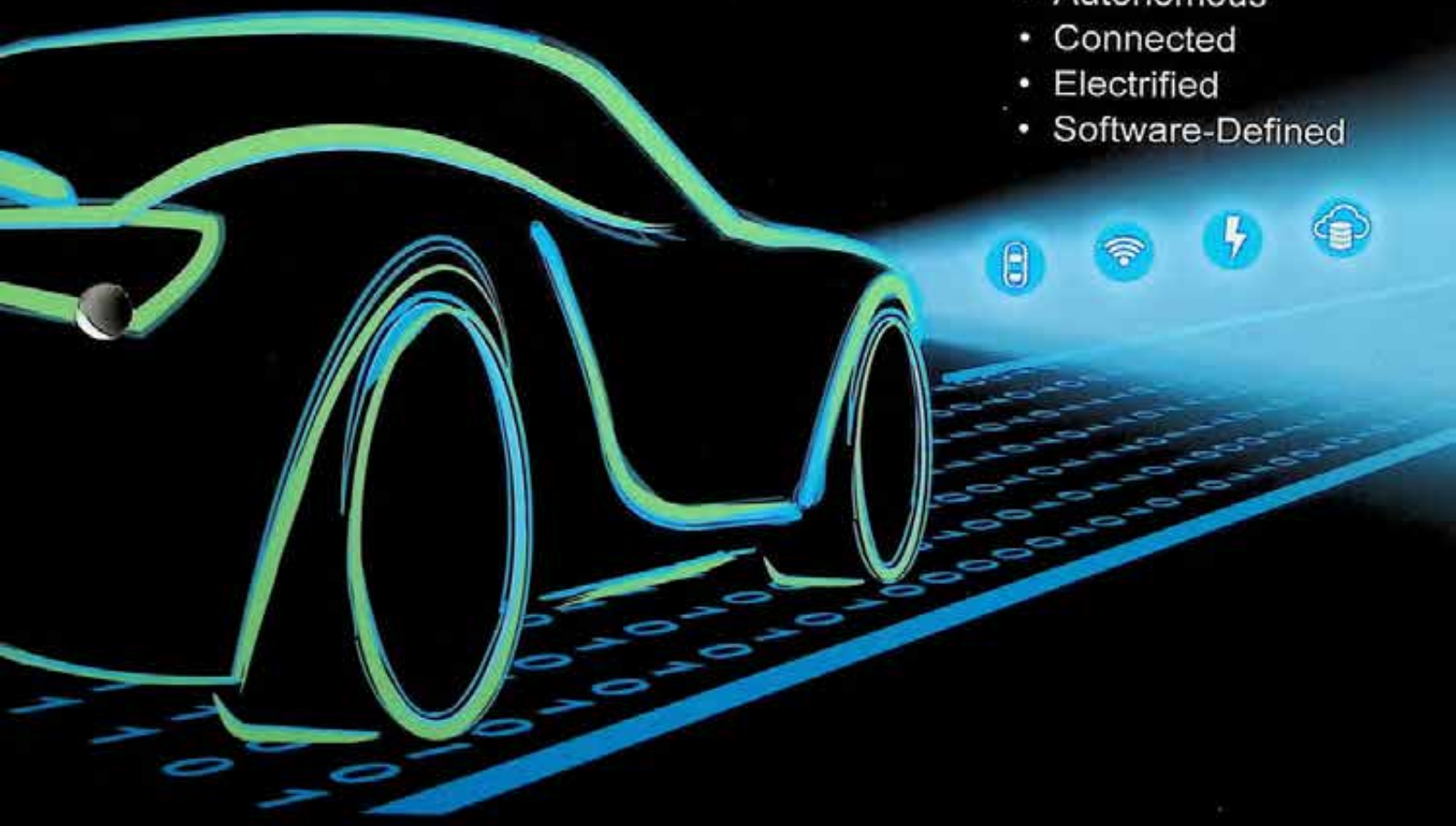
Auto Upkeep

Maintenance, Light Repair, Auto Ownership, Advanced Driver Assistance Systems (ADAS), and Next-Generation Vehicles

5th Edition

Including:

- Autonomous
- Connected
- Electrified
- Software-Defined



Instructor Guide

We Support ASE Education Foundation

Michael E. Gray and Linda E. Gray

Auto Upkeep 5th Edition

From choosing an insurance policy to performing basic maintenance and repair, *Auto Upkeep* is the do-it-yourself automotive guide for the driver in you. The *Auto Upkeep Instructor Guide* is a comprehensive resource that assists in delivering the curriculum.

Instructor Guide

Complete Curriculum Solution!



Resources Include:

- Course Syllabus Example
- Lesson Plans
- Readability Worksheets
- Study Questions
- Daily Reflection Log
- Article, Website, or Video Review Forms
- Career Exploration Forms
- Self-Assessment Forms
- Work Order/ Repair Invoice
- Vehicle Walk-Around Inspection Form
- Multi-Point Vehicle Inspection Form
- Rubrics
- Tools and Supplies List
- Activity Completion Record
- Competency Profile/ Task List
- Tests and Final Exam
- Answer Keys



Auto Upkeep
Certificate of Completion

This is to certify that

_____

has completed

Foundational | Automotive Systems | Consumer and Advanced Technology

on this ____ day of _____ in the year _____

Michael E. Gray
Auto Upkeep

_____
Instructor

Automotive/Consumer Education

www.AutoUpkeep.com

ISBN 978-1-62702-059-6

Rolling Hills Publishing

Table of Contents

Course Syllabus Example..... 13

Chapter 1

Introduction and How Cars Work



Lesson Plan 27
Readability Worksheet 31
Study Questions..... 33
Article, Website, or Video Review Form..... 34
Self-Assessment Form..... 35
Career Exploration Form..... 36
Test 37

Answer Keys

Readability Worksheet Answer Key 41
Study Questions Answer Key..... 43
Test Answer Key 45

Certificate

Certificate of Completion..... 49

Chapter 2

Buying an Automobile



Lesson Plan 51
Readability Worksheet 55
Study Questions..... 57
Article, Website, or Video Review Form..... 58
Self-Assessment Form..... 59
Career Exploration Form..... 60
Test 61

Answer Keys

Readability Worksheet Answer Key 65
Study Questions Answer Key..... 67
Test Answer Key 69

Certificate

Certificate of Completion..... 73

Chapter 3

Automotive Expenses



Lesson Plan 75
Readability Worksheet 79
Study Questions..... 81
Article, Website, or Video Review Form..... 82
Self-Assessment Form..... 83
Career Exploration Form..... 84
Test 85

Answer Keys

Readability Worksheet Answer Key 89
Study Questions Answer Key..... 91
Test Answer Key 93

Certificate

Certificate of Completion..... 97

Chapter 4

Repair Facilities



Lesson Plan 99
Readability Worksheet 103
Study Questions..... 105
Article, Website, or Video Review Form..... 106
Self-Assessment Form..... 107
Career Exploration Form..... 108
Test 109

