

	<h2>Great Oaks Heating, Ventilating and Air Conditioning Essential Skills Profile</h2>
	<p>This profile provides an outline of the skills required for successful completion of this career program. Additional information is located on the Great Oaks website at <a href="http://hs.greatoaks.com/essential-skills-high-school-programs/">http://hs.greatoaks.com/essential-skills-high-school-programs/</a> and selecting the corresponding career program.</p>

### Recommended WorkKeys® Scores for Heating, Ventilating, and Air Conditioning

Applied Mathematics-4	Graphic Literacy-5
Workplace Documents-4	

\*Practice tests and more information at [www.act.org/workkeys](http://www.act.org/workkeys)

Essential Skills Needed to Successfully Complete the Program			
Rating Key:	Low = Slightly Essential	Medium = Essential	High = Very Essential

Key Vocational Factors		Rating
Visual Acuity	The ability to detect differences/details visually	Medium
Depth Perception	The ability to detect the physical distance/depth of objects in space and time	Medium
Oral Communication	The ability to express/explain ideas	High
Oral Expression	The ability to verbally explain and express self in an intelligible manner so others will understand	High
Written Communication	The ability to communicate in a written format and record information accurately	Medium
Physical Mobility/Strength	Extended standing, bending, stooping, use of ladders, working inside and outside, and working on roofs or at high levels above the ground or on ground level	Medium
Eye-hand Coordination	The ability to use tools	High
Auditory Acuity	The ability to detect differences in pitch and sound	Low
Safety Understanding	Able to comprehend hazards of working with tools, materials, equipment, and environmental conditions; able to wear personal protective equipment suitable for task	High

Worker Trait Skills		Rating
Ability to get along with others		Medium
Ability to work independently, without close supervision		High
Ability to work toward work including tasks of minimal interest		Medium
Ability to follow and retain:		
Multistep oral instructions		Medium
Written instructions/technical manuals - multistep		High
Simple to complex diagram instructions		High

Visual models or demonstrated instructions	High
Ability to use tools of trade (voltage or current meters, screwdrivers, pressure indicators, power saws, hammers, etc.)	High
Ability to use numerical data (count, measure, compute, etc.) in applied setting	High
Ability to discriminate between objects of similar:	
Size, shape, color and spatial relationship	Medium
Ability to organize work process/follow defined procedures	High
Coordination (eye-hand)	Medium
Able to sequence events or follow a sequence as necessary	High
Ability to sequence events of follow a sequence as necessary	High
Dexterity (fine finger)	Medium
Equipment Maintenance: Performing routine maintenance on equipment and determining when and what kind of maintenance is needed	High
Installation: Installing equipment, machines, wiring, or programs to meet specifications	High
Quality Control Analysis: Conducting tests and inspections of products, services, or processes to evaluate quality or performance	High

<b>Reading Skills *See Recommended WorkKeys® Scores Above</b>	
<b>Math Skills *See Recommended WorkKeys® Scores Above</b>	
Counting-Recording-Comparing-Calculating	Whole numbers and decimals
Calculating fractions, decimals, ratios, order of operations	Pre-Algebra and Geometry
Ratio, Algebra, formulas, square roots	Geometry

### **Additional Abilities Required**

<b>Problem Sensitivity</b>	The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
<b>Finger Dexterity</b>	The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.
<b>Near Vision</b>	The ability to see details at close range (within a few feet of the observer).

### **Knowledge Required in Heating, Ventilating, and Air Conditioning Field**

<b>Building and Construction</b>	Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.
<b>Mechanical</b>	Knowledge of machines and tools, including their designs, uses, repair, and maintenance.
<b>Customer and Personal Service</b>	Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

### **Additional Considerations**

Must enjoy working with their hands, able to follow directions, and work independently	Must possess good communication skills
Must be aware of surroundings such as live electrical points, safety glasses, overhead dangers, safety harness requirements, and gas lines	Must be able to problem solve
Wear a uniform	Must have high integrity

