

# VIRGINIA BOARD OF EDUCATION AGENDA ITEM

Agenda Item: B

**Date:** March 17, 2022

Title: Final Review of Proposed 2022 Driver Education Standards of

Learning

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# **Purpose of Presentation:**

Action required by state or federal law or regulation.

# **Executive Summary:**

On November 18, 2021, the Virginia Board of Education (Board) received the proposed revisions to the 2015 *Driver Education Standards of Learning* for first review. The proposed 2022 *Driver Education Standards of Learning* were developed through numerous phases of meetings convened with Virginia educators, researchers, college professors, the Virginia Departments of Transportation, Motor Vehicles and Health, the Virginia Bicycle and Pedestrian Safety Task Force, Trucking Association, and other subject matter experts. The proposed standards reflect a comprehensive, collaborative review of the standards and the expertise of diverse constituents.

The proposed revision of the 2015 *Driver Education Standards of Learning* aligns with Priorities 1 and 3 of the <u>Board of Education Goals from the 2018-2023 Comprehensive Plan</u>. Additionally, the proposed revisions include emphasis on ingraining an attitude of safety and risk management, as well as the following:

• the financial responsibilities associated with purchasing or leasing a vehicle and cost for maintenance and insurance;

- the legalization of marijuana and its effects on drivers;
- safe interactions with law enforcement at the roadside;
- an understanding that responsibility is shared, crashes are preventable (not accidents) and that fatalities and serious injuries are unacceptable; and
- how advancements in active and passive vehicle occupant protection systems and intelligent handling and stability control innovations affect driving practices and reduce human error.

The proposed revisions also include edits to enhance clarity, specificity, rigor, alignment of skills and content, and reflect current academic research and practice. The goals of the standards are to equip students with the knowledge and skills necessary to

- acquire in-depth knowledge and essential driving skills (Content Knowledge);
- obtain a driver's license and practice effective communication, self-management, social awareness, and responsible decision-making skills (Workplace Skills);
- foster responsible driving attitudes and displaying responsible driving behaviors that protect self and others (Community Engagement and Civic Responsibility); and
- explore lifetime learning opportunities in the highway transportation system and the field of traffic safety (Career Exploration).

The highway transportation system—which consists of vehicles, roadways, and people (including attitudes)—is constantly changing. The updated standards of learning reflect these changes. Attachments A and B include the strikethrough and clean versions of the proposed standards. No changes have been made to the proposed standards from first to final review.

After presenting for first review of the proposed revisions to the 2015 *Driver Education Standards of Learning* the following actions occurred:

- The Virginia Department of Education (VDOE) solicited public comment on the 2015 Driver Education Standards of Learning from December 17, 2021 – January 28, 2022; and
- The Board held two virtual public hearings for the proposed *Driver Education Standards* of *Learning* on February 8 and 16, 2022.

The VDOE received two written comments on the proposed standards between December 17, 2021, and January 28, 2022. There were 213 registrants and 13 additional comments received through the public hearing process. The feedback received was overwhelmingly positive in nature and focused on the following:

- the importance of a high-quality, standardized driver education (DE) SOL/curriculum for all students in Virginia to promote the pursuit of employment, higher education opportunities, and for other socio-economic purposes;
- positive reflection of the proposed DE SOL goals that develop conceptual understanding of safe driving practices and proficient skill-based performance for new drivers;
- commending the proposed standards use of an interdisciplinary approach to the SOL addressing social-emotional well-being, physical, mental and cognitive skills;
- the vital importance of DE.9 for effects of alcohol/other drugs on driver performance; DE.13 for multiple causes of driver distraction and its potential consequences; DE.16 for technological advances in vehicle and occupant safety; DE.23 for environmental impact of transportation; and DE.24 for both driver and law enforcement safety;
- support for the addition of the effects of marijuana on driver performance since the legalization of marijuana usage/possession in Virginia;
- a parental concern on identification of drivers with special needs with law enforcement;
- VASCD's representative shared the need for clarification on shifts in vehicle load (i.e., yaw, pitch, roll), and using a gradual stepwise approach as an off-road recovery strategy;
- the importance of highly qualified driver education teachers in both classroom and in-car;
- praise for goals to develop conceptual understanding of safe driving practices and proficient skill-based performance with new drivers.;
- parents and Bike/Walk to School advocates voiced the need/benefits for safe walk and bike routes to/from schools as well as the inclusion of more pedestrian/cyclist interaction training/information in driver education;
- concern over placement of DE.24 as to whether it belongs at the end or placed near DE.1;
- a school bus driver advocated for the need to reinforce positive and safe interaction between school buses and other drivers;
- a suggestion to use Topics/Headers/Strands for the DE SOL such as Vehicle Operation & Emergencies, Traffic Safety, Driver Performance & Motor Skills, and Consumerism & Conservation;
- skills and competencies learned in driver education are life skills often used every day that are quite complex as they not only require understanding basic vehicle operating procedures, they also require effective communication, collaboration, self-management, social awareness, stress-management and responsible decision-making skills.

# **Action Requested:**

Final review: Action requested at this meeting.

# **Superintendent's Recommendation**

The Superintendent of Public Instruction recommends that the Board of Education approve the proposed 2022 *Driver Education Standards of Learning* and authorize the VDOE to make technical edits.

## **Rationale for Action:**

Action by the Board allows the VDOE to provide school divisions with the revised 2022 *Driver Education Standards of Learning* that include current best practice and reflect a comprehensive, collaborative review of the standards and the expertise of diverse constituents.

# **Previous Review or Action:**

Previous review or action.

Date: January 28, 2021

Action: Report on Timeline for the Review and Revision of the 2015 Driver Education

Standards of Learning.

Date: November 18, 2021

**Action:** First review of the proposed 2022 Driver Education Standards of Learning

# **Background Information and Statutory Authority:**

Section 22.1-253.13:1-B of the Code of Virginia states, in part, that "[t]he Board of Education shall establish a regular schedule, in a manner it deems appropriate, for the review and revision as may be necessary of the Standards of Learning in all subject areas. Such review of each subject area shall occur at least once every seven years. Nothing in this section shall be construed to prohibit the Board from conducting such review and revision on a more frequent basis ..."

The <u>2015 Driver Education Standards of Learning</u> were adopted by the Board of Education in January 2015.

