

be tire smart play your **PART**

Dear Educator:

You probably know that tire safety is easy to achieve through routine monitoring and maintenance. Yet fewer than half of all drivers actually take the time to properly check the condition of their vehicle's tires on a regular basis – an oversight that can increase the risk of tire failure every time they take to the road.

To help novice drivers and their parents gain a better understanding of the importance of proper tire maintenance, the Rubber Manufacturers Association and Young Minds Inspired (YMI) are pleased to bring you this free, comprehensive educational program, **Be Tire Smart – Play Your PART**.

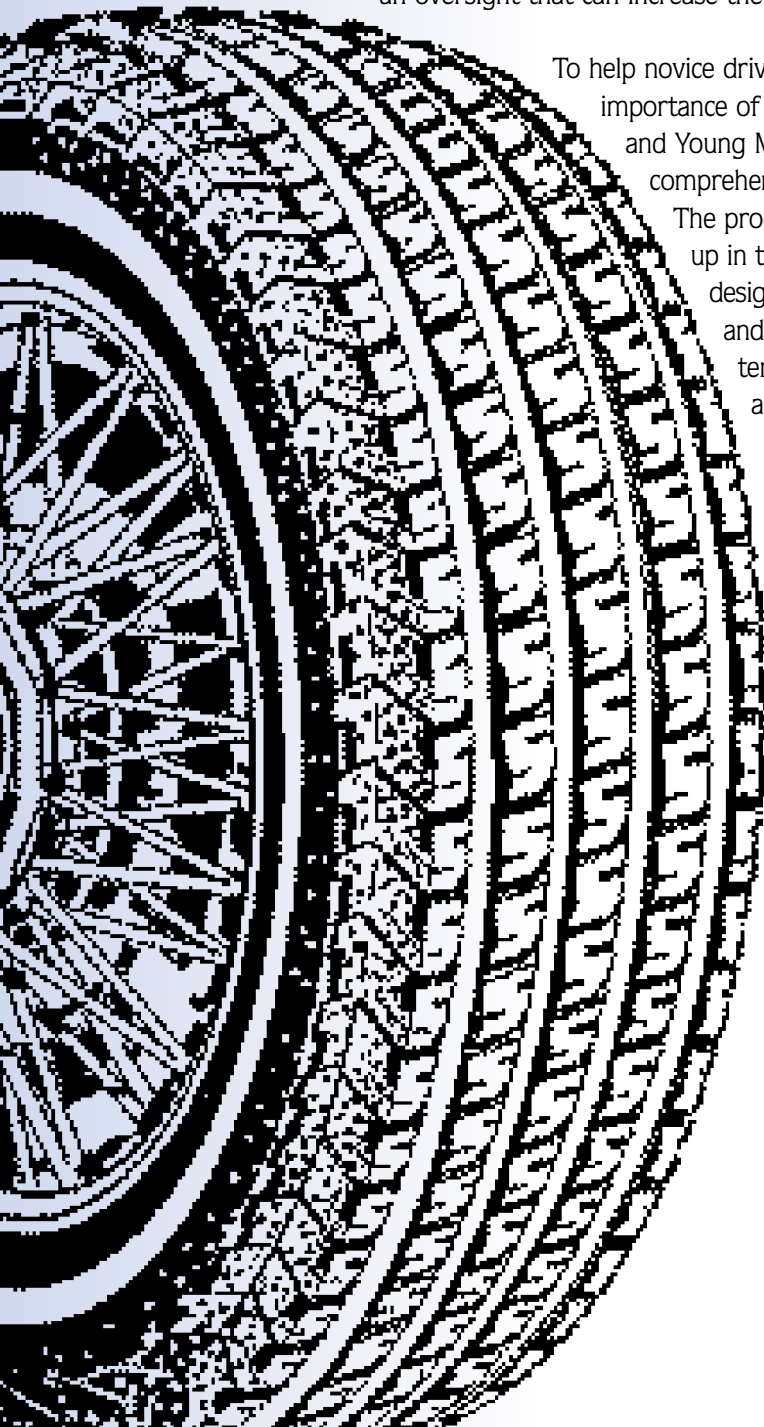
The program focuses on four key elements of proper tire care summed up in the word "PART" – **P**ressure, **A**lignment, **R**otation, and **T**read. It is designed to show students in driver education, automotive mechanics, and consumer science classes the simple steps for proper tire maintenance, in order to help them become safe and successful owners and operators of motor vehicles.

