officials, and high school driver education instructors. Community safety committee members should be called on for help, too.
4. Arousing the interest of local automotive dealers, parts distributors and service stations is especially important. Perhaps they can provide the facilities at a specified time for safety checking and tuning up cars. They further may agree to supervise those activities.

When adopting rules and plans for conducting the events, leaders and members should decide on the plans which best fit their needs and situation, patterned after the suggested plans and rules given in the Leaders' Guide and members' project booklet.

As a leader you are responsible for local publicity, and for recruiting adult volunteers for committee work. It is necessary to form Observer Committees, members of which must be volunteers of high personal standards who advocate safe automotive operation. Insurance agents, car dealers, civic employees, and others interested in traffic safety will provide representative committees. These committee members should meet prior to the events to become familiar with their responsibilities.

### Driver Skill Demonstration Activity

The events suggested in this activity to be demonstrated are:

Stopping on a Line  
Straight Line Driving  
Serpentine Driving

Parallel Parking  
Written Test  
Display of the Family Car

To properly conduct this demonstration, it will be advisable to have an area layout as shown by the diagram on page 19. Also, instructions for 'Marker and Flag Details' are on Page 19.

On page 17 the objective, procedure, and scoring procedures are listed for each event. As a part of this activity, a written test (Pg. 18) could very nicely be included as well as a display of the family car (Pg. 18) as a product of work done by the automotive member — could well be called a 'result demonstration'.

*Form committees* to (a) plan this demonstration activity; (b) select events to be demonstrated; (c) lay out the area; (d) secure adult personnel to act as demonstration judges; (e) publicize the event; and (f) conduct the activity with all eligible automotive members putting on the demonstrations.

A proposed summary sheet is on page 20.



## The Economy Run Activity

The "Road Test Check List", appearing as part of Section IX, can be used as a score card, marking directly in the project booklet, if desired, or acquiring additional copies and instruction sheets usually available to local AAA Clubs. If not, extras can be obtained by writing national headquarters, 1712 G. Street, N.W., Washington, D.C. A nominal purchase price is charged.

A map of the course and a point-to-point itinerary should be prepared for each contestant (samples are in the project booklet). It is suggested that each contestant insert copies of the map and itinerary in his project booklet after using them in the contest.

For the Safety Inspection, excellent suggestions can be obtained without charge from the National Vehicle Safety Check Committee, 1200 Eighteenth St., N.W., Washington 6, D.C.

Observers should ride with each 4-H driver in the Economy Run Activity to keep him within the time limits, help him stay on course, and check his ability to operate the vehicle properly.

Contest Record Sheets, similar to booklet samples, can be prepared for use. Each contestant can transfer the figures to his book to keep a permanent record after the contest.

In calculating fuel consumption, carefully follow the instructions outlined in the project booklet. Working out a practical application of this data should be a worthwhile experience for all participants. One of the many lessons which the project will teach is that miles-per-gallon is not a reliable basis for judging economy of operation.

A sponsored picnic, luncheon or awards dinner is the ideal place to review the events, compare individual results and give credit for jobs well done. If possible, awards should be presented in two categories: (1) Economy of vehicle operation; (2) Safe driving practices.

*Economy awards* should be given in each of the weight classes — heavy, middle and light — on the basis of ton-miles per gallon. The contestant who achieves the best *car-miles* per gallon may also warrant recognition.

*Safety awards* are based on driving skill as scored by the observer.

Because the scoring is computed by deducting points for errors, a low score will designate the winner. If the "Road Test Check List" is used, you may want to use the standardized norms (ratings) established as follows:

| Quality of Driving | Score        |
|--------------------|--------------|
| Excellent          | 0 - 52       |
| Good               | 53 - 112     |
| Average            | 113 - 172    |
| Poor               | 173 - 262    |
| Very Poor          | 263 or above |

*This will require careful scoring by each observer.* (note: In 15 years of testing it has been found that nearly 40 percent of all drivers taking this exam fall in the 113 to 172 bracket.)

Remember that recognition is a basic desire of young people, and the premise of the 4-H Philosophy of Awards is to provide prizes and certificates for as many participants as possible.