# **Timetable for Further Review/Action:**

Upon Board approval, and pending any technical edits or clarifications by VDOE staff, the revised standards will be posted on the VDOE website and constituents will be informed of the new standards through a variety of communication channels, including a Superintendent's Memorandum. The VDOE will proceed with the ongoing review of the *Curriculum Guide for Driver Education in Virginia* to support teachers and administrators in the implementations of the 2022 *Driver Education Standards of Learning*. It is anticipated that the curriculum review process will be completed by summer 2022, and the resources will be distributed to the field via the VDOE website. School divisions will implement the 2022 *Driver Education Standards of Learning* beginning in the 2022-2023 school year.

# Impact on Fiscal and Human Resources:

The administrative impact and any other cost associated with the development and distribution of the standards will be absorbed within existing resources.

Driver
Education
Standards of
Learning
for

Virginia Public Schools



# Driver Education Standards of Learning

for

# Virginia

# **Public Schools**

# Adopted in March 2022 by the

**Board of Education** 

Daniel A. Gecker, President

Jamelle S. Wilson, Vice President

Pamela Davis-Vaught

Francisco Durán

Anne B. Holton

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# **Superintendent of Public Instruction**

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Commonwealth of Virginia Board of Education

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# **Superintendent of Public Instruction**

Jillian Balow

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Michael F. Bolling

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# **Statement of Non-Discrimination**

The Virginia Department of Education does not discriminate on the basis of race, sex, color, national origin, religion, sexual orientation, gender identity, age, political affiliation, or against otherwise qualified persons with disabilities. The policy permits appropriate employment preferences for veterans and specifically prohibits discrimination against veterans.

# **Profile of a Virginia Graduate**

The 2022 Driver Education Standards of Learning support the Profile of a Virginia Graduate through the development and use of communication, collaboration, creativity, critical thinking and civic responsibility competencies necessary to inform choices, improve skills and attitudes, and produce safer drivers who are focused and ready to respond to anything that may happen in the driving environment.



# Through Driver Education, students will

- ✓ Acquire in depth knowledge and essential driving skills. (Content Knowledge)
- ✓ Obtain a driver's license and practice effective communication, self-management, social awareness, and responsible decision-making skills. (Workplace Skills)
- ✓ Foster responsible driving attitudes and display responsible driving behaviors that protect self and others. (Community Engagement and Civic Responsibility)
- ✓ Explore lifetime learning opportunities in the highway transportation system and the field of traffic safety. (Career Exploration)

# **Profile of a Virginia Graduate**

In Virginia, the Life Ready Individual Will During His or Her K-12 Experience:



### **Preface**

The *Driver Education Standards of Learning for Virginia Public Schools* provides the framework for the *Curriculum Guide for Driver Education in Virginia*, which defines the skills and competencies necessary to become a proficient user of the highway transportation system. As prescribed by §22.1-205 of the Code of Virginia, the curriculum guide serves as the Board of Education's approved program of study for public, private, and commercial driver training school programs. Public and private school driver education programs are approved by the Board of Education, and commercial driver training schools are approved and licensed by the Virginia Department of Motor Vehicles.

The Driver Education Standards of Learning focus on core concepts and procedures and set clear, concise, and measurable expectations for novice drivers. The standards, which have been refined through public hearings and numerous rounds of feedback from parents, teachers, administrators, and representatives from higher education, are <u>informed amplified</u> by teachers' experience, content experts' <u>input</u>, research, and national standards. Parents are encouraged to work with their children to help them achieve these standards, and teachers are encouraged to use simulation and other technologies to enhance student learning.

A major goal of Virginia's educational agenda is to create an excellent statewide system of public education that meets the needs of all young people in Virginia. These Standards of Learning chart the course for achieving that objective.

## Introduction

Driver literacy is an important life skill. Learning to drive safely is a skill used often throughout life. Cars do not crash; people crash them. The guiding principles for a systematic approach to cultivating safe driving behaviors include deaths and injuries are unacceptable, humans make mistakes, humans are vulnerable, responsibility is shared and safety is proactive. Every day in Virginia there are at least two deaths, every 12 minutes there is a serious traffic-related injury and the estimated annual economic impact of motor vehicle crashes exceeds a billion dollars. The mission of Virginia's Strategic Highway Plan (SHSP) is to save lives and reduce injuries through a data driven strategic approach that uses enforcement, education, engineering, and emergency response strategies. Virginia's *Toward Zero Deaths* vision is for all roadway users to arrive safely at their destinations. Making a commitment to zero traffic deaths requires a supporting culture that places safety first and addresses all aspects of safety using a holistic layered approach for safer road users, safer vehicles, safer speeds, safer roads and effective post-crash care.

Becoming a driver is a life-changing event. Actual mobility (driving) affects upward mobility (employment). Mobility is also a key factor in the economic and social growth of our citizens. Unlicensed Virginians struggle to get to grocery stores with fresh produce, vote in elections, open bank accounts and cash checks. *Not having a driver's license* is also an often overlooked reason why economically disadvantaged individuals struggle to rise above poverty. And while not all jobs require a driver's license, driver license requirements affect many low-income individuals trying to get into the labor market as some employers use a driver's license as a proxy for whether a person is employable - disqualifying many unlicensed applicants before they even complete an application.

A robust equitable, culturally inclusive, quality public school *systems approach* to driver education serves the public interest of shared prosperity and the common good, and is essential to the individual and collective well-being of the citizens of the Commonwealth. The majority of the public schools in Virginia offer classroom driver education in lieu of 36 periods of tenth grade health education. Conversely, less than 50 percent of Virginia's public school students are receiving in car driver education instructional services from their schools. These cuts in public school in-car driver education services significantly impact low-income families as fees for commercial driver training lessons are often prohibitively high creating inherent barriers to the school-to-career pipeline.

The classroom and in-car driver education standards are intended to help students develop conceptual understanding of safe driving practices and <u>proficient</u> skill-based performance. The standards also stress the abilities to reason and connect safe driving skills with safe driving attitudes. Emphasis is placed on linking the skills of visual search, managing time and space, and maintaining vehicle balance. Significant attention is given to awareness of risks, driver alertness, <u>minimizing</u> driver distractions and <u>protectingon of</u> occupants.

Students begin driving by applying basic driving skills in low-to-moderate traffic environments and progress to demonstrating skills in more complex traffic situations. The ability to move a car skillfully, however, is not the same as the ability to drive safely.

Successful completion of a state-approved <u>classroom and in car</u> driver education program does not make a teenager a responsible, experienced driver. Traffic safety education involves family, community, industry, government, and personal factors such as motivation and maturity. Evidence shows that often it is not poor driving skills that lead to crashes among this age group, but inexperience, inappropriate attitude, and/or lack of decision-making skills. The family, not the school, is in the best position to have a sustained effect on minimizing the risks faced by inexperienced drivers and encouraging responsible behaviors. Throughout the course, emphasis <u>should beis</u> placed on extensive supervised driving practice with a licensed parent, guardian or other mentor.