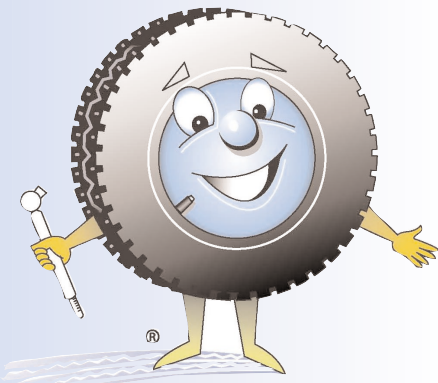
This easy-to-use educational program includes four reproducible student activity sheets, covering such topics as tire pressure, alignment, rotation, and treadwear; this teacher's guide containing background information, presentation suggestions, and follow-up ideas; and an informative classroom wall poster (also available as a letter-size handout).

We hope you will enjoy using this program with your students and sharing it with other interested educators in your school. Although the materials are copyrighted, you have permission to make as many copies as you need for educational purposes.

Sincerely,

Dr. Dominic Kinsley
Editor in Chief





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Teacher's Guide

INTRODUCTION

Much like other key aspects of safe automobile operation, such as seat belt use, mechanical maintenance, and observing traffic laws, tire safety and maintenance is a matter of personal responsibility that deserves special attention in the driver education and consumer science curricula. Understanding the importance of proper tire maintenance and learning the steps to keeping tires in top condition are key parts of becoming a safe and successful owner and operator of a motor vehicle.

Designed to communicate the vital importance of proper tire care to new drivers, this free educational program, provided by the Rubber Manufacturers Association, is intended for use by instructors of high school driver education courses, and as a supplement to the consumer science/life skills curriculum.

PROGRAM OBJECTIVES

- Increase awareness of tire safety.
- Highlight the key factors involved in proper tire maintenance – Pressure, Alignment, Rotation, and Tread.
- Outline the simple steps required to keep tires in top condition.

- Reinforce the connection between proper tire care and vehicle safety.
- Investigate how proper tire maintenance can lower vehicle operating costs.

TARGET AUDIENCE

The program is designed for use with driver education students in high schools and private driving schools, automotive mechanics students, and as a supplement to the consumer science/life skills curriculum.

PROGRAM COMPONENTS

- This Teacher's Guide, which coordinates the program components and provides a statement of objectives; background information; presentation suggestions for the activities; follow-up activities and resources for further exploration.
- Four reproducible activity sheets containing interactive exercises involving the program's major themes.
- A wall poster for display in the classroom as a motivational tool.

USING THE PROGRAM

Preparation

- Photocopy the enclosed activity sheets to provide a set for each student in your class.
- Display the enclosed wall poster in your classroom. Use it to introduce the program and as a long-term reminder of the importance of proper tire care.
- Arrange access to a vehicle or inflated tire so that students can practice checking tire pressure with a pressure gauge and checking treadwear using a penny.

Presentation

This program can be completed in one to two class periods. The activities are self-contained and can be presented in sequence or used selectively, depending on your students' needs. To maximize instruction on these topics, portions of the materials can be assigned as homework and students encouraged to involve parents, mentors, and friends in the activities. You may find the procedure outlined below an efficient way to integrate the program into your class plans.

1. Have students complete the tire safety quiz (Activity One) individually and review their answers to identify strengths and weaknesses.
2. Use the checklist on Activity Two to show students how to check tire pressure, then let them practice checking the pressure of a real tire with a pressure gauge.
3. Use the illustration on Activity Three to show students how to check treadwear with a penny, then have them try this test themselves.
4. Have students complete the scenario sections of Activities Two and Three in small groups. Review their answers in a class discussion.
5. Assign the remaining parts of the program as homework.
6. Follow up by having students discuss and compare what they learned about tire rotation patterns (Activity Three) and tire replacement costs (Activity Four) for their own vehicles.
7. Review students' tire maintenance profiles (Activity Four) in a class discussion, focusing on the importance of safe driving habits.
8. Conclude by having students clip the tire safety checklist on Activity Four.

Activity One How Tire Smart Are YOU?

This initial activity is designed to raise student awareness through a quiz on various tire maintenance and tire safety topics. Introduce the activity by asking students what it would be like to play basketball with a ball that is under inflated. Use their response to make the point that under inflated tires can have a similar — and more dangerous — effect on driving. Yet while no basketball player would step on the court with an under inflated ball, fewer than half of all drivers even check the condition of their tires on a regular basis.

Distribute the activity sheet and explain that this quiz is not a test but a chance to find out how much they know — and don't know — about tire care. When students complete the activity, review the answers as a class.