Answer Keys

Readability Worksheet Answer Key 113
Study Questions Answer Key..... 115
Test Answer Key 117

Certificate

Certificate of Completion..... 121

Chapter 5

Safety Around the Automobile



Lesson Plan 123
Readability Worksheet 127
Study Questions..... 129
Article, Website, or Video Review Form..... 130
Self-Assessment Form..... 131
Career Exploration Form..... 132
Test 133

Answer Keys

Readability Worksheet Answer Key 137
Study Questions Answer Key..... 139
Test Answer Key 141

Certificate

Certificate of Completion..... 145

Chapter 6

Tools, Fasteners, and Equipment



Lesson Plan 147
Readability Worksheet 151
Study Questions..... 153
Article, Website, or Video Review Form..... 154
Self-Assessment Form..... 155
Career Exploration Form..... 156
Test 157

Answer Keys

Readability Worksheet Answer Key 161
Study Questions Answer Key..... 163
Test Answer Key 165

Certificate

Certificate of Completion..... 169

CHAPTER 7

Auto Care and Cleaning



Lesson Plan 171
Readability Worksheet 175
Study Questions 177
Article, Website, or Video Review Form 178
Self-Assessment Form 179
Career Exploration Form 180
Test 181

Answer Keys

Readability Worksheet Answer Key 185
Study Questions Answer Key 187
Test Answer Key 189

Certificate

Certificate of Completion 193

CHAPTER 8

Fluid Level Check



Lesson Plan 195
Readability Worksheet 199
Study Questions 201
Article, Website, or Video Review Form 202
Self-Assessment Form 203
Career Exploration Form 204
Test 205

Answer Keys

Readability Worksheet Answer Key 209
Study Questions Answer Key 211
Test Answer Key 213

Certificate

Certificate of Completion 217

CHAPTER 9

Electrical System



Lesson Plan 219
Readability Worksheet 225
Study Questions 227
Article, Website, or Video Review Form 228
Self-Assessment Form 229
Career Exploration Form 230
Test 231

Answer Keys

Readability Worksheet Answer Key 235
Study Questions Answer Key 237
Test Answer Key 239

Certificate

Certificate of Completion 243

CHAPTER 10

Lubrication System



Lesson Plan 245
Readability Worksheet 249
Study Questions 251
Article, Website, or Video Review Form 252
Self-Assessment Form 253
Career Exploration Form 254
Test 255

Answer Keys

Readability Worksheet Answer Key 259
Study Questions Answer Key 261
Test Answer Key 263

Certificate

Certificate of Completion 267

CHAPTER 11

Fuel System



Lesson Plan 269
Readability Worksheet 275
Study Questions 277
Article, Website, or Video Review Form 278
Self-Assessment Form 279
Career Exploration Form 280
Test 281

Answer Keys

Readability Worksheet Answer Key 285
Study Questions Answer Key 287
Test Answer Key 289

Certificate

Certificate of Completion 293

CHAPTER 12

Cooling System and Climate Control



Lesson Plan 295
Readability Worksheet 299
Study Questions 301
Article, Website, or Video Review Form 302
Self-Assessment Form 303
Career Exploration Form 304
Test 305

Answer Keys

Readability Worksheet Answer Key 309
Study Questions Answer Key 311
Test Answer Key 313

Certificate

Certificate of Completion 317

CHAPTER 13

Ignition System

Lesson Plan 319
Readability Worksheet 323
Study Questions 325
Article, Website, or Video Review Form 326
Self-Assessment Form 327
Career Exploration Form 328
Test 329



Answer Keys

Readability Worksheet Answer Key 333
Study Questions Answer Key 335
Test Answer Key 337

Certificate

Certificate of Completion 341

CHAPTER 14

Suspension, Steering, and Tires

Lesson Plan 343
Readability Worksheet 349
Study Questions 351
Article, Website, or Video Review Form 352
Self-Assessment Form 353
Career Exploration Form 354
Test 355



Answer Keys

Readability Worksheet Answer Key 359
Study Questions Answer Key 361
Test Answer Key 363

Certificate

Certificate of Completion 367

CHAPTER 15

Braking System

Lesson Plan 369
Readability Worksheet 375
Study Questions 377
Article, Website, or Video Review Form 378
Self-Assessment Form 379
Career Exploration Form 380
Test 381



Answer Keys

Readability Worksheet Answer Key 385
Study Questions Answer Key 387
Test Answer Key 389

Certificate

Certificate of Completion 393

CHAPTER 16

Drivetrain

Lesson Plan 395
Readability Worksheet 401
Study Questions 403
Article, Website, or Video Review Form 404
Self-Assessment Form 405
Career Exploration Form 406
Test 407



Answer Keys

Readability Worksheet Answer Key 411
Study Questions Answer Key 413
Test Answer Key 415

Certificate

Certificate of Completion 419

CHAPTER 17

Exhaust and Emission System

Lesson Plan 421
Readability Worksheet 427
Study Questions 429
Article, Website, or Video Review Form 430
Self-Assessment Form 431
Career Exploration Form 432
Test 433



Answer Keys

Readability Worksheet Answer Key 437
Study Questions Answer Key 439
Test Answer Key 441

Certificate

Certificate of Completion 445

CHAPTER 18

Alternative Fuels and Designs

Lesson Plan 447
Readability Worksheet 453
Study Questions 455
Article, Website, or Video Review Form 456
Self-Assessment Form 457
Career Exploration Form 458
Test 459



Answer Keys

Readability Worksheet Answer Key 463
Study Questions Answer Key 465
Test Answer Key 467

Certificate

Certificate of Completion 471

CHAPTER 19

Automotive Accessories

Lesson Plan 473
Readability Worksheet 477
Study Questions 479
Article, Website, or Video Review Form 480
Self-Assessment Form 481
Career Exploration Form 482
Test 483



Answer Keys

Readability Worksheet Answer Key 487
Study Questions Answer Key 489
Test Answer Key 491

Certificate

Certificate of Completion 495

CHAPTER 20

Common Problems and Roadside Emergencies

Lesson Plan 497
Readability Worksheet 505
Study Questions 507
Article, Website, or Video Review Form 508
Self-Assessment Form 509
Career Exploration Form 510
Test 511



Answer Keys

Readability Worksheet Answer Key 515
Study Questions Answer Key 517
Test Answer Key 519

Certificate

Certificate of Completion 523

CHAPTER 21

Electric Vehicles

Lesson Plan 525
Readability Worksheet 533
Study Questions 535
Article, Website, or Video Review Form 536
Self-Assessment Form 537
Career Exploration Form 538
Test 539



Answer Keys

Readability Worksheet Answer Key 543
Study Questions Answer Key 545
Test Answer Key 547

Certificate

Certificate of Completion 551

CHAPTER 22

Next-Generation Vehicles

Lesson Plan 553
Readability Worksheet 561
Study Questions 563
Article, Website, or Video Review Form 564
Self-Assessment Form 565
Career Exploration Form 566
Test 567



Answer Keys

Readability Worksheet Answer Key 571
Study Questions Answer Key 573
Test Answer Key 575

Certificate

Certificate of Completion 579

FINAL EXAM

Final Exam 581

Answer Key

Final Exam Answer Key 593

Certificate

Certificate of Completion 605

COURSE SCHEDULE, SCOPE, AND SEQUENCE

The following is based on an 18-week semester meeting for 1.5 hours per day.