# **Safety**

Safety must be given the highest priority in implementing the driver education instructional program. Teachers must be vigilant, focused, and able to control the vehicle at all times. Students must practice basic evasive braking and efficient, controlled steering maneuvers in low-risk driving environments. For every instructional activity, careful consideration should be given to ensure use of appropriate training techniques, driving environments, speed, and driving experiences. Selection of safe facilities for instruction and performance requires thorough route and lesson planning, careful management, and constant monitoring. Providing a safe learning environment is an essential part of any performance-based, hands-on driving lesson, whether on a closed driving range, parking lot or public roadway. Students must follow safety guidelines, demonstrate appropriate safety techniques that lead to safe driving habits, and use safety equipment appropriately.

# Goals

The purpose of driver education is to provide students with a detailed understanding of the fundamentals of driving and to foster responsible driving attitudes and behaviors. As a result of quality traffic-safety instruction, students will be able to

- demonstrate a working knowledge of the laws governing the operation of a motor vehicle;
- identify and analyze responsible habits and behaviors and understand how physical and psychological conditions affect driver performance;
- apply knowledge, processes, and skills to become safe, competent users of the highway transportation system;
- use visual search skills and a systematic decision-making process to make risk-reducing decisions by adjusting speed and/or position;
- demonstrate balanced vehicle movement through precise and timely steering, braking, and accelerating under a variety of conditions and unexpected circumstances;
- protect self and others by using active and passive vehicle occupant protection systems and display responsible driving behaviors when alone and with peers;
- interact safely with other roadway users by predicting vehicle performance, avoiding conflicts, and minimizing and managing risks;

- identify how advancements in intelligent handling and stability technology systems affect driving practices;
- engage in meaningful, extensive supervised practice to progress from simple to more complex driving skills in low, moderate, and higher risk driving environments; and
- <u>demonstrate an understanding that responsibility is shared, crashes are not accidents and fatalities and serious injuries are unacceptable and preventable.</u>
- master precision movements for maintaining optimal vehicle balance and control in expected as well as unexpected circumstances.

# **Standards of Learning**

DE.1 The student will demonstrate an understanding of Virginia traffic laws, licensing procedures, and other responsibilities associated with the driving privilege. Key concepts include

- a) <u>demonstrating an understanding of graduated driver licensing requirements</u>, <del>and</del> types of licenses, <u>and required identification documentation</u>;
- b) analyzing traffic safety information in the Virginia Driver's Manual;
- c) <u>comparing the Virginia Driver's Manual information with</u> the motor vehicle section of the Code of Virginia; and
- d) <u>investigating the social implications and understanding the civic responsibility of</u> the organ- and tissue- donation designation process.
- e) interaction with law enforcement; and
- f) responsibilities at a crash scene.

DE.2 The student will demonstrate an understanding of basic vehicle operating procedures. Key concepts/skills include

- a) understanding and sequentially demonstrating pre-driving procedures;
- b) comparing starting procedures for automatic and manual transmissions;
- c) <u>interpreting and accurately responding to vehicle information</u>, warning, and control devices;
- d) applying efficient accelerating, braking, and steering techniques; and
- e) demonstrating vehicle securing procedures.

DE. 3 The student will <u>demonstrate the ability to</u> use vehicle reference points to <u>establish</u> <u>and explain how visual referencing skills aid in judging</u> vehicle position and <u>distance when</u> executeing basic driving maneuvers. for <u>Key concepts/skills include</u>

- a) parking;
- b) turning;
- c) establishing lane position; and
- d) backing.

DE. 4 The student will recognize the effects of identify how laws of physics (i.e., momentum, gravity, and inertia) on vehicle control and balance, and the relationship between kinetic energy effect and force of impact. Key concepts/skills include

- a) analyzing how sitting and hand position affect ergonomics and vehicle control;
- b) <u>evaluating how</u> steering, braking, and accelerating <u>positively and negatively impact</u> <u>vehicle control and balance</u>;

- c) <u>identifying and accurately</u> compensating for shifts in vehicle load (from side to side, front to rear, and rear to front) that affect vehicle performance;
- d) <u>demonstrating how to prevent and correctly manageing</u> front tire traction loss (understeer) and rear tire traction loss (oversteer); and
- e) analyzing the cause and severity of types of collisions, (i.e., head-on, near-frontal, broadside, rear-end, rollover, sideswipe).

DE.5 The student will demonstrate the ability to manage visibility, time, and space to reduce driving risks and avoid collisions. Key concepts/skills include

- a) demonstrating targeting and tracking skills;
- b) synthesizing information visually from the driving environment using the Search, Evaluate and Execute in Time (SEEiT) space-management systematic-decision-making process;
- c) applying following distance, time and other space <u>management</u> concepts;
- d) selecting appropriate speed, maintaining adequate gapspace, and skillfully judging time and distance to safely execute basic driving maneuvers;
- e) estimating time and space needs for passing; and
- f) identifying and <u>adeptly</u> responding to open and closed spaces and changes to line-of-sight and path-of-travel.

DE.6 The student will demonstrate <u>skills to make</u> appropriate adjustments when approaching controlled and uncontrolled intersections, curves, work zones, railroad crossings, and hills with line-of-sight and path-of-travel limitations. Key concepts/skills include

- a) <u>analyzing and applying right-of-way rules and demonstrating appropriate communication</u> skills;
- b) displaying responsible actions and safe response to roadway signs, signals, and markings;
- c) assessing and managing slope/grade of terrain; and
- d) <u>modifying</u> vehicle position and speed <u>to manage the effects on momentum, balance and</u> control.

DE.7 The student will identify the unique characteristics of an expressway and apply risk management driving strategies. Key concepts/skills include

- a) managing different types of interchanges (e.g., diamond, trumpet, cloverleaf);
- b) entering, merging, and exiting <u>without interruptingfrom</u> traffic flow, <u>preparing for variable and higher speeds and managing toll facilities</u>;
- c) selecting vehicle appropriate speed, correct lane, lane position, changing lanes on multilane roadways, and detecting and avoiding highway hypnosis; and
- d) managing toll facilities demonstrating an understanding of the integrated numbering system for highways within the nationwide grid in the contiguous United States.

DE.8 The student will demonstrate the ability to\_communicate presence and intentions to other highway transportation users. Key concepts/skills include

- a) interpreting vehicle position and driver action;
- b) utilizing vehicle communication devices; and
- c) <u>demonstrating</u> hand signals for slow/stop, right turn and left turn.

