

**Florida Department of Education
CURRICULUM FRAMEWORK**

Program Title: Major Appliance and Refrigeration Repair
Occupational Area: Industrial Education
 (See Residential Appliance for secondary 1 through 6.
 Major for 7 through 10.)

	<u>Secondary</u>	<u>PSAV</u>
Program Numbers	8706000	I470106
CIP Number	0647.010601	0647.010601
Grade Level	9-12, 30, 31	30, 31
Length	10 Credits	1500 Hours
Certification	APPLI REPR @7 G GAS FITTER @7 G	APPLI REPR @7 G GAS FITTER @7 G

- I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as electric home appliance technicians (85711656), electrical appliance servicers (827.261-010), or appliance service representatives (827.261-010).

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, electrical and refrigeration skills, analyzing, diagnosing and repairing washers, dryers, dishwashers, trash compactors, ranges, refrigerators, freezers, microwave ovens, and window air conditioners.

8706010 - Residential Appliance and Refrig. Repair	1 (150)	
8706020 - Residential Appliance and Refrig. Repair	2 (150)	[300] OCP A
8706030 - Residential Appliance and Refrig. Repair	3 (150)	
8706040 - Residential Appliance and Refrig. Repair	4 (150)	[300] OCP B
8706050 - Residential Appliance and Refrig. Repair	5 (150)	
8706060 - Residential Appliance and Refrig. Repair	6 (150)	
8706070 - Major Appliance and Refrig Repair	7 (150)	[450] OCP C
8706080 - Major Appliance and Refrig Repair	8 (150)	
8706090 - Major Appliance and Refrig Repair	9 (150)	
8706100 - Major Appliance and Refrig Repair	10 (150)	[450] OCP D

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Major Appliance & Refrigeration industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

- II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in fundamentals of electricity and refrigeration, identifying, analyzing, and diagnosing gas and electric appliance system problems, disassembling and reassembling appliances, and servicing appliances.
- III. **SPECIAL NOTE:** SkillsUSA-VICA, Inc. is the appropriate Career and Technical Student Organization (CTSO) for providing leadership training and for reinforcing specific career and technical skills. Career and Technical Student Organizations, when provided, shall be an integral part of the career and technical instructional program, and the

activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.145, FAC.

Cooperative training - OJT is appropriate for this program. Whenever cooperative training - OJT is offered, the following are required for each student: a training plan, signed by the student, teacher, and employer, which includes instructional objectives and a list of on-the-job and in-school learning experiences; a workstation that reflects equipment, skills and tasks that are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for adult vocational students to complete this program are: Mathematics 9.0, Language 9.0, Reading 9.0. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently through Vocational Preparatory Instruction (VPI). Please refer to the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified on an individual basis. The job or jobs for which the student is being trained should be reflected in the student's desired postschool outcome statement on the Transition Individual Educational Plan (Transition IEP).

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The standard length of this program is 1500 hours.

- IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE - A

APPLIANCE HELPER (CORE) 300 Hours

RESIDENTIAL APPLIANCE AND REFRIGERATION REPAIR 1

- 01.0 Apply proper laboratory practices.
- 02.0 Apply electrical fundamentals.
- 03.0 Apply gas fundamentals.

RESIDENTIAL APPLIANCE AND REFRIGERATION REPAIR 2

- 04.0 Demonstrate appropriate communication skills.
- 05.0 Demonstrate appropriate math skills.
- 06.0 Demonstrate appropriate understanding of basic science.
- 07.0 Demonstrate employability skills.

08.0 Demonstrate an understanding of entrepreneurship.

OCCUPATIONAL COMPLETION POINT - DATA CODE - B

LAUNDRY TECHNICIAN 300 Hours

RESIDENTIAL APPLIANCE AND REFRIGERATION REPAIR 3 - (10.01-10.16)

09.0 Install, troubleshoot and repair electric clothes dryers.

RESIDENTIAL APPLIANCE AND REFRIGERATION REPAIR 4 - (10.17-10.35)