18 weeks x 5 days a week x
1.5 hours per day = 135 hours

Auto Upkeep correlates to the 2024 ASE Maintenance and Light Repair (MLR) Tasks. The following abbreviations are used.

MLR Task Abbreviations	Content Areas
SPS	Shop and Personal Safety
xEV	xEV Vehicle Safety
TE	Tools and Equipment
PVS	Preparing for Vehicle Service
PVC	Preparing Vehicle for Customer
PS	Personal Standards
WHE	Work Habits/Ethics
I	Engine Repair – MLR
II	Automatic Transmission and Transaxle – MLR
III	Manual Drive Train and Axles – MLR
IV	Suspension and Steering – MLR
V	Brakes – MLR
VI	Electrical/Electronic Systems – MLR
VII	Heating, Ventilation, and Air Conditioning (HVAC) – MLR
VIII	Engine Performance – MLR

For a detailed list of all the ASE MLR Tasks, visit **aseeducationfoundation.org/resources** and click on *Program Standards* and then *Auto Program Standards – 2024*.

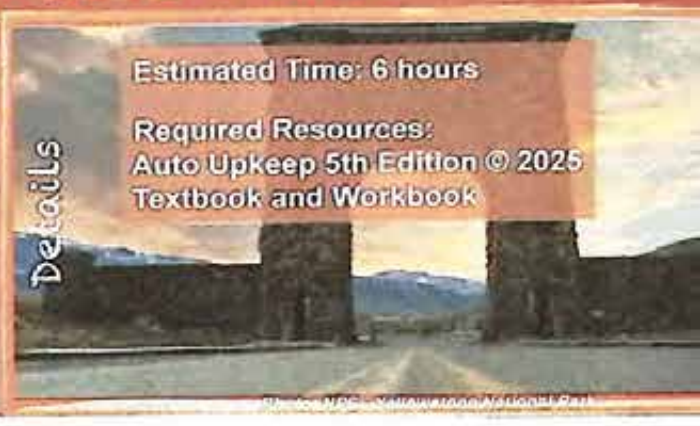
The ASE MLR Tasks are also found on page 633 of this book.

Week	Day	Topic	Task	Activities, Assignments, and Assessments (Check off when completed.)	2024 ASE MLR Tasks
		Introduction Course Syllabus Tour of Area			
Week 1	Day 1	CHAPTER 1 Introduction and How Cars Work 	Pages 10-15	☐ Complete Readability Worksheet ☐ Complete Article, Website, or Video Review Form ☐ Complete Daily Reflection Log	SPS.13, 14 PVS.1, 2 PVC.1 PS.1, 2, 3, 4, 5 WHE.1-14 I.B.1 I.C.1 VII.A.1 VIII.A.1
	Day 2		Pages 16-25	☐ Complete Readability Worksheet ☐ Answer Study Questions ☐ Complete Daily Reflection Log	
	Day 3		Activities	☐ Complete Workplace Skills Activity ☐ Complete Car Identification and Preparing for Vehicle Service Activity ☐ Complete Owner's Manual Activity ☐ Complete Daily Reflection Log	
	Day 4		Test	☐ Complete Self-Assessment Form ☐ Complete Career Exploration Form ☐ Review for Test ☐ Take Test ☐ Complete Daily Reflection Log	
Week 2	Day 5	CHAPTER 2 Buying an Automobile 	Pages 26-41	☐ Complete Readability Worksheet ☐ Complete Article, Website, or Video Review Form ☐ Complete Daily Reflection Log	WHE.11 I.A.1 II.A.1 III.A.1 IV.A.1 VI.A.1 VIII.A.1
	Day 6		Pages 42-51	☐ Complete Readability Worksheet ☐ Answer Study Questions ☐ Complete Daily Reflection Log	
	Day 7		Activities	☐ Complete Towing and Hauling Activity ☐ Complete Advanced Driver Assistance Systems (ADAS) Activity	
	Day 8		Activities	☐ Complete Buying a New Automobile Activity ☐ Complete Buying a Used Automobile Activity ☐ Complete Daily Reflection Log	
	Day 9		Test	☐ Complete Self-Assessment Form ☐ Complete Career Exploration Form ☐ Review for Test ☐ Take Test ☐ Complete Daily Reflection Log	
Week 3	Day 10	CHAPTER 3 Automotive Expenses 	Pages 52-59	☐ Complete Readability Worksheet ☐ Complete Article, Website, or Video Review Form ☐ Answer Study Questions ☐ Complete Daily Reflection Log	WHE.11
	Day 11		Activities	☐ Complete Automotive Expenses Activity ☐ Complete Daily Reflection Log	
	Day 12		Test	☐ Complete Self-Assessment Form ☐ Complete Career Exploration Form ☐ Review for Test ☐ Take Test ☐ Complete Daily Reflection Log	
	Day 13	CHAPTER 4 Repair Facilities 	Pages 60-67	☐ Complete Readability Worksheet ☐ Complete Article, Website, or Video Review Form ☐ Answer Study Questions ☐ Complete Daily Reflection Log	PVS.1-7
	Day 14		Activities	☐ Complete Repair Facilities Activity ☐ Complete Daily Reflection Log	
	Day 15		Test	☐ Complete Self-Assessment Form ☐ Complete Career Exploration Form ☐ Review for Test ☐ Take Test ☐ Complete Daily Reflection Log	