DE.9 The student will analyze and describe the physiological, psychological, and cognitive effects of alcohol, marijuana and other drugs and their impact on a driver's awareness of risks, and involvement in collisions. Key concepts/skills include

- a) <u>evaluating the impact of prescription and nonprescription medications on mood, personality, risk taking, coordination, judgment, reaction time and driver performance;</u>
- b) demonstrating an understanding that driving while impaired by any substance (legal or illegal drugs) places the driver and others in harm's way.
- c) <u>researching the effects of alcohol, marijuana,</u> and other drugs on vision and space management;
- d) <u>analyzing how the synergistic effects of using two or more drugs at the same time can</u> <u>amplify the impairing effects of each drug;</u> and
- e) <u>examining waysphysiological and biological factors that influence how alcohol, marijuana</u> and other drugs <u>are absorbed, metabolized and are eliminated from the body.</u>

DE. 10 The student will identify and analyze the legal and economic consequences associated with alcohol, marijuana and other drug use while driving. Key concepts/skills include

- a) analyzing the impact of positive and negative peer pressure;
- b) <u>describing the mediating influence of</u> refusal and peer-intervention skills <u>on preventing</u> alcohol, marijuana and other drug misuse;
- c) <u>comparing</u> Implied Consent, Zero Tolerance and Use and Lose laws <u>and demonstrating</u> an understanding of why driving while impaired is illegal;
- d) <u>researching</u> Administrative License Revocation, loss of license, ignition interlock and other licensing restrictions, <del>and</del>
- e) <u>analyzing</u> court costs, insurance requirements, Virginia Alcohol Safety Action Program referral, and other-costspenalties associated with impaired driving; and
- f) evaluating the effectiveness of alternative safe transportation programs as countermeasures for reducing impaired driving.

DE.11 The student will recognize the consequences of aggressive driving and the influence of emotions on driving behaviors. Key concepts/skills include

- a) evaluating how stress and anxiety effect driver fitness and mental preparedness;
- b) identifying how anger management strategies reduce hostility and frustration; and
- c) <u>analyzing the relationship between how aggressive driving and road rage pose a threat to</u> health and safety for everyone on the road; and
- d) quantifying the legal and financial consequences of reckless driving and road rage.

DE.12 The student will analyze the effects of fatigue and other physical conditions on that impact driver performance. Key concepts include

- a) circadian rhythms identifying fatigue warning signs and countermeasures;
- b) analyzing the relationship between circadian rhythms and sleep deprivation;
- c) <u>comparing the effect of short- and long- term physical and mental disabilities cognitive disorders on the driving tasks;</u> and
- d) evaluating how chronic health conditions may affect driver performance.

DE.13 The student will identify visual, auditory, manual, and cognitive distractions that divert

attention from the driving task and analyze how divided visual and mental attention that contribute to driver error. Key concepts/skills include

- a) researching and evaluating the most dangerous distracted drivering behaviors (e.g., texting, setting navigation systems, reading emails, adjusting radio and other controls, eating, drinking, smoking, personal grooming);
- b) gathering and analyzing strategies to prevent eell phones and other portable technology devices distractions that take the driver's eyes off the road and hands off the wheel;
- c) identifying interior distractions (interactive technologies, passengers, pets, insects);
- d) vehicle accessories evaluating the impact of exterior distractions (looking at crash scenes, places of interest, billboards, emergency vehicles); and
- e) insects and pets demonstrating an understanding of distracted driving laws and analyzing the cost of distracted driving.

DE.14 The student will identify changes in the environment that affect visibility and traction and demonstrate an understanding of evaluate appropriate driver reaction communication, speed and lane position adjustment to reduce these risks. Key concepts/skills include

- a) mitigating limitations (e.g., nighttime visibility, overdriving headlights, curve-adaptive headlights) when driving at night;
- b) <u>evaluating multiple solutions for smoke- and weather-related conditions that reduce visibility;</u>
- c) <u>demonstrating an understanding and responding appropriately to</u> road construction and other adverse road conditions; and
- d) <u>examining the difference between electronic</u> vehicle stability <u>control</u> and traction control systems.

DE.15 The student will demonstrate an understanding of the proper use of vehicle occupant-protection features and analyze how they can reduce injury severity and increase collision survival. Key concepts/skills include

- a) <u>investigating the efficacy of</u> active restraint systems (<u>e.g.</u>, <u>seat belts</u>, <u>head restraints</u>, <u>child</u> safety seats);
- b) <u>passive restraint systems analyzing the effect of seating and steering wheel position on</u> injury severity;
- c) <u>child restraint systems investigating legal obligation, ethical decision making and the</u> importance of advocating for proper use of vehicle occupant-protection devices; and
- d) other vehicle safety design features researching Virginia's occupant protection laws and understanding the dangers of riding in the bed of a truck; and
- e) <u>analyzing automotive safety and highway transportation system career options based on</u> personal interests, abilities, achievements, and goals.

DE.16 The student will analyze how technological <u>innovations</u>advancements in intelligent <u>handling and stability control systems</u> affect driving practices <u>and reduce human error</u>. Key concepts/skills include

- a) <u>demonstrating an understanding of advanced safety features (e.g., electronic stability control systems, blind spot detection, forward collision warning, lane departure warning)</u>
- b) <u>comparing efficacy of passive</u> occupant protection systems to include thorax, curtain, knee and other airbags <u>and adaptive cervical head restraint systems</u>;

- c) seatbelt technologies and intelligent head restraints systems demonstrating an understanding of advanced driver assist features (e.g., rearview video systems, automatic emergency braking, pedestrian automatic emergency braking, rear automatic emergency braking, lane centering assist);
- d) <u>researching partially automated safety features (e.g., lane keeping assist, adaptive cruise control and automatic emergency braking systems, traffic jam assist, self park);</u>
- e) lane-keeping assist and blind spot warning systems analyzing the impact of fully autonomous safety features (e.g., autopilot self-driving vehicles that will integrate onto roadways by progressing through six levels of driver assistance technology advancements in coming years); and
- f) reversing and other cameras; and analyzing the transformative potential of new mobility options and employment opportunities that automated vehicles may provide for millions of people with disabilities. and
- g) adaptive front lighting.