10.0 Install, troubleshoot and repair gas clothes dryers.

11.0 Install, troubleshoot and repair clothes washers.

OCCUPATIONAL COMPLETION POINT - DATA CODE - C

KITCHEN TECHNICIAN 450 Hours

RESIDENTIAL APPLIANCE AND REFRIGERATION REPAIR 5

12.0 Install, troubleshoot and repair electric ranges.

RESIDENTIAL APPLIANCE AND REFRIGERATION REPAIR 6

13.0 Install, troubleshoot and repair microwave ovens.

14.0 Install, troubleshoot and repair gas ranges.

MAJOR APPLIANCE AND REFRIGERATION REPAIR 7

15.0 Install, troubleshoot and repair dishwashers.

OCCUPATIONAL COMPLETION POINT - DATA CODE - D

REFRIGERATION TECHNICIAN 450 Hours

MAJOR APPLIANCE AND REFRIGERATION REPAIR 8

16.0 Utilize fundamentals of refrigeration.

17.0 Work with tubing and fittings.

MAJOR APPLIANCE AND REFRIGERATION REPAIR 9

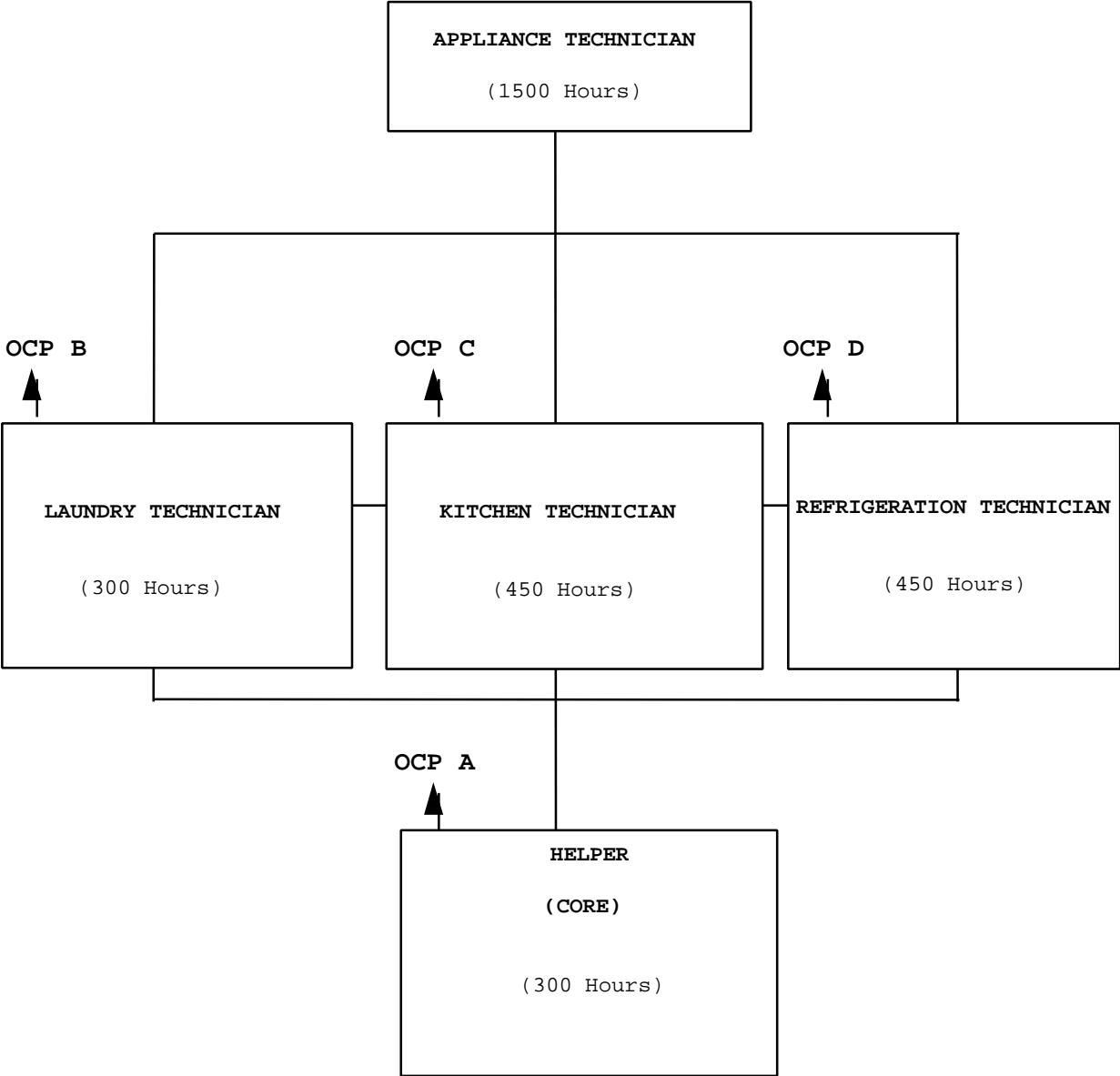
18.0 Install, troubleshoot and repair refrigerators, icemakers and freezers.

MAJOR APPLIANCE AND REFRIGERATION REPAIR 10

19.0 Install, troubleshoot and repair window air conditioners.

The following diagram illustrates the program structure:

MAJOR APPLIANCE AND REFRIGERATION TECHNOLOGY



**Florida Department of Education
INTENDED OUTCOMES**

Program Title: Major Appliance and Refrigeration Repair

	<u>PSAV</u>
Program Numbers	I470106
CIP Number	0647.010601
Grade Level	30, 31
Length	1500 Hours
Certification	APPLI REPR @7 G GAS FITTER @7 G

OCCUPATIONAL COMPLETION POINT - DATA CODE - A
APPLIANCE HELPER (CORE) 300 Hours

- 01.0 APPLY PROPER LABORATORY PRACTICES--The student will be able to:
- 01.01 Use industry accepted safety practices.
 - 01.02 Explain appropriate first aid for electrical shock and potential shop accidents.
 - 01.03 Perform appropriate record keeping functions.
 - 01.04 Explain and demonstrate the proper use and care of hand tools.
 - 01.05 Explain and demonstrate the proper use and care of meters and test equipment.
 - 01.06 Explain and demonstrate the proper use and care of power tools.
- 02.0 APPLY ELECTRICAL FUNDAMENTALS--The student will be able to:
- 02.01 Explain electron theory.
 - 02.02 Identify circuits from schematics and diagrams using commonly accepted symbols.
 - 02.03 Explain Ohm's Law.
 - 02.04 Measure resistance.
 - 02.05 Measure voltage.
 - 02.06 Measure amperage.
 - 02.07 Measure wattage.
 - 02.08 Explain and construct series circuits.
 - 02.09 Explain and construct parallel circuits.
 - 02.10 Explain and construct combination circuits.
 - 02.11 Explain inductance and magnetism and their relationship to electric motors.
 - 02.12 Describe how electric motors function.
 - 02.13 Explain the function of capacitors and how to troubleshoot them.
 - 02.14 Explain the function of relay and switches and how to troubleshoot them.
 - 02.15 Explain the function of capacitors and transformers in major appliances.
 - 02.16 Explain the concept and rationale of motor protection.
 - 02.17 Describe how a compressor functions.
- 03.0 APPLY GAS FUNDAMENTALS--The student will be able to:
- 03.01 Explain common use terms.
 - 03.02 Explain different types of gas.
 - 03.03 Explain specific gravity.
 - 03.04 Diagram and explain basic components of a gas burner.
 - 03.05 Explain requirements for burning.