ANSWERS

1. The best place to find the recommended tire pressure for most vehicles' tires is...

(b) The vehicle owner's manual or tire information label.

The tire information label is a decal posted on the vehicle doorframe, glove box door, or fuel door. Like the owner's manual, it tells the recommended tire pressure for the specific vehicle. The tire sidewall does NOT provide this information, listing instead the maximum allowable pressure for the specific tire.

2. According to most vehicle owners' manuals, tires should be rotated...

(b) Every 5,000 to 8,000 miles.

Shifting the position of the tires on a vehicle, following the pattern recommended in the owner's manual, can provide more uniform treadwear.

3. You can check to see if your tires are bald by using what common item?

(a) A penny.

Insert a penny upside down into your tire tread. If you can see all of President Lincoln's head, your tire is bald and you need a new tire.

4. The best time to check the air pressure of a vehicle's tires is...

(b) Before driving, so that the tires are still cool.

Driving even a short distance causes tires to become warm, which increases the air pressure.

5. You can tell if a tire is properly inflated to within a few pounds of its recommended pressure...

(c) With a pressure gauge.

Tires can look "flat" when they are properly inflated or feel solid when they are under inflated. The only reliable way to tell whether a tire is properly inflated is with a pressure gauge.

6. One leading cause of tire failure is...

(b) Under inflation.

Under inflation results in increased heat buildup in the tire, which can cause internal damage and lead to tire failure.

7. A bad jolt from hitting a curb or pothole can...

(b) Throw the wheels out of alignment.

If you hit a curb or pothole hard, you

TIRE AND LOADING INFORMATION			
SEATING CAPACITY: TOTAL 5; FRONT 2; REAR 3			
The combined weight of occupants and cargo should never exceed XXX kg or XXX lbs.*			
TIRE	SIZE	COLD TIRE PRESSURE	SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION
FRONT	P195/70R14	200KPA, 29PSI	
REAR	P195/70R14	200KPA, 29PSI	
SPARE	T125/70D15	420KPA, 60PSI	

Typical Tire Information Label

should have a tire dealer check your vehicle's alignment. Poor alignment can cause uneven and excessive tire wear.

8. Uneven treadwear is always a sign that a tire...

(b) Should be checked by a knowledgeable tire dealer.

Uneven treadwear can have many causes, but it is rarely a sign of internal structural damage to a tire or caused by mounting a tire backwards.

9. To choose the right replacement tires, you should...

(a) Know the tire size, load, and speed rating for your vehicle.

This information is available on the vehicle's tire information label, in the owner's manual, and from knowledgeable tire dealers.

10. Experts recommend checking the pressure and condition of your tires...

(c) Once a month.

Follow-Up Activities

1. Have students bring home unmarked copies of the "Tire Smart" quiz and ask older drivers in the family (parents, siblings, etc.) to take the test themselves. Have them see how these family members score, then compare those results with their own and those of their classmates, discussing the differences in class.

2. Suggest that students check on tire maintenance routines in their families. When was the last time the tire air pressure was checked? When were the tires aligned and balanced? Have they been rotated? How often are tires inspected for treadwear? Have students report on their findings to determine how your class compares to national statistics which show that fewer than fifty percent of drivers check the condition of their tires on a regular basis.

Activity Two Steer for Safety: Tire Pressure and Alignment

This activity addresses the first two ele-

ments of proper tire maintenance — pressure and alignment — in exercises designed to give students the tire care know-how they need to stay safe on the road.

P.A.R.T. One of the activity provides students with a checklist outlining the seven steps involved in checking proper tire inflation pressure:

1. DETERMINE PROPER TIRE PRESSURE.
2. MAKE SURE TIRES ARE COOL (i.e., they have not been driven on).
3. USE AN ACCURATE PRESSURE GAUGE.
4. CHECK AIR PRESSURE.
5. ADD AIR IF NEEDED.
6. VISUALLY INSPECT THE TIRES.

Introduce this activity by emphasizing that under inflation is a leading cause of tire failure — despite the fact that checking tire pressure is not at all difficult. Review the checklist, then have students follow it to check the pressure and condition of tires on a real car as a class activity using a pressure gauge. Students can then take their checklists home to follow when checking the pressure on their family vehicles.

In **P.A.R.T. Two**, students learn the importance of checking and maintaining proper wheel alignment and balance. After reading about these two factors in tire maintenance and the problems they can cause, students consider several on-the-road scenarios to determine whether improper alignment, balance, or both could be responsible for a vehicle's performance.

ANSWERS, Part Two

1-b The vibration could be caused by an unbalanced wheel and tire assembly.