Week	Day	Topic	Task	Activities, Assignments, and Assessments (Check off when completed.)	2024 ASE MLR Tasks
Week 15	Day 73	CHAPTER 20 Common Problems and Roadside Emergencies 	Pages 280-291	☐ Complete Readability Worksheet ☐ Complete Article, Website, or Video Review Form ☐ Complete Daily Reflection Log	SPS.3 I.A.2, 3 I.D.4 II.A.3 III.A.3 IV.A.1, 3 IV.F.1 V.A.3 VI.A.1-4, 7, 8, 11, 12 VI.B.6 VI.E.1 VI.F.1 VI.G.5 VII.A.3 VIII.A.1, 2
	Day 74		Pages 292-299	☐ Complete Readability Worksheet ☐ Answer Study Questions ☐ Complete Daily Reflection Log	
	Day 75		Activities	☐ Complete Changing a Flat Tire Activity ☐ Complete Jump-Starting Activity ☐ Complete Daily Reflection Log	
Week 16	Day 76		Activities	☐ Complete Lighting Activity ☐ Complete Replacing Wipers Activity ☐ Complete On-Board Diagnostics Activity ☐ Complete Daily Reflection Log	
	Day 77		Test	☐ Complete Self-Assessment Form ☐ Complete Career Exploration Form ☐ Review for Test ☐ Take Test ☐ Complete Daily Reflection Log	
	Day 78	CHAPTER 21 Electric Vehicles 	Pages 300-311	☐ Complete Readability Worksheet ☐ Complete Article, Website, or Video Review Form ☐ Complete Daily Reflection Log	xEV.1-6 VI.A.2 VI.H.1
	Day 79		Pages 312-325	☐ Complete Readability Worksheet ☐ Complete Article, Website, or Video Review Form ☐ Complete Daily Reflection Log	
	Day 80		Pages 326-339	☐ Complete Readability Worksheet ☐ Answer Study Questions ☐ Complete Daily Reflection Log	
Week 17	Day 81		Activities	☐ Complete Electric Vehicles Activity ☐ Complete Daily Reflection Log	
	Day 82		Test	☐ Complete Self-Assessment Form ☐ Complete Career Exploration Form ☐ Review for Test ☐ Take Test ☐ Complete Daily Reflection Log	
	Day 83	CHAPTER 22 Next-Generation Vehicles 	Pages 340-349	☐ Complete Readability Worksheet ☐ Complete Article, Website, or Video Review Form ☐ Complete Daily Reflection Log	VI.G.1, 3
	Day 84		Pages 350-359	☐ Complete Readability Worksheet ☐ Complete Article, Website, or Video Review Form ☐ Complete Daily Reflection Log	
	Day 85		Pages 360-369	☐ Complete Readability Worksheet ☐ Answer Study Questions ☐ Complete Daily Reflection Log	
Week 18	Day 86		Activities	☐ Complete ADAS and Vehicle Automation Level Identification Activity ☐ Complete Daily Reflection Log	
	Day 87		Test	☐ Complete Self-Assessment Form ☐ Complete Career Exploration Form ☐ Review for Test ☐ Take Test ☐ Complete Daily Reflection Log	
	Day 88	**Review for Final Exam**	Review	☐ Review for Final Exam ☐ Complete Daily Reflection Log	
	Day 89	**Final Exam**	Test	☐ Take Final Exam ☐ Complete Daily Reflection Log	
	Day 90	**Scheduled Make-up Day/Inclement Weather Day**		☐ Scheduled Make-Up Day/Inclement Weather Day	

Introduction and How Cars Work





Chapter 1 - Lesson Plan

Unit lesson plans follow the Understanding by Design® (UbD™) framework. This framework consists of three stages:

- Stage 1 - Desired Results
  What should students know, understand, and be able to do?
- Stage 2 - Evidence
  What is the evidence that students understand?
- Stage 3 - Learning Plan
  What instructional method makes the most sense to support the desired learning?

Videos

Auto Upkeep Videos

www.Video.AutoUpkeep.com
Click on Chapter 1

Weblinks

Auto Upkeep Resources

www.AutoUpkeep.com/resources
Click on Chapter 1

Key Terms and Abbreviations

- Cugnot
- Benz
- Ford
- Automotive History
- Conservation of Energy
- Force
- Work
- Power
- Energy
- Torque
- Horsepower
- RPM
- Four-Stroke Engine
- Spark Ignition
- Compression Ignition
- Engine Configuration
- Displacement
- TDC
- BDC
- Cubic Inches
- Liters
- Compression Ratio
- VIN
- Make
- Model
- Year
- Trim Level
- Type
- Automotive Parts
- Automotive Systems
- Careers
- Workplace Skills

Stage 1 - Desired Results
(What should students know, understand, and be able to do?)

Goals

2024 ASE MLR Tasks

SPS.13, 14
PVS.1, 2
PVC.1
PS.1, 2, 3, 4, 5
WHE.1-14
I.B.1
I.C.1
VII.A.1
VIII.A.1

Transfer

Students will be able to independently use their learning to…

Textbook Objectives:
- Identify early automotive contributors.
- Differentiate between vehicle manufacturers, makes, models, and trim levels.
- Describe how cars work.
- Locate and use an online owner's manual.

Workbook Objectives:
- Identify important workplace skills and understand why they are integral to professionalism.
- Identify an automobile by manufacturer, model year, make, model, and trim level.
- Prepare a vehicle for service and return to the customer.
- Locate and use an online owner's manual.

Meaning

UNDERSTANDINGS *Students will understand that…*	ESSENTIAL QUESTIONS
1. Early automotive contributors included Nicholas Cugnot, Henry Ford, Carl Benz, among many others.	1. Who were early automotive contributors?
2. Automobiles are shifting from hardware-defined vehicles to software-defined vehicles and from ICEs to EVs.	2. How is the automotive paradigm shifting?
3. Many automotive events (e.g., Henry Ford's moving assembly line) contributed to the development of the automobile.	3. What were significant automotive events?
4. Energy is needed to make a car work.	4. How do cars work?
5. Force is a push or pull interaction between objects. Work is the transfer of energy from one object to another. Power is the rate at which work is done. Objects have the ability to do work when they have energy.	5. What is force, work, power, and energy?
6. The strokes in a four-stroke engine are intake, compression, power (combustion), and exhaust.	6. What are the stokes in a four-stroke engine?
7. In a spark ignition engine, a spark plug ignites gasoline or another fuel. In a compression ignition engine, compression ignites the diesel from high pressure and heat (no spark plugs).	7. How are spark ignition and compression ignition engines different?
8. Gasoline engines emit HC, NO_x, CO, and CO_2. Diesels emit NO_x and PM, in addition to greenhouse gas pollutants.	8. What pollutants occur from the combustion of gasoline and diesel?
9. EVs are emerging as a popular vehicle design.	9. What are possible future vehicle designs?
10. Vehicles are classified by their fuels and designs.	10. How are vehicles classified?
11. Engine size is important to know when purchasing parts and determining vehicle capabilities.	11. Why is it good to know the size of your vehicle's engine?
12. The 17-character VIN can be seen on the left side of the dash from outside the vehicle through the windshield or inside the driver's doorjamb.	12. What is the VIN and where is it located?
13. Vehicles are identified by their VIN, manufacturer, make, model, year, trim level, and type.	13. How are vehicles identified?
14. Parts and systems work together to make a car work.	14. What are parts and systems?
15. Manufacturing, service, repair, and support careers are available in the automotive field.	15. What careers are available in the automotive field?
16. Workplace skills, which include personal standards and work habits/ethics, are an important part of employment.	16. What are workplace skills?
17. Preparing a vehicle for service includes identifying information needed and the service requested, plus protecting the vehicle with fender covers, mats, seat, and steering wheel covers.	17. How should vehicles be prepared for service?
18. Preparing a vehicle for a customer includes following the school/company policy.	18. How should vehicles be prepared for the customer?
19. Online owner's manuals can be located using keyword search terms.	19. How do you locate and navigate an online owner's manual?

Stage 1 - Desired Results
(What should students know, understand, and be able to do?)