- 03.06 Perform pressure tests on gas systems.
- 04.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:
- 04.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
 - 04.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
 - 04.03 Read and follow written and oral instructions.
 - 04.04 Answer and ask questions coherently and concisely.
 - 04.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
 - 04.06 Demonstrate appropriate telephone/communication skills.
- 05.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:
- 05.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
 - 05.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
 - 05.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
 - 05.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
 - 05.05 Demonstrate an understanding of federal, state and local taxes and their computation.
- 06.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:
- 06.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
 - 06.02 Draw conclusions or make inferences from data.
 - 06.03 Identify health-related problems, which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
 - 06.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
- 07.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:
- 07.01 Conduct a job search.
 - 07.02 Secure information about a job.
 - 18.03 Identify documents, which may be required when applying for a job interview.
 - 07.04 Complete a job application form correctly.
 - 07.05 Demonstrate competence in job interview techniques.
 - 07.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
 - 07.07 Identify acceptable work habits.
 - 07.08 Demonstrate knowledge of how to make job changes appropriately.
 - 07.09 Demonstrate acceptable employee health habits.
 - 07.10 Demonstrate knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

08.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 08.01 Define entrepreneurship.
- 08.02 Describe the importance of entrepreneurship to the American economy.
- 08.03 List the advantages and disadvantages of business ownership.
- 08.04 Identify the risks involved in ownership of a business.
- 08.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 08.06 Identify the business skills needed to operate a small business efficiently and effectively.

OCCUPATIONAL COMPLETION POINT - DATA CODE - B

LAUNDRY TECHNICIAN 300 Hours

09.0 INSTALL, TROUBLESHOOT, AND REPAIR ELECTRIC CLOTHES DRYER--The student will be able to:

- 09.01 Install an electric dryer.
- 09.02 Identify components and their function.
- 09.03 Troubleshoot timers and components.
- 09.04 Remove and replace timer or component.
- 09.05 Troubleshoot drive motors and components.
- 09.06 Remove and replace drive motor or component.
- 09.07 Troubleshoot heating elements and components.
- 09.08 Remove and replace element or component.
- 09.09 Remove and replace thermostats.
- 09.10 Troubleshoot thermostats.
- 09.11 Troubleshoot bearings and components.
- 09.12 Remove and replace bearing or component.
- 09.13 Troubleshoot belts and pulleys.
- 09.14 Remove and replace belt or pulley.
- 09.15 Troubleshoot rollers and glides.
- 09.16 Remove and replace roller or glides.
- 09.17 Troubleshoot filters.
- 09.18 Remove and replace filter.
- 09.19 Troubleshoot seals.
- 09.20 Remove and replace seals.
- 09.21 Troubleshoot push-to-start switch.
- 09.22 Remove and replace push-to-start switch.
- 09.23 Troubleshoot door switches.
- 09.24 Remove and replace door switches.
- 09.25 Troubleshoot selector switches.
- 09.26 Remove and replace selector switches.
- 09.27 Remove and replace sensor and electronic control.
- 09.28 Troubleshoot sensor and electronic control.
- 09.29 Perform operational check.
- 09.30 Instruct consumer on use and care.

10.0 INSTALL, TROUBLESHOOT AND REPAIR GAS CLOTHES DRYERS--The student will be able to:

- 10.01 Install a gas dryer.
- 10.02 Identify components and their function.
- 10.03 Read and interpret schematics and diagrams.
- 10.04 Troubleshoot electric ignition components.

- 10.05 Remove and replace electric ignition components.
- 10.06 Troubleshoot timers and electronic controls and components.
- 10.07 Remove and replace timer electronic control or component.
- 10.08 Troubleshoot drive motors.
- 10.09 Remove and replace drive motor.
- 10.10 Troubleshoot gas burner.
- 10.11 Remove and replace gas burner.
- 10.12 Troubleshoot thermostats.
- 10.13 Remove and replace thermostat.
- 10.14 Troubleshoot gas valves.
- 10.15 Remove and replace gas valve.
- 10.16 Troubleshoot thermocouples.
- 10.17 Remove and replace thermocouple.
- 10.18 Troubleshoot flame switch.
- 10.19 Remove and replace flame switch.
- 10.20 Troubleshoot bearing assemblies and components.
- 10.21 Remove and replace bearing or component.
- 10.22 Troubleshoot belts and pulleys.
- 10.23 Remove and replace belt or pulley.
- 10.24 Troubleshoot rollers and glides.
- 10.25 Remove and replace roller or glide.
- 10.26 Troubleshoot seals.
- 10.27 Remove and replace seals.
- 10.28 Troubleshoot door switches.
- 10.29 Remove and replace door switch.
- 10.30 Troubleshoot selector switches.
- 10.31 Remove and replace selector switch.
- 10.32 Troubleshoot motor switches.
- 10.33 Remove and replace motor switch.
- 10.34 Perform operational check.
- 10.35 Instruct consumer on use and care.

11.0 INSTALL, TROUBLESHOOT AND REPAIR CLOTHES WASHERS--The student will be able to:

- 11.01 Install a clothes washer.
- 11.02 Identify components and their function.
- 11.03 Read and interpret schematics and diagrams.
- 11.04 Troubleshoot timers and components.
- 11.05 Remove and replace timer or component.
- 11.06 Troubleshoot selector switches.
- 11.07 Remove and replace selector switch.
- 11.08 Troubleshoot water level switches and components.
- 11.09 Remove and replace water level switch or component.
- 11.10 Troubleshoot water inlet valves and components.
- 11.11 Remove and replace water inlet valve or component.
- 11.12 Troubleshoot hoses.
- 11.13 Remove and replace hoses.
- 11.14 Troubleshoot water pumps and components.
- 11.15 Remove and replace water pump or component.
- 11.16 Troubleshoot filters.
- 11.17 Remove and replace filter.
- 11.18 Troubleshoot drive motors and components.
- 11.19 Remove and replace drive motor or component.
- 11.20 Troubleshoot belts and pulleys.
- 11.21 Remove and replace belt or pulley.
- 11.22 Troubleshoot transmissions and components.
- 11.23 Remove and replace transmission or component.
- 11.24 Troubleshoot bearings.
- 11.25 Remove and replace bearings.

- 11.26 Troubleshoot water and oil seals.
- 11.27 Remove and replace water and oil seals.
- 11.28 Troubleshoot clutches.
- 11.29 Remove and replace clutch.
- 11.30 Troubleshoot brakes.
- 11.31 Remove and replace brake.
- 11.32 Troubleshoot lid switches and components.
- 11.33 Remove and replace lid switch or component.
- 11.34 Perform operational check.
- 11.35 Instruct consumer on use and care.