DE.17 The student will identify and evaluate emergency-response strategies to avoid or reduce the severity of a collision. Key concepts/skills include

- a) understanding analyzing and-demonstrating evasive maneuvers, using braking and steering combinations while maintaining and managing front and rear traction control;
- b) identifying open space as an emergency escape route;
- c) recognizing how decisions are influenced and limited by the environment, the vehicle, driver error, and driver capabilities; and
- d) demonstrating evasive maneuvers, using braking and steering combinations; and <u>a</u> gradual stepwise approach to safe off-road recovery.
- e) managing off-road recovery.

DE.18 The student will identify and describe the performance characteristics of other road users and apply problem-solving skills to minimize risks when sharing the roadway. <u>Key concepts/skills include investigating the unique characteristics and vulnerabilities of</u>

- a) pedestrians and animals;
- b) bicycles, scooters, mopeds, and motorcycles;
- c) tractor-trailers, trucks, and construction vehicles;
- d) sport utility vehicles, recreation vehicles, and trailers;
- e) emergency vehicles;
- f) funeral processions;
- g) passenger and school buses; and
- h) farm machinery and horse-drawn vehicles; and
- i) highway workers.

DE.19 The student will compare vehicle braking systems and explain and demonstrate proper braking techniques for various weather and roadway conditions. Key concepts/skills include

- a) demonstrating proper use of conventional <u>hydraulic</u> brake systems <u>and understanding of</u> <u>new technologies</u> <u>such as regenerative braking</u>;
- b) demonstrating and evaluating <u>appropriate use of</u> controlled braking, trail braking, and threshold braking;

- c) engaging antilock brake systems (ABS) and steering toward a target; and
- d) analyzing how preventive maintenance <u>and the annual state safety inspection</u> reduces the possibility of brake failure and enhances safety.

DE.20 The student will analyze how regular preventive maintenance reduces the possibility of vehicle failures and recognize the warning signs that indicate the need for maintenance, repair, or replacement. Key concepts/skills include <u>demonstrating an understanding of</u>

- a) vehicle warning devices;
- b) lights and signals;
- c) steering and suspension systems;
- d) tires and braking systems;
- e) fluids, cooling systems, and belts; and
- f) fuel system and ignition electronics.

DE.21 The student will identify and describe the investigate vehicle ownership responsibilities including the processes and legal aspects of and identify the financial responsibilities for associated with purchasing or leasing a vehicle as well as the operating and maintainingenance and insuring a motor vehicle costs. Key concepts/skills include

- a) <u>demonstrating an understanding of the Financial Responsibility Law (*Code of Virginia* § 46.2-706);</u>
- b) <u>differentiating between required</u> and optional insurance coverage;
- c) <u>demonstrating an understanding of title</u> and vehicle and registration <u>requirements</u>;
- d) <u>analyzing</u> vehicle inspection <u>and emissions requirements</u>;
- e) fuel, fluids, tires, and other maintenance costs evaluating the advantages and disadvantages of purchasing or leasing an all-electric, hybrid electric, hydrogen fuel cell, ethanol, biodiesel, natural gas or traditional gas-powered vehicle; and
- f) collision involvement; calculating depreciation and estimating a budget for routine maintenance and repair costs for new and older vehicles.

DE.22 The student will demonstrate competentey map-reading and <u>road-trip-planning</u> skills <u>by</u> utilizing available resources. Key concepts/skills include

- a) analyzing reliable route trip-planning resources;
- b) map reading and creating an itinerary, calculating total trip-planning technologies time, investigating alternative routes, traffic, rest stops and other options; and
- c) calculating the cost of a trip to include fuel, tolls, daily and total mileage, fuel efficiency, food, hotels, and other variables; and
- d) <u>demonstrating an understanding of safe and legal practices for using navigation tools</u> while driving.

DE. 23 The student will research and evaluate personal transportation needs and their impact on the environmental impact of transportation needs and their impact on and demonstrate skills necessary to be an informed consumer options and how to choose fuel-efficient vehicles. Key concepts/skills include

a) <u>printed and Internet resources</u> <u>analyzing how all-electric, hybrid electric, hydrogen fuel</u> <u>cell, ethanol, biodiesel, and natural gas-powered vehicles conserve fuel and lower vehicle emissions;</u>

- b) community resources comparing and evaluating the environmental impact of using public transportation, walking, cycling, ridesharing and carpooling;
- c) <u>examining the health risks of vehicleair pollution and how some passenger</u> vehicles <u>produce significant amounts of pollution, including nitrogen oxides, carbon monoxide, carbon dioxide, ozone causing gases, and acids and other pollution;</u>
- d) <u>investigating</u> appropriate disposal of batteries, fluids, tires, and other environmentally hazardous materials; and
- e) <u>demonstrating an understanding of energy conservation</u>, alternative or renewable sources of energy, <u>and conservation</u> of natural resources <u>and green driving practices (e.g., smooth acceleration, idle reduction, properly inflated tires, eliminating excess weight, anticipating stops).</u>

<u>DE.24</u> The student will demonstrate an understanding of safe interaction with law enforcement and the steps to take if involved in or a witness to a crash. Key concepts/skills include

- a) analyzing factors that may enhance safe interaction with law enforcement at the roadside (e.g., don't panic, slow down, signal and locate a safe location, pull over, turn engine and radio off, keep hands on steering wheel, show respect, provide registration, driver license and proof of insurance when asked);
- b) investigating the consequences of moving violations and demerit points; and
- c) examining the driver's legal responsibilities at a crash scene (*Code of Virginia* § 46.2-896).



# **2022 Driver Education Standards of Learning**

For Final Review – March 17, 2022

Adopted on March 17, 2022 by the Board of Education
Daniel A. Gecker, President
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Superintendent of Public Instruction Jillian Balow

VIRGINIA BOARD OF EDUCATION

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# **Statement of Non-Discrimination**

The Virginia Department of Education does not discriminate on the basis of race, sex, color, national origin, religion, sexual orientation, gender identity, age, political affiliation, or against otherwise qualified persons with disabilities. The policy permits appropriate employment preferences for veterans and specifically prohibits discrimination against veterans.

# Profile of a Virginia Graduate

The 2022 *Driver Education Standards of Learning* support the *Profile of a Virginia Graduate* through the development and use of communication, collaboration, creativity, critical thinking, and civic responsibility competencies necessary to inform choices, improve skills and attitudes, and produce safer drivers who are focused and ready to respond to anything that may happen in the driving environment.