Acquisition

Students will know…

1. Early automotive contributors.
2. Automotive paradigms.
3. Automotive significant events.
4. How cars work.
5. Force, work, power, and energy.
6. The four strokes in a four-stroke engine.
7. Spark and compression ignition engines.
8. Gasoline and diesel pollutants.
9. Future vehicle designs.
10. Vehicle classifications.
11. Engine size.
12. VIN locations and identification.
13. Vehicle identifications.
14. Automotive parts and systems.
15. Automotive careers.
16. Workplace skills.
17. Vehicle preparation for service.
18. Vehicle preparation for a customer.
19. Online owner's manuals.

Students will be skilled at…

1. Identifying automotive contributors.
2. Explaining automotive paradigms.
3. Listing automotive significant events.
4. Describing how cars work.
5. Differentiating between force, work, power, and energy.
6. Explaining the four strokes in a four-stroke engine.
7. Distinguishing differences between spark and compression ignition engines.
8. Relating pollutants to gasoline and diesel engines.
9. Proposing and discussing possible future vehicle designs.
10. Classifying vehicle types.
11. Identifying the engine size and configuration.
12. Locating and identifying the Vehicle Identification Number (VIN).
13. Practicing identifying and explaining differences between automobiles by the VIN, manufacturer, make, model, year, trim level, and type.
14. Explaining how parts and systems work together to make a car work.
15. Identifying careers in the automotive industry.
16. Demonstrating workplace skills.
17. Preparing a vehicle for service.
18. Preparing a vehicle for a customer.
19. Navigating an online owner's manual.

Stage 2 - Evidence
(What is the evidence that students understand?)

Evaluation Criteria

PERFORMANCE TASK(S):

- Activity Rubric

See Appendix L - Rubrics

OTHER EVIDENCE:

- Readability Worksheet Rubric
- Daily Reflection Log Rubric
- Article, Website, or Video Review Form Rubric
- Study Questions Rubric
- Self-Assessment Form Rubric
- Career Exploration Form Rubric
- Active Participation Rubric
- Workplace Skills Rubric
- Test Rubric

See Appendix L - Rubrics

Assessment Evidence

PERFORMANCE TASK(S):

- Workplace Skills Activity
- Car Identification and Preparing for Vehicle Service Activity
- Owner's Manual Activity

OTHER EVIDENCE:

- Readability Worksheet
- Daily Reflection Log
- Article, Website, or Video Review Form
- Study Questions
- Self-Assessment Form
- Career Exploration Form
- Active Participation
- Workplace Skills
- Test

Stage 3 - Learning Plan
(What instructional method makes the most sense to support the desired learning?)

Summary of Key Learning Events and Instruction

Warm-Up:
Present essential questions.

Review:
Chapter 1 in the *Auto Upkeep Textbook*.

Assignments and Activities:
Students will…
- Complete Readability Worksheet
- Complete Article, Website, or Video Review Form
- Answer Study Questions
- Complete Workplace Skills Activity
- Complete Car Identification and Preparing for Vehicle Service Activity
- Complete Owner's Manual Activity
- Complete Self-Assessment Form
- Complete Career Exploration
- Review for Test
- Take Test
- Complete Daily Reflection Log

Closure/Summary:
- Discuss the results of the assignments and activities.
- Identify any difficulties students had while completing the assignments and activities.

Reflection and Self Evaluation
(What worked, what didn't? What should I change? Notes for next time.)

Chapter 1 - Readability Worksheet

Directions
Read the textbook to fill in the missing words from the sentences below.

1. The word "automobile" literally means _____.

2. The development of the _____ in 1860 made road vehicles more promising.

3. By the 1920s, _____ the cars in the world were Model T Fords.

4. A key concept to understand is that energy cannot be _____ or _____, it is just converted from one form to another.

5. Simply defined, force is a _____ or _____ interaction between objects.

6. When an object has moved from a force, the position of the object has _____ and _____ has occurred.

7. Power is the rate at which _____ is done (the amount of work done, energy delivered, in a given amount of _____).

8. The four-strokes of the spark ignition engine are _____, _____, _____ (combustion), and _____.

9. Compression ignition (CI) engines are fueled by _____.

10. Gasoline engines use _____ to ignite the air-fuel mixture in the engine.

11. The size of an engine is calculated from the cylinder displacement _____ during one piston stroke (bottom dead center (BDC) to top dead center (TDC)) multiplied by the number of cylinders in the engine.

12. A higher compression ratio means more work from same amount of fuel, increasing _____.

13. The _____ contains coded vehicle information.

14. The _____ of a vehicle refers to the specific name of each vehicle within a make.

15. _____ levels identify versions (different equipment and features) of the same vehicle model.

16. Parts that work together to perform a specific task make up a _____.

17. The _____ system uses oil or e-fluids to reduce wear and heat.

18. The _____ transfers power from the engine or e-motor to the wheels.

19. Automotive _____ can work in a variety of repair facilities in different capacities to diagnose, service, and repair a vehicle.

20. Workplace skills, including personal standards, work habits, and _____, are integral to a professional work environment.

Chapter 1 - Study Questions

Directions
Use complete sentences to answer the following questions.

1. What was the earliest self-powered road vehicle?

2. Who was credited with the world's first practical motorcar?

3. What is the difference between force, work, power, and energy?

4. What are the strokes in a four-stroke internal combustion engine? What is the difference between a gasoline and a diesel engine?

5. What two units of measurement are used to classify engine sizes?

6. What is an engine configuration? List several examples.

7. What does the acronym VIN represent? What information is coded into the VIN?

8. What is the difference between a manufacturer and make?

9. What are the systems of the automobile?

10. What types of careers exist in the automotive industry?

Name_____ Class_____ Date_____ Score_____



Chapter 1 - Article, Website, or Video Review Form

Directions

Research an article, visit a website, or watch a video and then complete this form by writing sentences in your own words. Do not copy verbatim from the source.

BIBLIOGRAPHY

SUMMARY

OPINIONS/CONCLUSIONS/REACTIONS

Chapter 1 - Self-Assessment Form

Directions

Complete the self-assessment and identify your strengths, areas of improvement, values, goals, and achievements.

Score/Mastery				
A	B	C	D	F
Master	Proficient	Apprentice	Novice	No Attempt
4	3	2	1	0

Grade Scale			
4.0 = A	3.0 = B	2.0 = C	1.0 = D
3.7 = A-	2.7 = B-	1.7 = C-	0.7 = D-
3.3 = B+	2.3 = C+	1.3 = D+	0 = F

Task/Skill	Domain	Level
Chapter 1. Introduction and How Cars Work		
Describe how cars work.	Cognitive	Knowledge
Locate and identify the Vehicle Identification Number (VIN).	Psychomotor	Imitation
Identify the engine size and configuration.	Cognitive	Knowledge
Explain the difference between manufacturer, make, and model.	Cognitive	Comprehension
Classify vehicle types.	Cognitive	Analysis
Distinguish differences between spark and compression ignition engines.	Cognitive	Analysis
Relate pollutants to gasoline and diesel engines.	Cognitive	Synthesis
Propose and discuss possible future vehicle designs.	Affective	Valuing
Practice identifying automobiles by model year, make, model, and type.	Psychomotor	Manipulation
Differentiate between force, work, power, and energy.	Cognitive	Analysis
Identify careers in the automotive industry.	Cognitive	Knowledge
Navigate an online owner's manual.	Psychomotor	Manipulation

Strengths: Identify tasks or skills that you are performing well.