OCCUPATIONAL COMPLETION POINT - DATA CODE - C

KITCHEN TECHNICIAN 450 Hours

12.0 INSTALL, TROUBLESHOOT, AND REPAIR ELECTRIC RANGES--The student will be able to:

- 12.01 Install an electric range.
- 12.02 Describe the operation and application of components.
- 12.03 Read and interpret schematics and diagrams.
- 12.04 Troubleshoot clocks/timers.
- 12.05 Remove and replace clocks/timers.
- 12.06 Troubleshoot surface unit switches and components.
- 12.07 Remove and replace surface switches or components.
- 12.08 Troubleshoot oven thermostats and components.
- 12.09 Remove and replace oven thermostats or components.
- 12.10 Troubleshoot oven selector switches and components.
- 12.11 Remove and replace oven selector switches or components.
- 12.12 Troubleshoot surface units and components.
- 12.13 Remove and replace surface units or components.
- 12.14 Troubleshoot bake and broil elements.
- 12.15 Remove and replace bake and broil elements.
- 12.16 Troubleshoot electronic controls.
- 12.17 Remove and replace electronic controls.
- 12.18 Troubleshoot time delay relays.
- 12.19 Remove and replace time delay relay.
- 12.20 Troubleshoot oven sensors and components.
- 12.21 Remove and replace oven sensor or component.
- 12.22 Troubleshoot door locks and components.
- 12.23 Remove and replace door lock or component.
- 12.24 Troubleshoot fans.
- 12.25 Remove and replace fan.
- 12.26 Troubleshoot gaskets and seals.
- 12.27 Remove and replace gasket or seals.
- 12.28 Perform operational check.
- 12.29 Instruct consumer on use and care.

13.0 INSTALL, TROUBLESHOOT, AND REPAIR MICROWAVE OVENS--The student will be able to:

- 13.01 Install a microwave oven.
- 13.02 Describe the operation and application of components.
- 13.03 Read and interpret schematics and diagrams.
- 13.04 Troubleshoot clocks/timers/electronic controls.
- 13.05 Remove and replace clocks/timers/electronic controls.
- 13.06 Troubleshoot door switches.
- 13.07 Remove and replace door switches.
- 13.08 Troubleshoot relays.
- 13.09 Remove and replace relays.

- 13.10 Troubleshoot thermal protectors.
- 13.11 Remove and replace thermal protectors.
- 13.12 Troubleshoot the power transformer.
- 13.13 Remove and replace the power transformer.
- 13.14 Troubleshoot the high voltage diode.
- 13.15 Remove and replace the high voltage diode.
- 13.16 Troubleshoot the capacitor.
- 13.17 Remove and replace the capacitor.
- 13.18 Troubleshoot the magnetron.
- 13.19 Remove and replace the magnetron.
- 13.20 Troubleshoot the fan.
- 13.21 Remove and replace the fan.
- 13.22 Troubleshoot the stirrer blade and motor.
- 13.23 Remove and replace the stirrer blade and motor.
- 13.24 Troubleshoot the turntable motor.
- 13.25 Remove and replace the turntable motor.
- 13.26 Perform operational check.
- 13.27 Instruct consumer on use and care.

14.0 INSTALL, TROUBLESHOOT, AND REPAIR GAS RANGES--The student will be able to:

- 14.01 Install a gas range.
- 14.02 Identify components and their function.
- 14.03 Read and interpret schematics and diagrams.
- 14.04 Troubleshoot clocks/timers/electronic controls.
- 14.05 Remove and replace clocks/timers/electronic controls.
- 14.06 Troubleshoot oven thermostats.
- 14.07 Remove and replace oven thermostats.
- 14.08 Troubleshoot oven selector switches.
- 14.09 Remove and replace oven selector switches.
- 14.10 Troubleshoot self-clean relays.
- 14.11 Remove and replace self-clean relays.
- 14.12 Troubleshoot oven sensors.
- 14.13 Remove and replace oven sensor.
- 14.14 Troubleshoot door locks.
- 14.15 Remove and replace door lock.
- 14.16 Troubleshoot fans.
- 14.17 Remove and replace fan.
- 14.18 Troubleshoot gas valves for surface burners.
- 14.19 Remove and replace gas valve for surface burner.
- 14.20 Troubleshoot gas valve for oven.
- 14.21 Remove and replace gas valve for oven.
- 14.22 Troubleshoot electric igniters.
- 14.23 Remove and replace electric igniter.
- 14.24 Troubleshoot safety valves.
- 14.25 Remove and replace safety valve.
- 14.26 Troubleshoot pressure regulators.
- 14.27 Remove and replace pressure regulator.
- 14.28 Troubleshoot door seals/gaskets.
- 14.29 Remove and replace door seal/gasket.
- 14.30 Perform operational check.
- 14.31 Instruct consumer on use and care.

15.0 INSTALL, TROUBLESHOOT, AND REPAIR DISHWASHERS--The student will be able to:

- 15.01 Install a dishwasher.
- 15.02 Identify components and their function.
- 15.03 Read and interpret schematics and diagrams.

- 15.04 Troubleshoot timers and electronic control or components.
- 15.05 Remove and replace timer and electronic control or component.
- 15.06 Troubleshoot selector switches.
- 15.07 Remove and replace selector switch.
- 15.08 Troubleshoot float switches.
- 15.09 Remove and replace float switch.
- 15.10 Troubleshoot door switches.
- 15.11 Remove and replace door switch.
- 15.12 Troubleshoot motors and components.
- 15.13 Remove and replace motor and component.
- 15.14 Troubleshoot heating elements.
- 15.15 Remove and replace heating element.
- 15.16 Troubleshoot relays.
- 15.17 Remove and replace relay.
- 15.18 Troubleshoot water valves and components.
- 15.19 Remove and replace water valve or component.
- 15.20 Troubleshoot hoses.
- 15.21 Remove and replace hoses.
- 15.22 Troubleshoot pumps and components.
- 15.23 Remove and replace pump or component.
- 15.24 Troubleshoot seals.
- 15.25 Remove and replace seals.
- 15.26 Troubleshoot dispensers and components.
- 15.27 Remove and replace dispenser or component.
- 15.28 Troubleshoot spray arms.
- 15.29 Remove and replace spray arm.
- 15.30 Troubleshoot blower motors.
- 15.31 Remove and replace blower motor.
- 15.32 Troubleshoot thermostats.
- 15.33 Remove and replace thermostat.
- 15.34 Perform operational check.
- 15.35 Instruct consumer on use and care.

