BIG IDEAS

Vehicle operation, service, and maintenance include consideration of **social and environmental impacts**.	Personal service and maintenance interests require the evaluation and refinement of skills.	Tools and **technologies** can be adapted for specific purposes.

Learning Standards

Curricular Competencies	Content
Students are expected to be able to do the following: **Applied Design** ***Understanding context*** • Interpret circumstances of or factors in a particular automotive situation or challenge ***Defining*** • Identify potential issues and troubleshoot • Identify requirements, intended impacts, and possible unintended negative consequences of service • Determine whether activity is collaborative or self-directed ***Ideating*** • Generate ideas to create a range of possibilities and add to others' ideas in ways that create additional possibilities • Critically analyze how competing social, ethical, and sustainability considerations impact creation and development of solutions • Choose an idea to pursue and maintain an open mind about other potentially viable ideas ***Prototyping*** • Identify and apply a variety of sources of information to develop a plan that includes key stages and resources • Analyze the **design for the life cycle** and evaluate its **impacts** • Consider a variety of materials for effective use and their potential for reuse, recycling, and biodegradability • Make changes to tools, materials, and procedures as needed	*Students are expected to know the following:* • simple automotive repair and maintenance • social, legal, and ethical responsibilities associated with vehicle operation • use of technical information and manuals for the purpose of **diagnostics** and repair • **fundamental automotive tools and equipment** • **lifting equipment** and **procedures** • chassis and body • engine diagnostic support systems • emerging and alternative energy sources used to power automotive vehicles • fundamentals of engine operation • **vehicle systems** • **vehicle safety systems** • design for the life cycle

Learning Standards (continued)

Curricular Competencies	Content
Testing • Identify and communicate with sources of feedback • Develop an **appropriate test**, conduct the test, and collect and compile data • Apply information based on feedback and testing results to make necessary changes ***Making*** • Identify appropriate tools, technologies, materials, processes, and time needed • Carry out updated plan, incorporating feedback from self and others and from testing results • Use materials in ways that minimize waste ***Sharing*** • Decide how and with whom to **share** their processes, to solicit and generate feedback • Share final plans, products and processes to evaluate their success • Critically reflect on plans, products and processes, and identify new goals • Identify and analyze new possibilities for plans, products and processes, including how they or others might build on them **Applied Skills** • Apply safety procedures for themselves, co-workers, and operators in both physical and digital environments • Individually or collaboratively identify and assess skills needed for automotive service plans, products and processes • Develop competency and proficiency in skills at various levels involving manual dexterity, mechanics, and maintenance • Develop specific plans to learn or refine identified skills over time **Applied Technologies** • Explore existing, new, and emerging tools, technologies, and systems to evaluate suitability for automotive maintenance and repair interests • Evaluate impacts, including unintended negative consequences, of choices made about technology use • Examine the role that advancing technologies play in automotive contexts	

Big Ideas – Elaborations

APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – Automotive Technology
Grade 11

- **social and environmental impacts:** including operator and public safety; emissions and effects on the environment; manufacturing, packaging, disposal, and recycling considerations related to vehicle parts and products
- **technologies:** tools that extend human capabilities

Curricular Competencies – Elaborations

APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – Automotive Technology
Grade 11

- **design for the life cycle:** taking into account economic costs and social and environmental impacts of the product, from the extraction of raw materials to eventual reuse or recycling of component materials
- **impacts:** including the social and environmental impacts of extraction and transportation of raw materials; manufacturing, packaging, and transportation to markets; servicing or providing replacement parts; expected usable lifetime; and reuse or recycling of component materials
- **appropriate test:** includes evaluating the degree of authenticity required for the setting of the test, deciding on an appropriate type and number of trials, and collecting and compiling data
- **share:** may include showing to others or use by others, giving away, or marketing and selling

Content – Elaborations

APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – Automotive Technology
Grade 11

- **diagnostics:** onboard diagnostic systems, external diagnostic systems
- **fundamental automotive tools and equipment:** hand, power, and pneumatic tools and equipment (e.g., wheel balancer, tire changer)
- **lifting equipment:** for example, jacks, hoists, stands
- **procedures:** planning, integrity, stability
- **vehicle systems:** for example, driveline, suspension, steering, electric
- **vehicle safety systems:** for example, air bags, crumple zones, restraints