Areas of Improvement: Identify tasks or skills that you can improve.

Values: Identify an example of values that are important.

Goals: Identify goals you would like to achieve relating to the content in this chapter.

Achievements: Identify accomplishments you reached relating to the content in this chapter.

Name_____ Class_____ Date_____ Score_____

Chapter 1 - Career Exploration Form

Directions

Use the Occupational Outlook Website (**www.bls.gov/ooh**) to research a career. As you identify the following, write complete sentences in your own words. Do not copy verbatim from the website.

CAREER

_____

SALARY POTENTIAL

_____

EDUCATION/TRAINING REQUIRED

_____

_____

_____

JOB OUTLOOK

_____

_____

_____

NATURE OF THE WORK

_____

_____

_____

_____

WORKING CONDITIONS

_____

_____

_____

_____

_____

REASON YOU CHOSE THIS CAREER

_____

_____

_____

_____

_____

Chapter 1 - Test

Section 1: Selected Response

Directions

Place the letter that corresponds to the correct answer on the space provided.

___1. The _____ was one of the earliest self-powered vehicles.
a. Hummer
b. Cugnot steam traction engine
c. Tucker
d. Taurus

___2. Most 4-cylinder engines are configured in this way.
a. V
b. Slant
c. X
d. Inline

___3. Automobiles became popular in the _____ century.
a. 14th
b. 16th
c. 18th
d. 20th

___4. The VIN is commonly located on the _____.
a. dashboard
b. taillight
c. headlight
d. wheel

___5. The Ford Model T became famous for being _____.
a. the first car
b. mass-produced on a moving assembly line
c. hand built
d. blue in color

___6. Who patented the world's first practical motorcar?
a. Carl Benz
b. Henry Ford
c. Nicholas Cugnot
d. Ferdinand Porsche

___7. What is a push or pull interaction between objects?
a. force
b. work
c. power
d. energy

___8. Objects have the ability to do work when they have _____.
a. force
b. work
c. power
d. energy

___9. In a given amount of time, _____ is the rate at which work is done.
a. force
b. distance
c. power
d. energy

___10. What is the transfer of energy from one object to another?
a. force
b. work
c. power
d. energy

___11. What is the term used to describe a twisting force?
a. torque
b. work
c. horsepower
d. energy

___12. One _____ is the work needed to lift 550 pounds a distance of 1 foot in 1 second.
a. torque
b. rpm
c. horsepower
d. energy

___13. Gasoline engines use _____ to ignite the air-fuel mixture in the engine.
a. torque
b. compression
c. a catalyst
d. spark plugs

___14. How much work has been done if a force of 20 pounds was used to move an object 50 feet?
a. 20 lb
b. 50 feet
c. 70 ft-lb
d. 1000 ft-lb

___15. What is stored energy or energy of position?
a. potential
b. kinetic
c. movement
d. force

___16. All of the following vehicle protection supplies are generally used when preparing a vehicle for service EXCEPT:
a. a fender cover.
b. a steering wheel cover.
c. a floor mat.
d. wax.

___17. Early electric vehicles were more popular in cities because they were _____, quiet, and started easily.
a. inexpensive to buy
b. clean running
c. built on an assembly line
d. great for long drives

___18. In the 1910s, city streets became chaotic and dangerous with vehicles, pedestrians, bicycles, horses, and streetcars. Cleveland, Ohio was the first to install _____.
a. toll stations
b. electric red and green traffic lights
c. motor vehicle parking meters
d. pedestrian crosswalks

___19. Who perfected the electric self-starter for engines, replacing dangerous hand cranking?
a. Charles Kettering
b. Henry Ford
c. Ferdinand Porsche
d. David Buick

___20. Important workplace skills include all of the following EXCEPT:
a. assisting others and requesting help when needed.
b. negotiating solutions to conflicts.
c. contributing to an inclusive environment for coworkers and customers.
d. keeping helpful ideas to yourself.

www.AutoUpkeep.com

Section 2: Selected Response ASE Style Questions

Directions

Place the letter that corresponds to the correct answer on the space provided.

___21. Technician A says that work habits and ethics are integral to a professional work environment. Technician B says that high personal standards in the workplace will not impact customer trust if you are good at diagnosing and fixing problems. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

___22. Technician A says that a walk-around inspection before vehicle service is a waste of time. Technician B says that you should always perform a walk-around inspection before performing vehicle service on a customer's vehicle. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

___23. Technician A says that gasoline engines have spark plugs to ignite the air-fuel mixture. Technician B says that diesel engines use compression to ignite the air-fuel mixture. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

___24. Technician A says that the day the vehicle comes off the assembly line is the model year. Technician B says that the model year can be located on the vehicle emission control information (VECI) sticker. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

___25. Technician A says that the number of cylinders within the engine block is used to identify the engine design. Technician B says that the engine configuration is used to identify the engine design. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

___26. Technician A says that engine size can be listed in liters. Technician B says that engine size can only be listed in cubic inches. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

___27. Technician A says that rotary motion of the pistons is converted to reciprocating motion of the crankshaft. Technician B says that rotary motion is up and down or back and forth. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

___28. Technician A says that strong math skills are important for an automotive technician. Technician B says that skills in communication and ethics are important for an automotive technician. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

Section 3: Constructed Response

Directions

Use complete sentences to answer the following questions. The criteria below will be used to assess your answers.

Outstanding (A = 4.0)	Very Good (B = 3.0)	Acceptable (C = 2.0)	Attempted (D = 1.0)	Did Not Attempt (F = 0)
Student demonstrates a complete understanding of the problem. Several details and examples were given to support the answer. The response was extremely well organized. Handwriting was very legible.	Student demonstrates a considerable understanding of the problem. Some details and examples were given to support the answer. The response was presented in a thoughtful manner. Handwriting was legible.	Student demonstrates a partial understanding of the problem. Few details and examples were given to support the answer. The response was somewhat organized, but did not have smooth transitions. Handwriting was legible.	Student demonstrates little understanding of the problem. Details and examples were not relevant or not given. The response was difficult to follow and confusing to the reader. However, the student made an honest attempt at answering the question. Handwriting was somewhat illegible.	No attempt was made to answer the question or handwriting was illegible.

29. How is power transferred in a gasoline powered vehicle?

30. What are the four strokes in the four-stroke spark ignition engine? What occurs during each stroke?

www.AutoUpkeep.com

Chapter 1 - Readability Worksheet Answer Key

Directions
Read the textbook to fill in the missing words from the sentences below.

1. The word "automobile" literally means ___self-moving___.

2. The development of the ___internal combustion engine (ICE)___ in 1860 made road vehicles more promising.

3. By the 1920s, ___half___ the cars in the world were Model T Fords.

4. A key concept to understand is that energy cannot be ___created___ or ___destroyed___, it is just converted from one form to another.