OCCUPATIONAL COMPLETION POINT - DATA CODE - D

REFRIGERATION TECHNICIAN 450 Hours

16.0 UTILIZE THE FUNDAMENTALS OF REFRIGERATION--The student will be able to:

- 16.01 Explain commonly used terms.
- 16.02 Perform heat transfer, measuring and temperature conversions.
- 16.03 Perform pressure measuring and conversion calculations.
- 16.04 Explain the concept of state of matter.
- 16.05 Explain the differences in refrigerants and their uses.
- 16.06 Diagram and explain the functions of the components of basic refrigeration systems.
- 16.07 Identify purpose and importance of CFC recover/recycling.
- 16.08 Identify operation of recovery system components.
- 16.09 Recover and recycle refrigerants.

17.0 WORK WITH TUBING AND FITTINGS--The student will be able to:

- 17.01 Identify types and uses of solders and brazing alloys.
- 17.02 Identify types and sizes of tubing and fittings.
- 17.03 Measure, cut, flare, swage and bend tubing.
- 17.04 Soft solder with acetylene.
- 17.05 Braze with acetylene and oxyacetylene.
- 17.06 Fabricate replacement sections of tubing for appliances.

18.0 INSTALL, TROUBLESHOOT, AND REPAIR REFRIGERATION ICEMAKERS AND FREEZERS--

The student will be able to:

- 18.01 Install a refrigerator and a freezer.
- 18.02 Identify components and their functions.
- 18.03 Read and interpret schematics and diagrams.
- 18.04 Troubleshoot gaskets and seals.
- 18.05 Remove and replace gaskets and seals.
- 18.06 Troubleshoot light and fan switches.
- 18.07 Remove and replace light and fan switches.
- 18.08 Troubleshoot fans.
- 18.09 Remove and replace fans.
- 18.10 Troubleshoot the defrost timer.
- 18.11 Remove and replace the defrost timer.
- 18.12 Troubleshoot the defrost thermostat.
- 18.13 Remove and replace the defrost thermostat.
- 18.14 Troubleshoot the defrost heater.
- 18.15 Remove and replace the defrost heater.
- 18.16 Troubleshoot the cold control.
- 18.17 Remove and replace cold control.
- 18.18 Troubleshoot icemakers.
- 18.19 Remove and repair icemakers.
- 18.20 Use test equipment to determine operating conditions of a refrigeration system.
- 18.21 Troubleshoot refrigeration system.
- 18.22 Remove and replace compressors.
- 18.23 Remove and replace condensers, evaporators, metering devices and dryers.
- 18.24 Perform operational check.
- 18.25 Instruct consumers on use and care.

19.0 INSTALL, TROUBLESHOOT, AND REPAIR WINDOW AIR CONDITIONERS--The student will be able to:

- 19.01 Install a window air conditioner.
- 19.02 Identify components and their functions.
- 19.03 Read and interpret schematics and diagrams.
- 19.04 Troubleshoot selector switches.
- 19.05 Remove and replace selector switches.
- 19.06 Troubleshoot the thermostats.
- 19.07 Remove and replace the thermostats.
- 19.08 Troubleshoot capacitors.
- 19.09 Remove and replace capacitors.
- 19.10 Troubleshoot the fan motor.
- 19.11 Remove and replace the fan motor.
- 19.12 Troubleshoot the heater.
- 19.13 Remove and replace the heater.
- 19.14 Troubleshoot the deicer.
- 19.15 Remove and replace the deicer.
- 19.16 Troubleshoot the reversing valve.
- 19.17 Remove and replace the reversing valve.
- 19.18 Troubleshoot the compressor.
- 19.19 Remove and replace the compressor.
- 19.20 Use test equipment to determine operating conditions of refrigeration systems.
- 19.21 Perform operational check.
- 19.22 Instruct consumer on use and care.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Residential Appliance and Refrigeration Repair 1
Course Number: 8706010
Course Credit: 1

01.0 APPLY PROPER LABORATORY PRACTICES--The student will be able to:

- 01.01 Use industry accepted safety practices.
- 01.02 Explain appropriate first aid for electrical shock and potential shop accidents.
- 01.03 Perform appropriate record keeping functions.
- 01.04 Explain and demonstrate the proper use and care of hand tools.
- 01.05 Explain and demonstrate the proper use and care of meters and test equipment.
- 01.06 Explain and demonstrate the proper use and care of power tools.

02.0 APPLY ELECTRICAL FUNDAMENTALS--The student will be able to:

- 02.01 Explain electron theory.
- 02.02 Identify circuits from schematics and diagrams using commonly accepted symbols.
- 02.03 Explain Ohm's Law.
- 02.04 Measure resistance.
- 02.05 Measure voltage.
- 02.06 Measure amperage.
- 02.07 Measure wattage.
- 02.08 Explain and construct series circuits.
- 02.09 Explain and construct parallel circuits.
- 02.10 Explain and construct combination circuits.
- 02.11 Explain inductance and magnetism and their relationship to electric motors.
- 02.12 Describe how electric motors function.
- 02.13 Explain the function of capacitors and how to troubleshoot them.
- 02.14 Relays and switches. Explain the function of relay and switches and how to troubleshoot them.
- 02.15 Explain the function of capacitors and transformers in major appliances.
- 02.16 Explain the concept and rationale of motor protection.
- 02.17 Describe how a compressor functions.