2-a The "pulling" of the car to one side is a likely indication of misaligned front wheels.

3-b An unbalanced wheel often results in a “bouncing” feel, along with uneven treadwear.

Follow-Up Activities

1. Use a tire gauge to demonstrate the proper procedures for checking a tire’s air pressure. Have each student become familiar with applying the gauge to a tire, and reading it to determine the pressure. Encourage students to purchase and use similar gauges for their own vehicles.
2. On a diagram of a typical automobile, have students indicate and describe the mechanical systems in a vehicle that must function properly with the tires to ensure a smooth ride – including wheels, brakes, suspension, steering, and drive train.

Activity **Three** **Keep ‘Em Rolling: Tire Rotation and Tread**

This third activity highlights the final two elements of proper tire maintenance – rotation and tread – in exercises designed to highlight their importance for extending tire life and proper tire performance.

P.A.R.T. One introduces students to the principles of tire rotation, which can sometimes correct irregular wear and extend tire life. The activity sheet includes diagrams of several typical tire rotation patterns. Students consult their owner’s manual to see which pattern (if any) matches the pattern recommended for their vehicle.

P.A.R.T. Two focuses on monitoring treadwear, providing directions for performing the “penny test” to determine when tires are worn down to 2/32 of an inch and must be replaced. Have students look at a penny to help them visualize this amount of tread, then use the scenarios in this part of the activity to discuss how worn tires can affect vehicle performance.

ANSWERS, Part Two

1. Skidding on a dry surface, especially at normal speeds, may indicate excessive treadwear.
2. Worn or uneven tread and the rain on the road resulted in hydroplaning,

preventing the tread from gripping the road surface.

3. The car’s increased stopping distance may well be an indication of worn tread.

Follow-Up Activities

1. Help students organize a “penny-thon” in which they check the treads of passenger cars parked in the school lot using the “penny test.” (Do not test heavy duty light truck tires, which have separate wear parameters depending on use.) Students can use this event to raise awareness of the importance of tire maintenance in general, and of checking treadwear in particular. **NOTE:** Student and staff safety are important. Check school regulations and obtain written permission from school administration before staging this event. You may also need to obtain permission from vehicle owners and have proximity car alarms disabled.
2. In addition to researching their vehicles’ rotation patterns, have students find out when their tires were last rotated (if ever) and when, according to the manufacturer’s recommendation, they should be rotated again.

Activity **Four** **Play Your P.A.R.T.: It All Adds Up**

This final activity alerts students to factors that can contribute to tire wear and invites them to compare the costs of regular tire maintenance with the cost of tire replacement.

Introduce the activity by asking students why race car drivers typically change tires during a pit stop. They should be able to explain that tire inflation, wheel alignment, and treadwear are all affected by the high stress maneuvers required on a race track. Point out that, in a similar way, high stress conditions in everyday driving can also affect the level of maintenance tires may need.

Have students complete the tire maintenance profile in **P.A.R.T. One** of the activity, then follow up by distinguishing high stress factors that may be unavoidable in your part of the country from those associated with driving behaviors. Reinforce the obvious

connection between safe driving and tire safety by asking students what other “costs” are associated with these high stress driving habits.

P.A.R.T. Two of the activity asks students to compare annual tire maintenance costs with the cost of tire replacement. Have them first add up the costs indicated for maintaining air pressure, checking wheel alignment, periodic tire rotation, and regular tread inspection. Then have them complete the chart by researching the cost of replacing all four tires on the vehicle they or their families drive. Follow-up by having each student calculate the difference between maintenance and replacement costs, then compile these figures to calculate an average “cost” for neglecting tire care.

Finally, review the checklist that concludes this activity and encourage students to clip this part of the sheet as a reminder to keep in their vehicle glove compartment.

Follow Up Activities

1. The code numbers used for tire sizes can seem mysterious, but they actually contain detailed information about the special characteristics of each different tire. As a follow up to their replacement cost research, have students visit the Rubber Manufacturers Association website at www.rma.org/tire_safety. Click on “The Sidewall Story” to learn more about the language of tire codes. Have each student “translate” the size and type information molded into their tire sidewalls.
2. Learning the right way to change a flat tire is part of becoming a safe driver. Have students consult their owner’s manuals for directions specific to their vehicle, then share this information in a class discussion that highlights the variety of jacks and spare tire locations one can encounter in different vehicles. Emphasize that following the owner’s manual directions is critical to changing a tire safely. As a follow-up, invite an AAA representative to review general safety rules for changing a flat tire with your class.