5. Simply defined, force is a ___push___ or ___pull___ interaction between objects.

6. When an object has moved from a force, the position of the object has ___changed___ and ___work___ has occurred.

7. Power is the rate at which ___work___ is done (the amount of work done, energy delivered, in a given amount of ___time___).

8. The four-strokes of the spark ignition engine are ___intake___, ___compression___, ___power___ (combustion), and ___exhaust___.

9. Compression ignition (CI) engines are fueled by ___diesel___.

10. Gasoline engines use ___spark plugs___ to ignite the air-fuel mixture in the engine.

11. The size of an engine is calculated from the cylinder displacement **volume** during one piston stroke (bottom dead center (BDC) to top dead center (TDC)) multiplied by the number of cylinders in the engine.

12. A higher compression ratio means more work from same amount of fuel, increasing **efficiency**.

13. The **VIN** contains coded vehicle information.

14. The **model** of a vehicle refers to the specific name of each vehicle within a make.

15. **Trim** levels identify versions (different equipment and features) of the same vehicle model.

16. Parts that work together to perform a specific task make up a **system**.

17. The **lubrication** system uses oil or e-fluids to reduce wear and heat.

18. The **drivetrain** transfers power from the engine or e-motor to the wheels.

19. Automotive **technicians** can work in a variety of repair facilities in different capacities to diagnose, service, and repair a vehicle.

20. Workplace skills, including personal standards, work habits, and **ethics**, are integral to a professional work environment.

Chapter 1 - Study Questions Answer Key

Directions

Use complete sentences to answer the following questions.

1. What was the earliest self-powered road vehicle?
   The Cugnot steam traction engine in 1769-1770 was the earliest self-powered road vehicle.

2. Who was credited with the world's first practical motorcar?
   Carl Benz was credited with building the world's first motorcar.

3. What is the difference between force, work, power, and energy?
   Force is a push or pull interaction between objects. When an object has moved from a force, the position of the object has changed and work has occurred. Power is the rate at which work is done. Energy is the "fuel" stored or used to perform work.

4. What are the strokes in a four-stroke internal combustion engine? What is the difference between a gasoline and a diesel engine?
   The four strokes are intake, compression, power (combustion), and exhaust. Gasoline powered engines use spark plugs to ignite the air-fuel mixture in the engine. Diesel engines are compression ignition engines; they do not have spark plugs.

5. What two units of measurement are used to classify engine sizes?
   Engine size is commonly listed in liters or cubic inches.

6. What is an engine configuration? List several examples.
   Engine configuration is the design of the engine block. Common engine configurations include inline, opposed, or V.

7. What does the acronym VIN represent? What information is coded into the VIN?
   VIN stands for Vehicle Identification Number. The VIN includes the following: country of origin, vehicle manufacturer, make, model, trim, type, etc. (e.g., engine size if applicable), check digit, model year, assembly plant, and the vehicle's serial number.

8. What is the difference between a manufacturer and make?
   An automotive manufacturer (example GM) is a company that produces vehicles. Automotive manufacturers identify the various vehicles they produce by their make (example Cadillac).

9. What are the systems of the automobile?
   Parts that work together to perform a specific task make up a system. Automotive systems include: electrical; lubrication; fuel; cooling and climate control; ignition; suspension, steering, and tires; braking; drivetrain; and exhaust and emission.

10. What types of careers exist in the automotive industry?
    Many automotive careers exist. These include, but are not limited to, automotive manufacturing, service and repair, software developer, information technology (IT) technician, automotive electrician, mechatronic engineer, ADAS calibration technician, along with other careers that support the industry.

This Page Intentionally Left Blank

Chapter 1 - Test Answer Key

Section 1: Selected Response

Directions

Place the letter that corresponds to the correct answer on the space provided.

b 1. The _____ was one of the earliest self-powered vehicles.
   a. Hummer
   b. Cugnot steam traction engine
   c. Tucker
   d. Taurus

d 2. Most 4-cylinder engines are configured in this way.
   a. V
   b. Slant
   c. X
   d. Inline

d 3. Automobiles became popular in the _____ century.
   a. 14th
   b. 16th
   c. 18th
   d. 20th

a 4. The VIN is commonly located on the _____.
   a. dashboard
   b. taillight
   c. headlight
   d. wheel

b 5. The Ford Model T became famous for being _____.
   a. the first car
   b. mass-produced on a moving assembly line
   c. hand built
   d. blue in color

a 6. Who patented the world's first practical motorcar?
   a. Carl Benz
   b. Henry Ford
   c. Nicholas Cugnot
   d. Ferdinand Porsche

a 7. What is a push or pull interaction between objects?
   a. force
   b. work
   c. power
   d. energy

d 8. Objects have the ability to do work when they have _____.
   a. force
   b. work
   c. power
   d. energy

c 9. In a given amount of time, _____ is the rate at which work is done.
   a. force
   b. distance
   c. power
   d. energy

b 10. What is the transfer of energy from one object to another?
   a. force
   b. work
   c. power
   d. energy

a 11. What is the term used to describe a twisting force?
   a. torque
   b. work
   c. horsepower
   d. energy

c 12. One _____ is the work needed to lift 550 pounds a distance of 1 foot in 1 second.
   a. torque
   b. rpm
   c. horsepower
   d. energy

d 13. Gasoline engines use _____ to ignite the air-fuel mixture in the engine.
a. torque
b. compression
c. a catalyst
d. spark plugs

d 14. How much work has been done if a force of 20 pounds was used to move an object 50 feet?
a. 20 lb
b. 50 feet
c. 70 ft-lb
d. 1000 ft-lb

a 15. What is stored energy or energy of position?
a. potential
b. kinetic
c. movement
d. force

d 16. All of the following vehicle protection supplies are generally used when preparing a vehicle for service EXCEPT:
a. a fender cover.
b. a steering wheel cover.
c. a floor mat.
d. wax.

b 17. Early electric vehicles were more popular in cities because they were _____, quiet, and started easily.
a. inexpensive to buy
b. clean running
c. built on an assembly line
d. great for long drives

b 18. In the 1910s, city streets became chaotic and dangerous with vehicles, pedestrians, bicycles, horses, and streetcars. Cleveland, Ohio was the first to install _____.
a. toll stations
b. electric red and green traffic lights
c. motor vehicle parking meters
d. pedestrian crosswalks

a 19. Who perfected the electric self-starter for engines, replacing dangerous hand cranking?
a. Charles Kettering
b. Henry Ford
c. Ferdinand Porsche
d. David Buick

d 20. Important workplace skills include all of the following EXCEPT:
a. assisting others and requesting help when needed.
b. negotiating solutions to conflicts.
c. contributing to an inclusive environment for coworkers and customers.
d. keeping helpful ideas to yourself.

www.AutoUpkeep.com

Section 2: Selected Response ASE Style Questions

Directions

Place the letter that corresponds to the correct answer on the space provided.

