

Student Name: _____

Date: _____

PROGRAM COMPETENCY PROFILE FOR CAREER TECHNICAL EDUCATION
Career Cluster: Architecture and Construction **Effective: 9/2014**

Program Name: Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician CIP: 470201 Effective 8/14
 State Standards determined by the Mechanical Safety and Licensing Board, NH Dept. of Safety and National Standards: US Department of Labor (US DOL), Occupational Safety and Health Administration (OSHA), National Fire Protection Association (NFPA), Air Conditioning and Refrigeration Institute (ARI), and American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)

Competencies (statement that provides the overview and defines the instructional area) Student will:	Knowledge, Content and Skills (what a student needs to know and be able to do and upon which they will be assessed http://www.careertech.org/career-technical-education/cctc/careerreadypractices.html	NH Common Core http://www.education.nh.gov/competencies/index.htm •English/Language Arts/Literacy: ELA •Mathematics: M	Rating Scale -Sample Performance Assessments (Performance tasks the student needs to demonstrate in order to be rated proficient in meeting the competency) Student will:				
Understand the concepts, procedures, methods and practices related to safety in order to provide a safe work environment.	1 .Explain the health and safety laws and practices affecting the employee, the surrounding community, and the environment in this industry. (US DOL, OSHA 10) CRP5 Consider the environmental, social and economic impacts of decisions. [AAI6]	ELA: 2,7	<table border="1" style="width: 100px; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table> As a new trainee your supervisor has arranged for you to take the OSHA 10 exam and depending on your results additional training may be required. CONT. to #2	1	2	3	4
1	2	3	4				
	2. Explain and demonstrate the correct use and inspection of personal and emergency safety equipment.	ELA: 2,7					
	3. Identify, interpret and comply with MSDSs and other standard labels and signs.	ELA: 2,4,8	<table border="1" style="width: 100px; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> </table> As a new trainee your supervisor has asked you to update the MSDS for a chemical found in the shop. You will need to research this and report to your supervisor and peers. This report could be oral or written.	1	2	3	4
1	2	3	4				

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	4. Demonstrate proper lifting techniques.		As a technician you are with a customer, you must properly disconnect, drain and prepare for transport a water heater, boiler or furnace. Then remove the water heater from the basement and bring in the new water heater, boiler or furnace in and re-install the new tank. Use your checklist and rubric. CONT. to #7, 11				
	5. Demonstrate and apply safe electrical practices as they apply to industry standards. (NFPA 70E)	ELA: 2,8,9 M: 6	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;">2</td> <td style="width: 25%;">3</td> <td style="width: 25%;">4</td> </tr> </table>	1	2	3	4
1	2	3	4				
	6. Become familiar with other common job-site hazards such as lead, asbestos, physical stresses, combustibles, and confined spaces, and know how to safely work in these conditions. Study the cost of injuries and accidents on the job to companies and individuals. CRP3: Attend to personal health and financial well-being.	ELA: 2,6	As a new technician attending a training that encompasses everyday hazardous conditions you may encounter you have to identify these hazards in a written report.				

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Understand concepts, procedures, and methods in the proper use of tools, instruments, materials, chemicals, and equipment to install and service new and existing applications.	7. Properly select and safely use hand tools and power tools in a variety of applications. CRP2: Apply appropriate academic and technical skills.	M:1	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> As a technician on the jobsite drill a series of holes after selecting the proper size drill bit, properly aligning the holes to accommodate rigid pipe. Use measuring tools to ensure accuracy of the alignment. CONT. to #9	1	2	3	4
	1	2	3	4			
	8. Demonstrate the ability to use measuring tools. [AAI4]	M: 1	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table>	1	2	3	4
	1	2	3	4			
9. Identify and select proper materials for various applications. [AAI3]	ELA: 2,8,9	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table>	1	2	3	4	
1	2	3	4				
10. Demonstrate use of electrical test equipment related to the industry.	ELA: 2,8,9 M:1	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> As a technician you will test the thermostat and low voltage circuit of a central air conditioning system. You will test and troubles shoot the high voltage contactor, compressor, compressor fan and capacitor. After testing and troubleshooting replace the required components.	1	2	3	4	
1	2	3	4				

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Understand the concepts, rules, regulations, and existing codes related to HVAC/R systems and installations.	11. Read and interpret various construction and schematic drawings, and recognize construction terms, symbols and components within the plans.	ELA:2,4,6 M:2,	<table border="1" style="width: 100px; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> You have been requested by your supervisor to update the glossary of mechanical symbols and their meanings and cite the code reference for each.	1	2	3	4
	1	2	3	4			
	12. Demonstrate the ability to measure temperature and pressure using instruments of the trade. CRP2: Apply appropriate academic and technical skills CRP11: Use technology to enhance productivity. [AAI5]	ELA:2,4,8 M:1	<table border="1" style="width: 100px; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> As a new technician connect your gauge set to the low and high pressure side of the air condition system and take a reading. Take a temperature reading at both the compressor and at the evaporator. Using the temperature and pressure chart determine what type of refrigerant the system uses. Present this information to the supervisor. Cont. to #14	1	2	3	4
1	2	3	4				
13. Explain appropriate relationships pertaining to temperature and pressure of refrigerants.	ELA: 2,4,8 M:4,6,7,9						