# Through Driver Education, students will

- ✓ Acquire in-depth knowledge and essential driving skills. (Content Knowledge)
- ✓ Obtain a driver's license and practice effective communication, self-management, social awareness, and responsible decision-making skills. (Workplace Skills)
- ✓ Foster responsible driving attitudes and display responsible driving behaviors that protect self and others. (Community Engagement and Civic Responsibility)
- ✓ Explore lifetime learning opportunities in the highway transportation system and the field of traffic safety. (Career Exploration)

# **Profile of a Virginia Graduate**

In Virginia, the Life Ready Individual Will During His or Her K-12 Experience:



### **PREFACE**

The *Driver Education Standards of Learning for Virginia Public Schools* provides the framework for the *Curriculum Guide for Driver Education in Virginia*, which defines the skills and competencies necessary to become a proficient user of the highway transportation system. As prescribed by §22.1-205 of the *Code of Virginia*, the curriculum guide serves as the Board of Education's approved program of study for public, private, and commercial driver training school programs. Public and private school driver education programs are approved by the Board of Education, and commercial driver training schools are approved and licensed by the Virginia Department of Motor Vehicles.

The *Driver Education Standards of Learning* focus on core concepts and procedures and set clear, concise, and measurable expectations for novice drivers. The standards, which have been refined through public hearings and numerous rounds of feedback from parents, teachers, administrators, and representatives from higher education, are amplified by teachers' experience, content experts' input, research, and national standards. Parents are encouraged to work with their children to help them achieve these standards, and teachers are encouraged to use simulation and other technologies to enhance student learning.

A major goal of Virginia's educational agenda is to create an excellent statewide system of public education that meets the needs of all young people in Virginia. These Standards of Learning chart the course for achieving that objective.

#### INTRODUCTION

Driver literacy is an important life skill. Learning to drive safely is a skill used often throughout life. Cars do not crash; people crash them. The guiding principles for a systematic approach to cultivating safe driving behaviors include deaths and injuries are unacceptable, humans make mistakes, humans are vulnerable, responsibility is shared and safety is proactive. Every day in Virginia there are at least two deaths, every 12 minutes there is a serious traffic-related injury, and the estimated annual economic impact of motor vehicle crashes exceeds a billion dollars. The mission of Virginia's Strategic Highway Safety Plan (SHSP) is to save lives and reduce injuries through a data-driven strategic approach that uses enforcement, education, engineering, and emergency response strategies. Virginia's *Toward Zero Deaths* vision is for all roadway users to arrive safely at their destinations. Making a commitment to zero traffic deaths requires a supporting culture that places safety first and addresses all aspects of safety using a holistic layered approach for safer road users, safer vehicles, safer speeds, safer roads and effective post-crash care.

Becoming a driver is a life-changing event. Actual mobility (driving) affects upward mobility (employment). Mobility is also a key factor in the economic and social growth of our citizens. Unlicensed Virginians struggle to get to grocery stores with fresh produce, vote in elections, open bank accounts and cash checks. *Not having a driver's license* is also an often overlooked reason why economically disadvantaged individuals struggle to rise above poverty. And while not all jobs require a driver's license, driver license requirements affect many low-income individuals trying to get into the labor market as some employers use a driver's license as a proxy for whether a person is employable—disqualifying many unlicensed applicants before they even complete an application.

A robust equitable, culturally inclusive, quality public school *systems approach* to driver education serves the public interest of shared prosperity and the common good, and is essential to the individual and collective well-being of the citizens of the Commonwealth. The majority of the public schools in Virginia offer classroom driver education in lieu of 36 periods of tenthgrade health education. Conversely, less than 50 percent of Virginia's public school students are receiving in car driver education instructional services from their schools. These cuts in public school in-car driver education services significantly impact low-income families as fees for commercial driver training lessons are often prohibitively high creating inherent barriers to the school-to-career pipeline.

The classroom and in-car driver education standards are intended to help students develop conceptual understanding of safe driving practices and proficient skill-based performance. The standards also stress the abilities to reason and connect safe driving skills with safe driving attitudes. Emphasis is placed on linking the skills of visual search, managing time and space, and maintaining vehicle balance. Significant attention is given to awareness of risks, driver alertness, minimizing driver distractions and protecting occupants.

Students begin driving by applying basic driving skills in low-to-moderate traffic environments

and progress to demonstrating skills in more complex traffic situations. The ability to move a car skillfully, however, is not the same as the ability to drive safely.

Successful completion of a state-approved classroom and in-car driver education program does not make a teenager a responsible, experienced driver. Traffic safety education involves family, community, industry, government, and personal factors such as motivation and maturity. Evidence shows that often it is not poor driving skills that lead to crashes among this age group, but inexperience, inappropriate attitude, and/or lack of decision-making skills. The family, not the school, is in the best position to have a sustained effect on minimizing the risks faced by inexperienced drivers and encouraging responsible behaviors. Throughout the course, emphasis should be placed on extensive supervised driving practice with a licensed parent, guardian or other mentor.

# **SAFETY**

Safety must be given the highest priority in implementing the driver education instructional program. Teachers must be vigilant, focused, and able to control the vehicle at all times. Students must practice basic evasive braking and efficient, controlled steering maneuvers in low-risk driving environments. For every instructional activity, careful consideration should be given to ensure the use of appropriate training techniques, driving environments, speed, and driving experiences. Selection of safe facilities for instruction and performance requires thorough route and lesson planning, careful management, and constant monitoring. Providing a safe learning environment is an essential part of any performance-based, hands-on driving lesson, whether on a closed driving range, parking lot or public roadway. Students must follow safety guidelines, demonstrate appropriate safety techniques that lead to safe driving habits, and use safety equipment appropriately.

# **GOALS**

The purpose of driver education is to provide students with a detailed understanding of the fundamentals of driving and to foster responsible driving attitudes and behaviors. As a result of quality traffic-safety instruction, students will be able to

- demonstrate a working knowledge of the laws governing the operation of a motor vehicle;
- identify and analyze responsible habits and behaviors and understand how physical and psychological conditions affect driver performance;
- apply knowledge, processes, and skills to become safe, competent users of the highway transportation system;
- use visual search skills and a systematic decision-making process to make risk-reducing decisions by adjusting speed and/or position;
- demonstrate balanced vehicle movement through precise and timely steering, braking, and accelerating under a variety of conditions and unexpected circumstances;
- protect self and others by using active and passive vehicle occupant protection systems and display responsible driving behaviors when alone and with peers;
- interact safely with other roadway users by predicting vehicle performance, avoiding conflicts, and minimizing and managing risks;
- identify how advancements in intelligent handling and stability technology systems affect driving practices;

- engage in meaningful, extensive supervised practice to progress from simple to more complex driving skills in low, moderate, and higher risk driving environments; and
- demonstrate an understanding that responsibility is shared, crashes are not accidents, and fatalities and serious injuries are unacceptable and preventable.

