

Heating, Ventilation & Air Conditioning (HVAC) — Exploratory

Level I Unit Outline

**Unit 1: Agenda Book Review/Classroom Rules**

- Class discussion of student agenda book
- Discussion of classroom rules
- School safety protocols, district drills and emergency evacuations, behavior and meeting locations
- Review expectations and school policies for electronic devices

**Unit 2: Safety, First Aid, Personal Protective Equipment and Shop Attire**

- Identify, discuss, locate first aid and blood borne kits
- Identify, locate and demonstrate function and purpose of the Emergency Eye Station
- Identify, discuss, locate fire extinguisher
- Identify, distribute and discuss function and uses of protective eyewear, appropriate personal protective equipment (PPE) required in shop, and acceptable shop attire
- Identify, show location and discuss function and uses of the SDS (Safety Data Sheets) and how to interpret the information about paints and aerosols, content precautions, material labeling
- Equipment safety protocols
- Identify, demonstrate shop ventilation systems where applicable
- Identify locate and discuss function of shop flammable cabinet where applicable
- Discuss and demonstrate shop housekeeping of supplies, work stations and room maintenance
- Discuss and identify electrical safety considerations in the shop area
- Compile a safety section in the student shop notebook
- Identify, demonstrate air gauge function and operation where applicable
- Completion of online safety course and successful passing of safety test(s)

**Unit 3: Introduction to Heating, Ventilation, Air-conditioning Refrigeration**

- Jobs Available in the HVAC industry
  - Industry levels of work
    - Residential/Light commercial
    - Commercial
    - Industrial
- Safety and Procedures specific to the HVAC shop

**Unit 4: Tools and Supplies**

- Trade specific hand tools

- Trade specific manufacturing tools found in the shop
- Materials and supplies encountered within the allotted time

### **Unit 5: Introduction to Working with Copper Tubing**

- The students will learn and practice all the procedures listed below and complete a project at the end of the unit
  - Copper tubing types
  - Soldering
  - Brazing
  - Flaring
  - Swaging
  - Bending

### **Unit 6: Introduction to Basic Electrical Wiring**

- Students will learn and apply basic electrical wiring and complete a series of electrical projects on specialized training boards.
  - Basic electrical terminology
  - Applied basics to electrical wiring
  - Reading and drawing electrical schematics
  - Component sequencing

### **Unit 7: Introduction to Sheet Metal Fabrication**

- Students will learn how to use the basic hand tools and shop machines utilized in sheet metal fabrication. Students will construct a sheet metal project at the end of the unit.
  - Hand shears
  - Hand bending tools
  - Mechanical Foot shear
  - Sheet Metal Brake
  - Students will draw and use mechanical drawings

### **Unit 8: Air Qualities, Psychrometrics and Thermodynamic Concepts**

- As part of a complete introduction to HVAC the students get introduced to the following:
  - Total heat calculations
  - Air qualities
  - Types of heat
  - Type of heat transfer
  - Psychrometric chart
  - Pressure temperature chart

## **Unit 9: Career Exploration**

- Jobs available within the HVAC industry
- Establishing short- and long-term goals
- Introduction to resume and portfolio building

HVAC

New Jersey Student Learning Standards

NJ Learning Standards 9.3

<b>CONTENT AREA:</b>	<b>9.3 CAREER AND TECHNICAL EDUCATION</b>
<b>MANUFACTURING CAREER CLUSTER®</b>	
<b>Number</b>	<b>Standard Statement</b>
<i>By the end of Grade 12, Career and Technical Education Program completers will be able to:</i>	
<b>CAREER CLUSTER®:</b>	<b>MANUFACTURING (MN)</b>
<b>PATHWAY:</b>	<b>MAINTENANCE, INSTALLATION, &amp; REPAIR (MN-MIR)</b>
9.3.MN-MIR.1	Demonstrate maintenance skills and proficient operation of equipment to maximize manufacturing performance.
9.3.MN-MIR.2	Demonstrate the safe use of manufacturing equipment to ensure a safe and healthy environment.
9.3.MN-MIR.3	Diagnose equipment problems and effectively repair manufacturing equipment.
9.3.MN-MIR.4	Investigate and employ techniques to maximize manufacturing equipment performance.
9.3.MN-MIR.5	Implement a preventative maintenance schedule to maintain manufacturing equipment, tools and workstations.
9.3.MN-MIR.6	Implement an effective, predictive and preventive manufacturing equipment maintenance program.