03.0 APPLY GAS FUNDAMENTALS--The student will be able to:

- 03.01 Explain common use terms.
- 03.02 Explain different types of gas.
- 03.03 Explain specific gravity.
- 03.04 Diagram and explain basic components of a gas burner.
- 03.05 Explain requirements for burning.
- 03.06 Perform pressure tests on gas systems.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Residential Appliance and Refrigeration Repair 2
Secondary Number: 8706020
Course Credit: 1

- 04.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:
- 04.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
 - 04.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
 - 04.03 Read and follow written and oral instructions.
 - 04.04 Answer and ask questions coherently and concisely.
 - 04.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
 - 04.06 Demonstrate appropriate telephone/communication skills.
- 05.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:
- 05.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
 - 05.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
 - 05.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
 - 05.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
 - 05.05 Demonstrate an understanding of federal, state and local taxes and their computation.
- 06.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:
- 06.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
 - 06.02 Draw conclusions or make inferences from data.
 - 06.03 Identify health-related problems, which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
 - 06.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.
- 07.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:
- 07.01 Conduct a job search.
 - 07.02 Secure information about a job.
 - 07.03 Identify documents, which may be required when applying for a job interview.
 - 07.04 Complete a job application form correctly.
 - 07.05 Demonstrate competence in job interview techniques.
 - 07.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
 - 07.07 Identify acceptable work habits.
 - 07.08 Demonstrate knowledge of how to make job changes appropriately.

- 07.09 Demonstrate acceptable employee health habits.
- 07.10 Demonstrate knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

08.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 08.01 Define entrepreneurship.
- 08.02 Describe the importance of entrepreneurship to the American economy.
- 08.03 List the advantages and disadvantages of business ownership.
- 08.04 Identify the risks involved in ownership of a business.
- 08.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 08.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Residential Appliance and Refrigeration Repair 3
Secondary Number: 8706030
Course Credit: 1

09.0 INSTALL, TROUBLESHOOT, AND REPAIR ELECTRIC CLOTHES DRYER--The student will be able to:

- 09.01 Install an electric dryer.
- 09.02 Identify components and their function.
- 09.03 Troubleshoot timers and components.
- 09.04 Remove and replace timer or component.
- 09.05 Troubleshoot drive motors and components.
- 09.06 Remove and replace drive motor or component.
- 09.07 Troubleshoot heating elements and components.
- 09.08 Remove and replace element or component.
- 09.09 Remove and replace thermostats.
- 09.10 Troubleshoot thermostats.
- 09.11 Troubleshoot bearings and components.
- 09.12 Remove and replace bearing or component.
- 09.13 Troubleshoot belts and pulleys.
- 09.14 Remove and replace belt or pulley.
- 09.15 Troubleshoot rollers and glides.
- 09.16 Remove and replace roller or glides.
- 09.17 Troubleshoot filters.
- 09.18 Remove and replace filter.
- 09.19 Troubleshoot seals.
- 09.20 Remove and replace seals.
- 09.21 Troubleshoot push-to-start switch.
- 09.22 Remove and replace push-to-start switch.
- 09.23 Troubleshoot door switches.
- 09.24 Remove and replace door switches.
- 09.25 Troubleshoot selector switches.
- 09.26 Remove and replace selector switches.
- 09.27 Remove and replace sensor and electronic control.
- 09.28 Troubleshoot sensor and electronic control.
- 09.29 Perform operational check.
- 09.30 Instruct consumer on use and care.

10.0 INSTALL, TROUBLESHOOT AND REPAIR GAS CLOTHES DRYERS--The student will be able to:

- 10.01 Install a gas dryer.
- 10.02 Identify components and their function.
- 10.03 Read and interpret schematics and diagrams.
- 10.04 Troubleshoot electric ignition components.
- 10.05 Remove and replace electric ignition components.
- 10.06 Troubleshoot timers and electronic controls and components.
- 10.07 Remove and replace timer electronic control or component.
- 10.08 Troubleshoot drive motors.
- 10.09 Remove and replace drive motor.
- 10.10 Troubleshoot gas burner.
- 10.11 Remove and replace gas burner.
- 10.12 Troubleshoot thermostats.
- 10.13 Remove and replace thermostat.
- 10.14 Troubleshoot gas valves.

- 10.15 Remove and replace gas valve.
- 10.16 Troubleshoot thermocouples.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Residential Appliance and Refrigeration Repair 4
Secondary Number: 8706040
Course Credit: 1

10.0 INSTALL, TROUBLESHOOT AND REPAIR GAS CLOTHES DRYERS--The student will be able to:

- 10.17 Remove and replace thermocouple.
- 10.18 Troubleshoot flame switch.
- 10.19 Remove and replace flame switch.
- 10.20 Troubleshoot bearing assemblies and components.
- 10.21 Remove and replace bearing or component.
- 10.22 Troubleshoot belts and pulleys.
- 10.23 Remove and replace belt or pulley.
- 10.24 Troubleshoot rollers and glides.
- 10.25 Remove and replace roller or glide.
- 10.26 Troubleshoot seals.
- 10.27 Remove and replace seals.
- 10.28 Troubleshoot door switches.
- 10.29 Remove and replace door switch.
- 10.30 Troubleshoot selector switches.
- 10.31 Remove and replace selector switch.
- 10.32 Troubleshoot motor switches.
- 10.33 Remove and replace motor switch.
- 10.34 Perform operational check.
- 10.35 Instruct consumer on use and care.