# STANDARDS OF LEARNING

DE.1 The student will demonstrate an understanding of Virginia traffic laws, licensing procedures, and other responsibilities associated with the driving privilege. Key concepts include

- a) demonstrating an understanding of graduated driver licensing requirements, types of licenses, and required identification documentation;
- b) analyzing traffic safety information in the Virginia Driver's Manual;
- c) comparing the *Virginia Driver's Manual* information with the motor vehicle section of the *Code of Virginia*; and
- d) investigating the social implications and understanding the civic responsibility of the organ- and tissue- donation designation process.

DE.2 The student will demonstrate an understanding of basic vehicle operating procedures. Key concepts/skills include

- a) understanding and sequentially demonstrating pre-driving procedures;
- b) comparing starting procedures for automatic and manual transmissions;
- c) interpreting and accurately responding to vehicle information, warning, and control devices;
- d) applying efficient accelerating, braking, and steering techniques; and
- e) demonstrating vehicle securing procedures.

DE. 3 The student will demonstrate the ability to use vehicle reference points and explain how visual referencing skills aid in judging vehicle position and distance when executing basic driving maneuvers for

- a) parking;
- b) turning;
- c) establishing lane position; and
- d) backing.

DE. 4 The student will identify how laws of physics (i.e., momentum, gravity, inertia) effect force of impact. Key concepts/skills include

- a) analyzing how sitting and hand position affect ergonomics and vehicle control;
- b) evaluating how steering, braking, and accelerating positively and negatively impact vehicle control and balance;
- c) identifying and accurately compensating for shifts in vehicle load (from side to side, front to rear, and rear to front) that affect vehicle performance;
- d) demonstrating how to prevent and correctly manage front tire traction loss (understeer) and rear tire traction loss (oversteer); and
- e) analyzing the cause and severity of types of collisions, (i.e., head-on, near-frontal, broadside, rear-end, rollover, sideswipe).

DE.5 The student will demonstrate the ability to manage visibility, time, and space to reduce driving risks and avoid collisions. Key concepts/skills include

- a) demonstrating targeting and tracking skills;
- b) synthesizing information visually from the driving environment using the Search, Evaluate and Execute in Time (SEEiT) space-management decision-making process;
- c) applying following distance, time and other space management concepts;
- d) selecting appropriate speed, maintaining adequate space, and skillfully judging time and distance to safely execute basic driving maneuvers;
- e) estimating time and space needs for passing; and
- f) identifying and adeptly responding to open and closed spaces and changes to line-of-sight and path-of-travel.

DE.6 The student will demonstrate skills to make appropriate adjustments when approaching controlled and uncontrolled intersections, curves, work zones, railroad crossings, and hills with line-of-sight and path-of-travel limitations. Key concepts/skills include

- a) analyzing and applying right-of-way rules and demonstrating appropriate communication skills;
- b) displaying responsible actions and safe response to roadway signs, signals, and markings;
- c) assessing and managing slope/grade of terrain; and
- d) modifying vehicle position and speed to manage the effects on momentum, balance, and control.

DE.7 The student will identify the unique characteristics of an expressway and apply risk management driving strategies. Key concepts/skills include

- a) managing different types of interchanges (e.g., diamond, trumpet, cloverleaf);
- b) entering, merging, and exiting without interrupting traffic flow, preparing for variable and higher speeds and managing toll facilities;
- c) selecting appropriate speed, correct lane, lane position, changing lanes on multi-lane roadways, and detecting and avoiding highway hypnosis; and
- d) demonstrating an understanding of the integrated numbering system for highways within the nationwide grid in the contiguous United States.

DE.8 The student will demonstrate the ability to\_communicate presence and intentions to other highway transportation users. Key concepts/skills include

- a) interpreting vehicle position and driver action;
- b) utilizing vehicle communication devices; and
- c) demonstrating hand signals for slow/stop, right turn and left turn.

DE.9 The student will analyze and describe the physiological, psychological, and cognitive effects of alcohol, marijuana and other drugs and their impact on a driver's awareness of risks, and involvement in collisions. Key concepts/skills include

- a) evaluating the impact of prescription and nonprescription medications on mood, personality, risk taking, coordination, judgment, reaction time, and driver performance;
- b) demonstrating an understanding that driving while impaired by any substance (legal or illegal drugs) places the driver and others in harm's way.

- c) researching the effects of alcohol, marijuana, and other drugs on vision and space management;
- d) analyzing how the synergistic effects of using two or more drugs at the same time can amplify the impairing effects of each drug; and
- e) examining physiological and biological factors that influence how alcohol, marijuana, and other drugs are absorbed, metabolized, and eliminated from the body.

DE. 10 The student will identify and analyze the legal and economic consequences associated with alcohol, marijuana, and other drug use while driving. Key concepts/skills include

- a) analyzing the impact of positive and negative peer pressure;
- b) describing the mediating influence of refusal and peer-intervention skills on preventing alcohol, marijuana, and other drug misuse;
- c) comparing Implied Consent, Zero Tolerance and Use and Lose laws and demonstrating an understanding of why driving while impaired is illegal;
- d) researching Administrative License Revocation, loss of license, ignition interlock and other licensing restrictions,
- e) analyzing court costs, insurance requirements, Virginia Alcohol Safety Action Program referral, and other penalties associated with impaired driving; and
- f) evaluating the effectiveness of alternative safe transportation programs as countermeasures for reducing impaired driving.

DE.11 The student will recognize the consequences of aggressive driving and the influence of emotions on driving behaviors. Key concepts/skills include

- a) evaluating how stress and anxiety affect driver fitness and mental preparedness;
- b) identifying how anger management strategies reduce hostility and frustration;
- c) analyzing how aggressive driving and road rage pose a threat to the health and safety of everyone on the road; and
- d) quantifying the legal and financial consequences of reckless driving and road rage.

DE.12 The student will analyze the effects of fatigue and other conditions that impact driver performance. Key concepts include

- a) identifying fatigue warning signs and countermeasures;
- b) analyzing the relationship between circadian rhythms and sleep deprivation;
- c) comparing the effect of short- and long-term physical and cognitive disorders on the driving tasks; and
- d) evaluating how chronic health conditions may affect driver performance.

