**Area of Learning: APPLIED DESIGN, SKILLS, AND TECHNOLOGIES — Automotive Technology**

**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

**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
- Evaluate suitability of plans, products and processes according to intended impact of service

**Prototyping**
- Evaluate and apply appropriate 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

### Content

**Students are expected to know the following:**

- complex automotive repair and maintenance
- vehicle inspection standards
- advanced automotive **tools and equipment**
- engine and vehicle **modifications**
- vehicle diagnostic and assessment methods
- transmission and gearing functions
- electrical and control systems
- mechanical systems
- fuel systems
- serviceability, overhaul, and repair
- design for the life cycle
- career options and opportunities in automotive technology

**interpersonal skills** for interacting with clients and customers
### Curricular Competencies

#### Testing
- Identify and communicate with sources of feedback
- Develop an **appropriate test**, conduct the test, and collect and compile data
- Evaluate ideas based on information from 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 and critically 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
- Demonstrate competency and proficiency in skills at various levels involving manual dexterity and complex 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
- Analyze the role that advancing technologies play in automotive contexts
### Big Ideas – Elaborations

- **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

- **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

- **tools and equipment**: for example, charging analyzer, timing light, fuel pressure gauge, separating tool, brake lathe, alignment
- **modifications**: for example, turbocharging, supercharging, lifting, lowering, tuning
- **interpersonal skills**: for example, professional communications, active listening to identify potential problems, courtesies