11.0 INSTALL, TROUBLESHOOT AND REPAIR CLOTHES WASHERS--The student will be able to:

- 11.01 Install a clothes washer.
- 11.02 Identify components and their function.
- 11.03 Read and interpret schematics and diagrams.
- 11.04 Troubleshoot timers and components.
- 11.05 Remove and replace timer or component.
- 11.06 Troubleshoot selector switches.
- 11.07 Remove and replace selector switch.
- 11.08 Troubleshoot water level switches and components.
- 11.09 Remove and replace water level switch or component.
- 11.10 Troubleshoot water inlet valves and components.
- 11.11 Remove and replace water inlet valve or component.
- 11.12 Troubleshoot hoses.
- 11.13 Remove and replace hoses.
- 11.14 Troubleshoot water pumps and components.
- 11.15 Remove and replace water pump or component.
- 11.16 Troubleshoot filters.
- 11.17 Remove and replace filter.
- 11.18 Troubleshoot drive motors and components.
- 11.19 Remove and replace drive motor or component.
- 11.20 Troubleshoot belts and pulleys.
- 11.21 Remove and replace belt or pulley.
- 11.22 Troubleshoot transmissions and components.
- 11.23 Remove and replace transmission or component.
- 11.24 Troubleshoot bearings.
- 11.25 Remove and replace bearings.

- 11.26 Troubleshoot water and oil seals.
- 11.27 Remove and replace water and oil seals.
- 11.28 Troubleshoot clutches.
- 11.29 Remove and replace clutch.
- 11.30 Troubleshoot brakes.
- 11.31 Remove and replace brake.
- 11.32 Troubleshoot lid switches and components.
- 11.33 Remove and replace lid switch or component.
- 11.34 Perform operational check.
- 11.35 Instruct consumer on use and care.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Residential Appliance and Refrigeration Repair 5
Secondary Number: 8706050
Course Credit: 1

12.0 INSTALL, TROUBLESHOOT, AND REPAIR ELECTRIC RANGES--The student will be able to:

- 12.01 Install an electric range.
- 12.02 Describe the operation and application of components.
- 12.03 Read and interpret schematics and diagrams.
- 12.04 Troubleshoot clocks/timers.
- 12.05 Remove and replace clocks/timers.
- 12.06 Troubleshoot surface unit switches and components.
- 12.07 Remove and replace surface switches or components.
- 12.08 Troubleshoot oven thermostats and components.
- 12.09 Remove and replace oven thermostats or components.
- 12.10 Troubleshoot oven selector switches and components.
- 12.11 Remove and replace oven selector switches or components.
- 12.12 Troubleshoot surface units and components.
- 12.13 Remove and replace surface units or components.
- 12.14 Troubleshoot bake and broil elements.
- 12.15 Remove and replace bake and broil elements.
- 12.16 Troubleshoot electronic controls.
- 12.17 Remove and replace electronic controls.
- 12.18 Troubleshoot time delay relays.
- 12.19 Remove and replace time delay relay.
- 12.20 Troubleshoot oven sensors and components.
- 12.21 Remove and replace oven sensor or component.
- 12.22 Troubleshoot door locks and components.
- 12.23 Remove and replace door lock or component.
- 12.24 Troubleshoot fans.
- 12.25 Remove and replace fan.
- 12.26 Troubleshoot gaskets and seals.
- 12.27 Remove and replace gasket or seals.
- 12.28 Perform operational check.
- 12.29 Instruct consumer on use and care.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Residential Appliance and Refrigeration Repair 6
Course Number: 8706060
Course Credit: 1

13.0 INSTALL, TROUBLESHOOT, AND REPAIR MICROWAVE OVENS--The student will be able to:

- 13.01 Install a microwave oven.
- 13.02 Describe the operation and application of components.
- 13.03 Read and interpret schematics and diagrams.
- 13.04 Troubleshoot clocks/timers/electronic controls.
- 13.05 Remove and replace clocks/timers/electronic controls.
- 13.06 Troubleshoot door switches.
- 13.07 Remove and replace door switches.
- 13.08 Troubleshoot relays.
- 13.09 Remove and replace relays.
- 13.10 Troubleshoot thermal protectors.
- 13.11 Remove and replace thermal protectors.
- 13.12 Troubleshoot the power transformer.
- 13.13 Remove and replace the power transformer.
- 13.14 Troubleshoot the high voltage diode.
- 13.15 Remove and replace the high voltage diode.
- 13.16 Troubleshoot the capacitor.
- 13.17 Remove and replace the capacitor.
- 13.18 Troubleshoot the magnetron.
- 13.19 Remove and replace the magnetron.
- 13.20 Troubleshoot the fan.
- 13.21 Remove and replace the fan.
- 13.22 Troubleshoot the stirrer blade and motor.
- 13.23 Remove and replace the stirrer blade and motor.
- 13.24 Troubleshoot the turntable motor.
- 13.25 Remove and replace the turntable motor.
- 13.26 Perform operational check.
- 13.27 Instruct consumer on use and care.

14.0 INSTALL, TROUBLESHOOT, AND REPAIR GAS RANGES--The student will be able to:

- 14.01 Install a gas range.
- 14.02 Identify components and their function.
- 14.03 Read and interpret schematics and diagrams.
- 14.04 Troubleshoot clocks/timers/electronic controls.
- 14.05 Remove and replace clocks/timers/electronic controls.
- 14.06 Troubleshoot oven thermostats.
- 14.07 Remove and replace oven thermostats.
- 14.08 Troubleshoot oven selector switches.
- 14.09 Remove and replace oven selector switches.
- 14.10 Troubleshoot self-clean relays.
- 14.11 Remove and replace self-clean relays.
- 14.12 Troubleshoot oven sensors.
- 14.13 Remove and replace oven sensor.
- 14.14 Troubleshoot door locks.
- 14.15 Remove and replace door lock.
- 14.16 Troubleshoot fans.
- 14.17 Remove and replace fan.
- 14.18 Troubleshoot gas valves for surface burners.
- 14.19 Remove and replace gas valve for surface burner.
- 14.20 Troubleshoot gas valve for oven.
- 14.21 Remove and replace gas valve for oven.
- 14.22 Troubleshoot electric igniters.
- 14.23 Remove and replace electric igniter.
- 14.24 Troubleshoot safety valves.
- 14.25 Remove and replace safety valve.
- 14.26 Troubleshoot pressure regulators.
- 14.27 Remove and replace pressure regulator.
- 14.28 Troubleshoot door seals/gaskets.
- 14.29 Remove and replace door seal/gasket.
- 14.30 Perform operational check.
- 14.31 Instruct consumer on use and care.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Major Appliance & Refrigeration Repair 7
Secondary Number: 8706070
Course Credit: 1