a 21. Technician A says that work habits and ethics are integral to a professional work environment. Technician B says that high personal standards in the workplace will not impact customer trust if you are good at diagnosing and fixing problems. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

b 22. Technician A says that a walk-around inspection before vehicle service is a waste of time. Technician B says that you should always perform a walk-around inspection before performing vehicle service on a customer's vehicle. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

c 23. Technician A says that gasoline engines have spark plugs to ignite the air-fuel mixture. Technician B says that diesel engines use compression to ignite the air-fuel mixture. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

b 24. Technician A says that the day the vehicle comes off the assembly line is the model year. Technician B says that the model year can be located on the vehicle emission control information (VECI) sticker. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

c 25. Technician A says that the number of cylinders within the engine block is used to identify the engine design. Technician B says that the engine configuration is used to identify the engine design. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

a 26. Technician A says that engine size can be listed in liters. Technician B says that engine size can only be listed in cubic inches. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

d 27. Technician A says that rotary motion of the pistons is converted to reciprocating motion of the crankshaft. Technician B says that rotary motion is up and down or back and forth. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

c 28. Technician A says that strong math skills are important for an automotive technician. Technician B says that skills in communication and ethics are important for an automotive technician. Who is correct?
a. Technician A
b. Technician B
c. Both Technician A and Technician B
d. Neither Technician A nor Technician B

Section 3: Constructed Response

Directions

Use complete sentences to answer the following questions. The criteria below will be used to assess your answers.

Outstanding (A = 4.0)	Very Good (B = 3.0)	Acceptable (C = 2.0)	Attempted (D = 1.0)	Did Not Attempt (F = 0)
Student demonstrates a complete understanding of the problem. Several details and examples were given to support the answer. The response was extremely well organized. Handwriting was very legible.	Student demonstrates a considerable understanding of the problem. Some details and examples were given to support the answer. The response was presented in a thoughtful manner. Handwriting was legible.	Student demonstrates a partial understanding of the problem. Few details and examples were given to support the answer. The response was somewhat organized, but did not have smooth transitions. Handwriting was legible.	Student demonstrates little understanding of the problem. Details and examples were not relevant or not given. The response was difficult to follow and confusing to the reader. However, the student made an honest attempt at answering the question. Handwriting was somewhat illegible.	No attempt was made to answer the question or handwriting was illegible.

29. How is power transferred in a gasoline powered vehicle?

1. Fuel is stored as chemical energy in the gas tank. 2. Fuel is transported to the engine by a fuel pump. 3. Air-fuel mixture enters the engine. 4. Electrical energy is used to create a spark at the spark plug. 5. Combustion occurs, converting the chemical energy to kinetic energy. 6. The reciprocating motion of the pistons is converted to rotary (circular) motion of the crankshaft. 7. The crankshaft's rotary motion turns the transmission. 8. On FWD vehicles, rotary motion is transferred through a transaxle then through the CV shafts. On RWD vehicles, rotary power is transferred from the transmission through the drive shaft, to a differential, and then through axles. 9. The axle shafts or CV shafts turn the wheels. 10. The rotary motion of the wheels converts to linear motion on the roadway.

30. What are the four strokes in the four-stroke spark ignition engine? What occurs during each stroke?

Intake stroke – Intake valve is open. Exhaust valve is closed. Piston moves down. Air-fuel mixture enters the combustion chamber.

Compression stroke – Intake and exhaust valves are closed. Piston moves up. Air-fuel mixture is compressed.

Power (Combustion) stroke – Intake and exhaust valves are closed. A spark plug ignites the fuel. Piston is forced down by combustion. This is the stroke that provides the power.

Exhaust stroke – Exhaust valve opens. Intake valve is closed. Piston moves up, pushing exhaust gases out of the engine.

www.AutoUpkeep.com

Auto Upkeep
Certificate of Completion

This is to certify that

_____

has completed

Introduction and How Cars Work

on this _____ day of _____ in the year _____

Michael E. Gray

Michael E. Gray
Auto Upkeep



_____

Instructor

Name_____ Class_____ Date_____ Score_____

Appendix D - Competency Profile/Task List

Score/Mastery				
A	B	C	D	F
Master	Proficient	Apprentice	Novice	No Attempt
4	3	2	1	0

Grade Scale			
4.0 = A	3.0 = B	2.0 = C	1.0 = D
3.7 = A-	2.7 = B-	1.7 = C-	0.7 = D-
3.3 = B+	2.3 = C+	1.3 = D+	0 = F

Task/Skill	Domain	Level
Chapter 1. Introduction and How Cars Work		
Describe how cars work.	Cognitive	Knowledge
Locate and identify the Vehicle Identification Number (VIN).	Psychomotor	Imitation
Identify the engine size and configuration.	Cognitive	Knowledge
Explain the difference between manufacturer, make, and model.	Cognitive	Comprehension
Classify vehicle types.	Cognitive	Analysis
Distinguish differences between spark and compression ignition engines.	Cognitive	Analysis
Relate pollutants to gasoline and diesel engines.	Cognitive	Synthesis
Propose and discuss possible future vehicle designs.	Affective	Valuing
Practice identifying automobiles by model year, make, model, and type.	Psychomotor	Manipulation
Differentiate between force, work, power, and energy.	Cognitive	Analysis
Identify careers in the automotive industry.	Cognitive	Knowledge
Navigate an online owner's manual.	Psychomotor	Manipulation
Chapter 2. Buying an Automobile		
Differentiate between transportation needs and wants.	Cognitive	Analysis
Develop a budget.	Cognitive	Application
Identify the steps in purchasing an automobile.	Cognitive	Knowledge
Compare and contrast different places to purchase an automobile.	Cognitive	Evaluation
Calculate a reasonable offer for a vehicle.	Cognitive	Application
Advocate for safety features in an automobile.	Affective	Characterization
Carry out research on vehicles using available resources.	Psychomotor	Imitation
Evaluate window stickers.	Cognitive	Evaluation
Conduct a vehicle inspection.	Psychomotor	Manipulation
Propose the benefits of selling, trading in, or donating a used vehicle.	Affective	Valuing
Chapter 3. Automotive Expenses		
Explain how car payments are calculated.	Cognitive	Synthesis
Describe insurance coverage levels.	Cognitive	Evaluation
Propose when it may be beneficial to have additional insurance.	Affective	Valuing
Calculate monthly expenses on a given vehicle.	Cognitive	Application
Explain depreciation.	Cognitive	Comprehension
Differentiate between maintenance and repairs.	Cognitive	Analysis
Chapter 4. Repair Facilities		
Describe how technicians can become certified.	Cognitive	Knowledge
Communicate effectively with a technician or service writer.	Affective	Responding
Interpret a work order/repair invoice.	Cognitive	Evaluation
Demonstrate use of the three C's (concern, cause, and correction).	Psychomotor	Imitation
List and describe different types of facilities.	Cognitive	Knowledge
Conduct research to locate a quality repair facility.	Psychomotor	Manipulation
Characterize business ethics.	Affective	Characterization
Summarize differences between warranty types.	Cognitive	Evaluation