DE.13 The student will identify visual, auditory, manual, and cognitive distractions that divert attention from the driving task and analyze how divided visual and mental attention contribute to driver error. Key concepts/skills include

- a) researching and evaluating the most dangerous distracted driving behaviors (e.g., texting, setting navigation systems, reading emails, adjusting radio and other controls, eating, drinking, smoking, personal grooming);
- b) gathering and analyzing strategies to prevent distractions that take the driver's eyes off the road and hands off the wheel;
- c) identifying interior distractions (e.g., interactive technologies, passengers, pets, insects);

- d) evaluating the impact of exterior distractions (e.g., looking at crash scenes, places of interest, billboards, emergency vehicles); and
- e) demonstrating an understanding of distracted driving laws and analyzing the cost of distracted driving.

DE.14 The student will identify changes in the environment that affect visibility and traction and evaluate appropriate communication, speed, and lane position adjustment to reduce risks. Key concepts/skills include

- a) mitigating limitations (e.g., nighttime visibility, overdriving headlights, curve-adaptive headlights) when driving at night;
- b) evaluating multiple solutions for smoke- and weather-related conditions that reduce visibility;
- c) demonstrating an understanding and responding appropriately to road construction and other adverse road conditions; and
- d) examining the difference between electronic vehicle stability control and traction control systems.

DE.15 The student will demonstrate an understanding of the proper use of vehicle occupant-protection features and analyze how they can reduce injury severity and increase collision survival. Key concepts/skills include

- a) investigating the efficacy of active restraint systems (e.g., seat belts, head restraints, child safety seats);
- b) analyzing the effect of seating and steering wheel position on injury severity;
- c) investigating legal obligation, ethical decision making, and the importance of advocating for proper use of vehicle occupant-protection devices; and
- d) researching Virginia's occupant protection laws and understanding the dangers of riding in the bed of a truck; and
- e) analyzing automotive safety and highway transportation system career options based on personal interests, abilities, achievements, and goals.

DE.16 The student will analyze how technological innovations affect driving practices and reduce human error. Key concepts/skills include

- a) demonstrating an understanding of advanced safety features (e.g., electronic stability control systems, blind spot detection, forward collision warning, lane departure warning);
- b) comparing efficacy of passive occupant protection systems to include thorax, curtain, knee and other airbags and adaptive cervical head restraint systems;
- c) demonstrating an understanding of advanced driver assist features (e.g., rearview video systems, automatic emergency braking, pedestrian automatic emergency braking, rear automatic emergency braking, lane centering assist);
- d) researching partially automated safety features (e.g., lane keeping assist, adaptive cruise control, traffic jam assist, self-park);
- e) analyzing the impact of fully autonomous safety features (e.g., autopilot self-driving vehicles that will integrate onto roadways by progressing through six levels of driver assistance technology advancements in coming years); and

f) analyzing the transformative potential of new mobility options and employment opportunities that automated vehicles may provide for millions of people with disabilities.

DE.17 The student will identify and evaluate emergency-response strategies to avoid or reduce the severity of a collision. Key concepts/skills include

- a) analyzing and demonstrating evasive maneuvers, using braking and steering combinations while maintaining front and rear traction control;
- b) identifying open space as an emergency escape route;
- c) recognizing how decisions are influenced and limited by the environment, the vehicle, driver error, and driver capabilities; and
- d) demonstrating a gradual stepwise approach to safe off-road recovery.

DE.18 The student will identify and describe the performance characteristics of other road users and apply problem-solving skills to minimize risks when sharing the roadway. Key concepts/skills include investigating the unique characteristics and vulnerabilities of

- a) pedestrians and animals;
- b) bicycles, scooters, mopeds, and motorcycles;
- c) tractor-trailers, trucks, and construction vehicles;
- d) sport utility vehicles, recreation vehicles, and trailers;
- e) emergency vehicles;
- f) funeral processions;
- g) passenger and school buses;
- h) farm machinery and horse-drawn vehicles; and
- i) highway workers.

DE.19 The student will compare vehicle braking systems and explain proper braking techniques for various conditions. Key concepts/skills include

- a) demonstrating proper use of conventional hydraulic brake systems and understanding of new technologies such as regenerative braking;
- b) demonstrating and evaluating appropriate use of controlled braking, trail braking, and threshold braking;
- c) engaging antilock brake systems (ABS) and steering toward a target; and
- d) analyzing how preventive maintenance and the annual state safety inspection reduces the possibility of brake failure and enhances safety.

DE.20 The student will analyze how regular preventive maintenance reduces the possibility of vehicle failures and recognize the warning signs that indicate the need for maintenance, repair, or replacement. Key concepts/skills include demonstrating an understanding of

- a) vehicle warning devices;
- b) lights and signals;
- c) steering and suspension systems;
- d) tires and braking systems;
- e) fluids, cooling systems, and belts; and
- f) fuel system and ignition electronics.

DE.21 The student will investigate vehicle ownership responsibilities including the processes and legal responsibilities for purchasing or leasing a vehicle as well as the operating and maintenance costs. Key concepts/skills include

- a) demonstrating an understanding of the Financial Responsibility Law (*Code of Virginia §* 46.2-706);
- b) differentiating between required and optional insurance coverage;
- c) demonstrating an understanding of title and vehicle and registration requirements;
- d) analyzing vehicle inspection and emissions requirements;
- e) evaluating the advantages and disadvantages of purchasing or leasing an all-electric, hybrid electric, hydrogen fuel cell, ethanol, biodiesel, natural gas or traditional gaspowered vehicle; and
- f) calculating depreciation and estimating a budget for routine maintenance and repair costs for new and older vehicles.

DE.22 The student will demonstrate competent map-reading and road-trip-planning skills by utilizing available resources. Key concepts/skills include

- a) analyzing reliable trip-planning resources;
- b) creating an itinerary, calculating total trip time, investigating alternative routes, traffic, rest stops, and other options;
- c) calculating the cost of a trip to include fuel, tolls, daily and total mileage, fuel efficiency, food, hotels, and other variables; and
- d) demonstrating an understanding of safe and legal practices for using navigation tools while driving.

DE. 23 The student will research and evaluate the environmental impact of transportation options and how to choose fuel-efficient vehicles. Key concepts/skills include

- a) analyzing how all-electric, hybrid electric, hydrogen fuel cell, ethanol, biodiesel, and natural gas-powered vehicles conserve fuel and lower vehicle emissions;
- b) comparing and evaluating the environmental impact of using public transportation, walking, cycling, ridesharing, and carpooling;
- c) examining the health risks of air pollution and how some passenger vehicles produce significant amounts of nitrogen oxides, carbon monoxide, and other pollution;
- d) investigating appropriate disposal of batteries, fluids, tires, and other environmentally hazardous materials; and
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- b) investigating the consequences of moving violations and demerit points; and

c) examining the driver's legal responsibilities at a crash scene (*Code of Virginia §* 46.2-896).