15.0 INSTALL, TROUBLESHOOT, AND REPAIR DISHWASHERS--The student will be able to:

- 15.01 Install a dishwasher.
- 15.02 Identify components and their function.
- 15.03 Read and interpret schematics and diagrams.
- 15.04 Troubleshoot timers and electronic control or components.
- 15.05 Remove and replace timer and electronic control or component.
- 15.06 Troubleshoot selector switches.
- 15.07 Remove and replace selector switch.
- 15.08 Troubleshoot float switches.
- 15.09 Remove and replace float switch.
- 15.10 Troubleshoot door switches.
- 15.11 Remove and replace door switch.
- 15.12 Troubleshoot motors and components.
- 15.13 Remove and replace motor and component.
- 15.14 Troubleshoot heating elements.
- 15.15 Remove and replace heating element.
- 15.16 Troubleshoot relays.
- 15.17 Remove and replace relay.
- 15.18 Troubleshoot water valves and components.
- 15.19 Remove and replace water valve or component.
- 15.20 Troubleshoot hoses.
- 15.21 Remove and replace hoses.
- 15.22 Troubleshoot pumps and components.
- 15.23 Remove and replace pump or component.
- 15.24 Troubleshoot seals.
- 15.25 Remove and replace seals.
- 15.26 Troubleshoot dispensers and components.
- 15.27 Remove and replace dispenser or component.
- 15.28 Troubleshoot spray arms.
- 15.29 Remove and replace spray arm.
- 15.30 Troubleshoot blower motors.
- 15.31 Remove and replace blower motor.
- 15.32 Troubleshoot thermostats.
- 15.33 Remove and replace thermostat.
- 15.34 Perform operational check.
- 15.35 Instruct consumer on use and care.

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STUDENT PERFORMANCE STANDARDS

Program Title: Major Appliance and Refrigeration Repair 8
Secondary Number: 8706080
Course Credit: 1

16.0 UTILIZE THE FUNDAMENTALS OF REFRIGERATION--The student will be able to:

- 16.01 Explain commonly used terms.
- 16.02 Perform heat transfer, measuring and temperature conversions.
- 16.03 Perform pressure measuring and conversion calculations.
- 16.04 Explain the concept of state of matter.
- 16.05 Explain the differences in refrigerants and their uses.
- 16.06 Diagram and explain the functions of the components of basic refrigeration systems.
- 16.07 Identify purpose and importance of CFC recover/recycling.
- 16.08 Identify operation of recovery system components.
- 16.09 Recover and recycle refrigerants.

17.0 WORK WITH TUBING AND FITTINGS--The student will be able to:

- 17.01 Identify types and uses of solders and brazing alloys.
- 17.02 Identify types and sizes of tubing and fittings.
- 17.03 Measure, cut, flare, swage and bend tubing.
- 17.04 Soft solder with acetylene.
- 17.05 Braze with acetylene and oxyacetylene.
- 17.06 Fabricate replacement sections of tubing for appliances.

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STUDENT PERFORMANCE STANDARDS

Program Title: Major Appliance Refrigeration and Repair 9
Secondary Number: 8706090
Course Credit: 1

18.0 INSTALL, TROUBLESHOOT, AND REPAIR REFRIGERATION ICEMAKERS AND FREEZERS--
The student will be able to:

- 18.01 Install a refrigerator and a freezer.
- 18.02 Identify components and their functions.
- 18.03 Read and interpret schematics and diagrams.
- 18.04 Troubleshoot gaskets and seals.
- 18.05 Remove and replace gaskets and seals.
- 18.06 Troubleshoot light and fan switches.
- 18.07 Remove and replace light and fan switches.
- 18.08 Troubleshoot fans.
- 18.09 Remove and replace fans.
- 18.10 Troubleshoot the defrost timer.
- 18.11 Remove and replace the defrost timer.
- 18.12 Troubleshoot the defrost thermostat.
- 18.13 Remove and replace the defrost thermostat.
- 18.14 Troubleshoot the defrost heater.
- 18.15 Remove and replace the defrost heater.
- 18.16 Troubleshoot the cold control.
- 18.17 Remove and replace cold control.
- 18.18 Troubleshoot icemakers.
- 18.19 Remove and repair icemakers.
- 18.20 Use test equipment to determine operating conditions of a refrigeration system.
- 18.21 Troubleshoot refrigeration system.
- 18.22 Remove and replace compressors.
- 18.23 Remove and replace condensers, evaporators, metering devices and dryers.
- 18.24 Perform operational check.
- 18.25 Instruct consumers on use and care.

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STUDENT PERFORMANCE STANDARDS

Program Title: Major Appliance and Refrigeration Repair 10
Secondary Number: 8706100
Course Credit: 1

19.0 INSTALL, TROUBLESHOOT, AND REPAIR WINDOW AIR CONDITIONERS--The student will be able to:

- 19.01 Install a window air conditioner.
- 19.02 Identify components and their functions.
- 19.03 Read and interpret schematics and diagrams.
- 19.04 Troubleshoot selector switches.
- 19.05 Remove and replace selector switches.
- 19.06 Troubleshoot the thermostats.
- 19.07 Remove and replace the thermostats.
- 19.08 Troubleshoot capacitors.
- 19.09 Remove and replace capacitors.
- 19.10 Troubleshoot the fan motor.
- 19.11 Remove and replace the fan motor.
- 19.12 Troubleshoot the heater.
- 19.13 Remove and replace the heater.
- 19.14 Troubleshoot the deicer.
- 19.15 Remove and replace the deicer.
- 19.16 Troubleshoot the reversing valve.
- 19.17 Remove and replace the reversing valve.
- 19.18 Troubleshoot the compressor.
- 19.19 Remove and replace the compressor.
- 19.20 Use test equipment to determine operating conditions of refrigeration systems.
- 19.21 Perform operational check.
- 19.22 Instruct consumer on use and care.