### **Heating, Ventilating, and Air Conditioning Work Activities**

Test pipe or tubing joints or connections for leaks, using pressure gauge or soap-and-water solution.	Test electrical circuits or components for continuity, using electrical test equipment.
Repair or replace defective equipment, components, or wiring.	Connect heating or air conditioning equipment to fuel, water, or refrigerant source to form complete circuit.
Discuss heating or cooling system malfunctions with users to isolate problems or to verify that repairs corrected malfunctions.	Repair or service heating, ventilating, and air conditioning (HVAC) systems to improve efficiency, such as by changing filters, cleaning ducts, or refilling non-toxic refrigerants.
Install, connect, or adjust thermostats, humidistats, or timers.	Record and report time, materials, faults, deficiencies, or other unusual occurrences on work orders.
Study blueprints, design specifications, or manufacturers' recommendations to ascertain the configuration of heating or cooling equipment components and to ensure the proper installation of components.	Comply with all applicable standards, policies, or procedures, such as safety procedures or the maintenance of a clean work area.

Install auxiliary components to heating or cooling equipment, such as expansion or discharge valves, air ducts, pipes, blowers, dampers, flues, or stokers.	Lay out and connect electrical wiring between controls and equipment, according to wiring diagrams, using electrician's hand tools.
Inspect and test systems to verify system compliance with plans and specifications or to detect and locate malfunctions.	Install and test automatic, programmable, or wireless thermostats in residential or commercial buildings to minimize energy usage for heating or cooling.
Adjust system controls to settings recommended by manufacturer to balance system.	Cut or drill holes in floors, walls, or roof to install equipment, using power saws or drills.
Install or repair self-contained ground source heat pumps or hybrid ground or air source heat pumps to minimize carbon-based energy consumption and reduce carbon emissions.	Recommend, develop, or perform preventive or general maintenance procedures, such as cleaning, power-washing, or vacuuming equipment, oiling parts, or changing filters.
Install dehumidifiers or related equipment for spaces that require cool, dry air to operate efficiently, such as computer rooms.	Install magnetic-centrifugal chillers, compressors, or related equipment to cool air temperatures through the use of recirculating water.
Measure, cut, thread, or bend pipe or tubing, using pipe fitter's tools.	Wrap pipes, securing insulation in place with cement or wire bands.
Install or repair air purification systems, such as specialized filters or ultraviolet (UV) light purification systems.	Assemble, position, and mount heating or cooling equipment, following blueprints or manufacturer's specifications.
Fabricate, assemble, or install duct work or chassis parts, using portable metal-working tools or welding equipment.	Install radiator controls for room-level zone control heating of residential or commercial buildings.

### **Technology**

Word Processing software	Spreadsheet software
Office Suite software	Database user interface and query software
Computer aided design (CAD) software	

### **Available Certifications**

Environmental Protection Agency (EPA) Refrigerant Recovery (Core+Level 1, Core+Level 2, Core+Level 3, Universal) (12 Points Each)	NCCER Core (6 Points)
OHSA 10-Construction Industry (1 Point)	NCCER Level 1-HVAC (6 Points)
Industrial Forklift Operations (1 Point)	NCCER Level 2-HVAC
CPR/First Aid Certification (1 Point)	

**Possible College Credits**

College Credit Plus in English, Math, Social Studies, or Science	Must be preapproved. Must pass a college course at an Ohio college or College Credit Plus class at Great Oaks.
Career Technical Credit Transfer	<p>The Ohio Transfer to Degree Guarantee helps career and technical students transfer credits earned in high school to community college or four-year degree programs. The credit can be used at any Ohio public college or university:</p> <ul style="list-style-type: none"> <li>• If you successfully completed your career-technical program and passed certain required assessments.</li> <li>• If you attend a similar program at a public Ohio college or university.</li> </ul> <p>For more information, go to <a href="http://www.transfercredit.ohio.gov">www.transfercredit.ohio.gov</a></p>
Articulated Credit	<p>Great Oaks has agreements with certain colleges; if you attend one of those colleges you can get credit toward a specific degree. Currently, Great Oaks has agreements in your program with:</p> <ul style="list-style-type: none"> <li>• Ohio Valley ABC (Air Conditioning, Refrigeration and Heating Apprenticeship, 144 class hours, 2000 hours work experience, 2nd level)</li> </ul>

\*Additional college or post-secondary education may be required in this field

**Possible Career Pathways**

HVAC Technician	Energy Systems Controller
Foreperson	Mechanical Engineer