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	14. Identify state and recognize national code standards as they relate to typical HVAC/R installations, modifications and repairs. (IMC,IRC,NFPA-54, NFPA-30,ICC)	ELA:2	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;">2</td> <td style="width: 25%;">3</td> <td style="width: 25%;">4</td> </tr> </table> As an experienced technician you are responsible for installing the proper safety equipment on a hydronic heating system and proving and identifying that they are properly installed per NFPA-54 and NFPA-30	1	2	3	4
1	2	3	4				
	15. Research and be able to reference New Hampshire state laws and rules related to the trade. CRP7: Employ valid and reliable research strategies.	ELA: 2, 6					
	16. Describe individual heating systems and components.	ELA:4,8	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;">2</td> <td style="width: 25%;">3</td> <td style="width: 25%;">4</td> </tr> </table> As a technician, explain to the property owner the type of residential comfort system, identify the components and explain the sequence of operation of the system. CONT. #18	1	2	3	4
1	2	3	4				
	17. Identify and explain fuels and fuel systems.	ELA:3,4,6,8	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;">2</td> <td style="width: 25%;">3</td> <td style="width: 25%;">4</td> </tr> </table>	1	2	3	4
1	2	3	4				
	18. Identify and explain individual air-conditioning/ refrigeration systems.	ELA:2,3, 4,6,8	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;">2</td> <td style="width: 25%;">3</td> <td style="width: 25%;">4</td> </tr> </table>	1	2	3	4
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	19. Apply proper handling protocol for refrigerants	M:1	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> As a technician, outline the steps required to properly evacuate an existing residential air conditioning system. Present this to your supervisor.	1	2	3	4
1	2	3	4				
	20. Recognize environmental issues as they relate to the specific refrigerants. CRP5: Consider the environmental, social and economic impacts of decisions. CRP7: Employ valid and reliable research strategies. [AAI8]	ELA:4,8	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> As a technician research the environmental hazards related to older refrigerants and present the problems to your supervisor.	1	2	3	4
1	2	3	4				
Understand the concepts, practices and procedures related to effective customer relations and communications in order to enhance positive relationships.	21. Demonstrate effective customer relations/communications techniques. CRP4: Communicate clearly, effectively and with reason.	ELA:7,8	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> You have received a call from an upset customer pertaining to their bill; effectively and respectfully using professional language goes over the bill to resolve the customers concerns.	1	2	3	4
1	2	3	4				

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	22. Explain and apply the ethical behaviors (integrity, honesty, good character) expected in the HVAC/R industry. CRP9: Model integrity, ethical leadership and effective management [AAI9]	ELA: 7,8	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> A customer calls questioning the amount of labor on a bill, they noticed one of the technicians was talking on their cell phone for an extended period of time, they feel they are being wrongfully charged for this technicians time. How do you address the technician in question and adjust the bill accordingly?	1	2	3	4
1	2	3	4				
Understand the fundamental concepts of Entrepreneurship.	23. Discuss and assess business creation possibilities and the process of opening your own business/ shop. CRP10: Plan education and career path aligned to personal goals. [AAI1]	ELA: 7,8 M: 1,2	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> You have decided that you want to open your own shop. You have made an appointment to meet with a small business representative to discuss a business plan. The representative has asked you to take the online assessment and bring your results to the meeting. Cont. to # 27 http://www.entrepreneur.com/personalityquiz	1	2	3	4
1	2	3	4				
	24. Discuss the characteristics associated with entrepreneurial success (passion, self-reliance, self-confidence, taking risks, information seeker, etc.). [AAI2]	ELA: 7,8	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table>	1	2	3	4
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Understand the Career Ready Practices (CRP) in order to achieve success in today's workplace.	25. Act as a responsible and contributing citizen and employee. [CRP1] [AAI7]		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For Example: You work for ABC refrigeration, your company has asked you to organize a team to provide 20 hours of community service to support a community action housing project. Cont. to #26	1	2	3	4
	1	2	3	4			
	26. Work productively in teams while using cultural/global competence. [CRP12]						
27. Demonstrate creativity and innovation. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them CRP6: Demonstrate creativity and innovation.		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> </table> For Example: It is 3 am; your customer has a faulty oil pump coupler, you need to have this system running until you can get the proper part at the supply house. Use items at hand to make it work.	1	2	3	4	
1	2	3	4				

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Understand the importance of personal growth and leadership responsibility by participating in activities/events offered through student organizations to enhance career success.	28. Plan education and career path aligned to personal goals. [CRP10]		<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;">2</td> <td style="width: 25%;">3</td> <td style="width: 25%;">4</td> </tr> </table> You are participating in an HVAC class in high school. Your advisory board is coming to interview you for a scholarship. Document and demonstrate through your portfolio why you are the best candidate for this opportunity.	1	2	3	4
1	2	3	4				

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