

GLOSSARY:

Autonomous Vehicles: Driverless or self-driving vehicles capable of sensing the environment via radar and GPS and navigating without human input. Autonomous vehicles exist mainly as prototypes and demonstration systems, but are likely to become more widespread in the near future.

Decibel: A unit used to measure the power of a signal, such as an electrical signal or sound, relative to some reference level.

Global Positioning System (GPS): A system of satellites combined with receivers on the Earth that determines the latitude and longitude of a particular receiver through triangulation.

Lithium Ion Battery: Rechargeable battery in which lithium ions move from the anode to the cathode during discharge and back when charging.

Regenerative Braking: Converts the energy generated by braking into electrical energy to charge the batteries for the electric motor portion of the propulsion system.



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Show Me Science Advanced

Transportation

Automotive Safety Innovations

K4606DVD

Advanced Teachers Guide

SYNOPSIS:

Automobiles have evolved in many ways over the years, with increasing fuel economy, reliability, handling, and comfort. However, automobile manufacturing is in a new era, focusing on safety while incorporating impressive new technologies into our transportation needs.

With a growing population, there are subsequently more people driving and more automobiles on the road. With more congestion and traffic, the likelihood of accidents seems imminent. Automobile engineers are reacting by making our transportation options safer with extensive crash tests, monitoring cameras and accident avoidance systems.

CURRICULUM UNITS:

- Engineering
- Environmental science
- Physics

CAREER OPPORTUNITIES:

- Automobile design
- Engineer
- Mechanic
- Service technician

PROGRAM OVERVIEW:

The latest automobile innovations are mostly geared at safety, both for the vehicles' occupants and the environment as well. Automobile manufacturers are making cars smarter. Complex computer programs are being tested to make vehicle to vehicle communication possible.

These algorithms calculate information to determine the best evasive measures when faced with an impending accident. Some alternative fuel vehicles such as the LEAF, run completely on electricity. The car is much quieter than an internal combustion engine as a result of significant noise reduction due to fewer moving parts and no exhaust.

ISSUES & CRITICAL THINKING:

1. Discuss with the class what they think automobiles will be like 10 years, 25 years, and 50 years from now. How might autonomous vehicles impact driving habits? If swarm technology helps alleviate traffic jams, will people in large cities be more apt to ride in a car rather than public transportation? If autonomous vehicles become more like riding public transportations, will people be more likely to take public transportation? Brainstorm a list of pros/cons on how these changes in habits could impact the economy and the environment.

2. Have students research what steps the government is taking to encourage automobile manufacturers to improve their fuel efficiencies and emissions. What role do automobile manufacturers and oil companies play in shaping government policies?

3. A difficult obstacle for alternative fuel vehicles to overcome is establishing an infrastructure. For example, having readily available charging stations or more gas stations that have alternative fuels for citizens on a long trip. Ask students what they believe will have to happen for consumers to become more confident in purchasing electric vehicles.