Although these activities require a lot of planning effort, they will pay off in enthusiasm among members as well as adult volunteers. Young people will find themselves thinking about driving skills not ordinarily applied in everyday driving. The contests should result in improved economy and safer driving for all participants — youth and adults alike.

## EVENT - Stopping on a Line

Demonstrator No. \_\_\_\_\_

**Objective:** To determine the ability of the driver to judge the position both front and rear of his vehicle.

**Procedure:** Member will drive from starting line and approach a 4-inch line painted, whitewashed, or lined on the ground. Stop with front bumper over line. There will be no penalty as long as front bumper is over line. Penalties will be charged for either under-running or over-running the line. Member may not change direction of travel once he has started to approach the line. After measurements are recorded, he will drive past line by at least 10 feet, then back up to approach line with rear bumper. Penalties will be assessed in the same manner as for front bumper.

| Scoring Procedures                                                                                                | No. Times | Points Penalty |
|-------------------------------------------------------------------------------------------------------------------|-----------|----------------|
| 1. Each instance of stalling or racing engine.                                                                    | _____ x   | 3 _____        |
| 2. Each instance of rough or jerking starts or rough, severe braking.                                             | _____ x   | 2 _____        |
| 3. Each instance of opening door to observe course layout.                                                        | _____ x   | 5 _____        |
| 4. Each instance of failure to follow instructions.                                                               | _____ x   | 5 _____        |
| 5. Each instance of stopping or interrupting continuous movement of vehicle, where not required in course layout. | _____ x   | 5 _____        |
| 6. Each inch, or fraction thereof, front bumper under-runs or over-runs line*.                                    | _____ x   | 1 _____        |
| 7. Each inch, or fraction thereof, rear bumper under-runs or over-runs line*.                                     | _____ x   | 1 _____        |
| Total Points Penalty                                                                                              |           | _____          |

\* Measure from edge of line closest to face of bumper.

## EVENT - Straight Line Driving

Demonstrator No. \_\_\_\_\_

**Objective:** To determine the ability of the driver to drive in a straight line.

**Procedure:** Member will drive left wheels of vehicle between 5 pairs of markers, where pairs are spaced tire width plus 4 inches apart. Penalties will be assessed for markers upset, and for changing direction of travel to avoid upsetting marker. Should a driver straddle or drive around a pair of markers, it will be scored at the same penalty as though both markers were upset.

| Scoring Procedures                                                                                                | No. Times | Points Penalty |
|-------------------------------------------------------------------------------------------------------------------|-----------|----------------|
| 1. Each instance of stalling or racing engine.                                                                    | _____ x   | 3 _____        |
| 2. Each instance of rough or jerking starts or rough, severe braking.                                             | _____ x   | 2 _____        |
| 3. Each instance of opening door to observe markers.                                                              | _____ x   | 5 _____        |
| 4. Each instance of failure to follow instructions.                                                               | _____ x   | 5 _____        |
| 5. Each instance of stopping or interrupting continuous movement of vehicle, where not required in course layout. | _____ x   | 5 _____        |
| 6. Each instance of upsetting a marker.                                                                           | _____ x   | 5 _____        |
| 7. Each instance of driving around a pair of markers.                                                             | _____ x   | 10 _____       |
| 8. Each instance of stopping and backing to avoid striking a marker.                                              | _____ x   | 3 _____        |
| Total Points Penalty                                                                                              |           | _____          |

## EVENT - Serpentine Driving

Demonstrator No. \_\_\_\_\_

**Objective:** To determine the ability of the driver to drive both forward and backward in a close, winding course.

**Procedure:** Member will drive forward through the Serpentine layout, going first on left, then on right side of center flags. He will then reverse and back through serpentine, going on opposite sides of center flags. Penalties will be based upon the number of flags touched or upset, number of times any portion of the vehicle extends beyond border limit lines, and the number of times travel direction is reversed to avoid striking a flag or extending vehicle beyond border limit lines.

| Scoring Procedures                                                                                                | No. Times | Points Penalty |
|-------------------------------------------------------------------------------------------------------------------|-----------|----------------|
| 1. Each instance of stalling or racing engine.                                                                    | _____ x   | 3 _____        |
| 2. Each instance of rough or jerking starts or rough, severe braking.                                             | _____ x   | 2 _____        |
| 3. Each instance of opening door to observe course layout.                                                        | _____ x   | 5 _____        |
| 4. Each instance of failure to follow instructions.                                                               | _____ x   | 5 _____        |
| 5. Each instance of stopping or interrupting continuous movement of vehicle, where not required in course layout. | _____ x   | 5 _____        |
| 6. Each instance of stopping and backing to avoid striking a flag.                                                | _____ x   | 3 _____        |
| 7. Each instance of touching a flag.                                                                              | _____ x   | 5 _____        |
| 8. Each instance where any portion of vehicle extends over border limit line.                                     | _____ x   | 5 _____        |
| Total Points Penalty                                                                                              |           | _____          |

## EVENT - Parallel Parking

Demonstrator No. \_\_\_\_\_

**Objective:** To determine the ability of the driver to parallel park.

**Procedure:** Member will parallel park on the right side of a street between two parked cars. There will be three parking spaces, each 22 feet long with cars parked in first and third space, and "centered" within their space. Penalties will be assessed for striking the curb with either front or rear tires, having either end of car too far from curb, for the number of extra tries needed, touching or striking a bumper or fender of either parked vehicle. After measurements are recorded, member will pull out of parking space, and drive to finish line. Penalties will be assessed this phase also.

| Scoring Procedures                                                                                                | No. Times or Inches | Points Penalty |
|-------------------------------------------------------------------------------------------------------------------|---------------------|----------------|
| 1. Each instance of stalling or racing engine.                                                                    | _____ x             | 3 _____        |
| 2. Each instance of rough or jerking starts or rough, severe braking.                                             | _____ x             | 2 _____        |
| 3. Each instance of opening door to observe course layout.                                                        | _____ x             | 5 _____        |
| 4. Each instance of failure to follow instructions.                                                               | _____ x             | 5 _____        |
| 5. Each instance of stopping or interrupting continuous movement of vehicle, where not required in course layout. | _____ x             | 5 _____        |
| 6. Each instance of hitting or touching car parked in front or at rear.                                           | _____ x             | 5 _____        |
| 7. Each instance of tire striking curb.                                                                           | _____ x             | 3 _____        |
| 8. Inches, or fraction thereof, car is off-center in parking space.                                               | _____ x             | 1 _____        |
| 9. Inches, or fraction thereof, front tire is away from curb.                                                     | _____ -             | 6 _____        |
| 10. Inches, or fraction thereof, rear tire is away from curb*.                                                    | _____ -             | 6 _____        |
| Total Points Penalty                                                                                              |                     | _____          |

\* Vehicle is considered as parked sufficiently close to curb when distance from tire to curb does not exceed 6 inches. Enter "zero" in the "Points Penalty" column when tire is 6 inches or less from curb.

## EVENT – DISPLAY OF FAMILY CAR

Demonstrator No. \_\_\_\_\_

The demonstrator will have the car to be judged located in the contest area at the time designated. The car will be judged on a safety check and carkeeping (cleanliness). The member will be on hand while car is being judged to answer questions from the judge. The car entered must be at least three months old.

### Scoring -

|                                                                                          |                         |
|------------------------------------------------------------------------------------------|-------------------------|
| I. Safety check - 300 Points (parts are all in proper safe condition)                    | Score                   |
| 30 points - Horn (working order, no siren or whistle) .....                              | _____                   |
| 30 points - Head lights (work properly on bright and dim) .....                          | _____                   |
| 30 points - Tail lights and license light (work properly, tail light red) .....          | _____                   |
| 30 points - Signal lights (work properly).....                                           | _____                   |
| 30 points - Brakes (foot brake has about 1" play, hand brake in order) .....             | _____                   |
| 30 points - Windshield wipers (work properly, rubber not worn) .....                     | _____                   |
| 30 points - Windows (check for breaks, cracks, chips, particularly in windshield) .....  | _____                   |
| 30 points - Rear view mirror (can be adjusted, in good condition) .....                  | _____                   |
| 30 points - Seat (can be adjusted) .....                                                 | _____                   |
| 30 points - Seat belts - (approved seat belts properly installed) .....                  | _____                   |
| Safety subtotal                                                                          | _____                   |
| II. Carkeeping - 200 points                                                              |                         |
| Interior care - 100 points                                                               |                         |
| 20 points - Dust and dirt (trim, glove compartment, ash tray, rear shelf) .....          | _____                   |
| 20 points - Trunk (cleanliness) .....                                                    | _____                   |
| 40 points - Upholstery and floors (cleanliness and unnecessary loose items lying around) | _____                   |
| 20 points - Repair of upholstery (torn spots are mended, etc.) .....                     | _____                   |
| Exterior care - 100 points                                                               | Interior Subtotal _____ |
| 30 points - Cars finish (washed and waxed) .....                                         | _____                   |
| 20 points - Spots removed (tar, tree sap, bugs, rust) .....                              | _____                   |
| 20 points - Chrome (cleaned and polished).....                                           | _____                   |
| 10 points - Tires (clean) .....                                                          | _____                   |
| 20 points - Windows (outside and inside polished clean) .....                            | _____                   |
| Exterior Subtotal                                                                        | _____                   |
| III. Basic Maintenance - 100 points                                                      |                         |
| 20 points - Battery water (proper level) .....                                           | _____                   |
| 20 points - Check oil (proper level) .....                                               | _____                   |
| 20 points - Radiator (proper level) .....                                                | _____                   |
| 40 points - Tires (proper inflation, no knobs, bulges, etc., not worn smooth) .....      | _____                   |
| Maintenance Subtotal                                                                     | _____                   |
| DEMONSTRATORS TOTAL SCORE                                                                | _____                   |

### Procedure for judge -

The judge will inspect the car for the violations of the items listed. He will not penalize for normal wear and tear on the car. Minor scratches in the paint will not be penalized if they have been repainted or waxed to prevent rusting. The demonstrator will be asked to explain how he, or she, did different operations, as a check on whether or not the demonstrator did the work himself. The member will be scored on the basis of what he has done to improve and maintain the appearance of the car, thereby giving the member with an older model an equal chance with those with a new model.

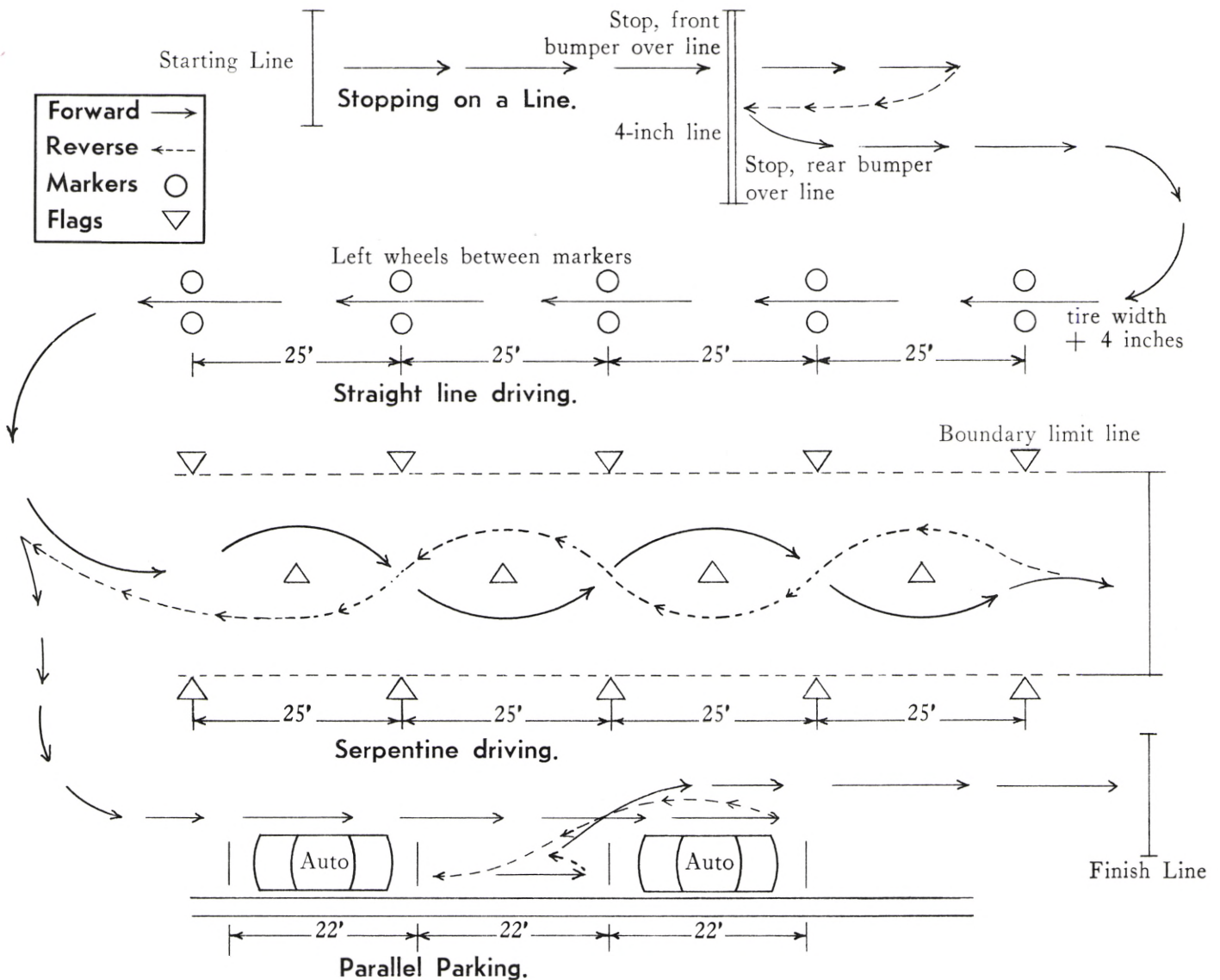
## EVENT – WRITTEN TEST

A written test, composed of 50 multiple choice and true-false questions taken from the subject matter area of the 4-H Automotive Project.

### Scoring:

Number of questions missed x 5 = Total Penalty Points

## DIAGRAM OF COURSE LAYOUT



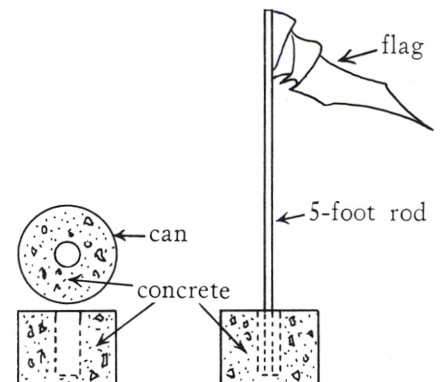
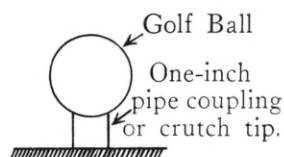
## MARKER AND FLAG DETAILS

### Markers:

Markers consist of golf balls on top of one-inch pipe couplings or crutch tips. - 10 needed.

### Flags:

Flags will consist of cans similar in size to coffee cans, filled with concrete, and holding a 5-foot rod with a flag on top. A short piece of pipe may be embedded in the concrete to hold the rod and flag. - 14 needed.



## SUGGESTED COURSE DIMENSIONS FOR VEHICLES OF DIFFERENT SIZES.

| Overall Length of Vehicle | Serpentine | Parallel Parking |
|---------------------------|------------|------------------|
| 220 inches and over       | 27.5 feet  | 24 feet          |
| 200 up to 220 inches      | 25.0 feet  | 22 feet          |
| 180 up to 200 inches      | 22.5 feet  | 20 feet          |
| Under 180 inches          | 20.0 feet  | 20 feet          |

## DRIVING SKILL SUMMARY SHEET

[illegible]

## This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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