

Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician, Classification of Instructional Program (CIP) 47.0201

Units of Instruction and Task Grid Linked to Pennsylvania Core Standards

Pennsylvania Core Standards for

Reading for Technical Subjects

Standard 3.5

symbols, key terms, and other

domain specific words.

Standard CC.3.5.9-10.E

Standard CC.3.5.11-12.E

Pennsylvania Core

Standards for Writing for

Technical Subjects

Produce clear and coherent

purpose, and audience.

Standard CC.3.6.9-10 D

Standard CC.3.6.11-12.D

writing...appropriate to task,

Pennsylvania Core

Standards for

Mathematics

Common Career

Technical Core

Standards

Secondary Competency Task Grid

with Unit and Task Numbers

		Standards	Standard 3.5	Standard 3.6	Standard 2.1
100	INTRODUCTION TO HVAC.		VIDV NDE 4 G/DEDA W G	TENTE ON INC.	
101 102 103 104 105	Identify HVAC systems. Describe career opportunities in the HVAC profession. Demonstrate awareness of the occupational requirements. RESERVED Use soft skills when interacting with customers.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE: Maintenance, Installation and Repair Career Pathway (Choose Standards)	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.11-12 A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.	
		1-2-3-4-5-6 NOTE: Refer to the Common Career Technical Core Standards booklet if you	CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other	PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent	

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wish to add more Career

needs of your local Area.

Pathways to meet the

Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F Standard CC.3.5.11-12.F

Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G

Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H

Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I

Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

Standard CC.3.5.11-12. G

Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H

Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I

Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E

Standard CC.3.6.11-12.E

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including

the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12 Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F

Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G

Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H.

Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12 Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I.

Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12 Standard CC.3.5.9-10.J Standard CC.3.5.11-12.J By the end of grades 9- 10, AND 11-12, read and comprehend technical texts independently and proficiently.

200	BASIC SAFETY.			
201 202 203 204 205	RESERVED Identify and demonstrate the use of personal protection equipment. Apply OSHA regulations to identify hazards and measures to prevent job site accidents from occurring. Set up and use stepladders, extension ladders, and scaffold.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE: Maintenance, Installation and Repair Career Pathway (Choose Standards) 1-2-3-4-5-6 NOTE: Refer to the Common Career Technical Core Standards booklet if you wish to add more Career Pathways to meet the needs of your local Area.	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.9-10. A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc. CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D Standard CC.3.5.9-10. D Determine the meaning of symbols, key terms, and other domain specific words. Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc. Standard CC.3.5.9-10.F Standard CC.3.5.9-10.F Standard CC.3.5.11-12.F	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc. PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writingappropriate to task, purpose, and audience. Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on

Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G

Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H

Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I

Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a

problem.

Standard CC.3.5.11-12. H

Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I

Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12 Standard CC.3.5.9-10.J

addressing what is most significant for a specific purpose and audience. Standard CC.3.6.9-10.E

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E.

Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12 Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F

Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G

Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H.

Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12 Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I.

Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

		Standard CC.3.5.11-12.J By the end of grades 9- 10, AND 11-12, read and comprehend technical texts independently and proficiently.	
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300	TOOLS FOR HVAC/R.				
301 302	Use and maintain basic power tools used in the trade. Use and maintain basic power tools used in the trade.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE: Maintenance, Installation and Repair Career Pathway (Choose Standards) 1-2-3-4-5-6 NOTE: Refer to the Common Career Technical Core Standards booklet if you wish to add more Career Pathways to meet the needs of your local Area.	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.9-10. A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc. CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D Standard CC.3.5.9-10. D Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words. Standard CC.3.5.9-10.E Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc. Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedureand Analyze the structure of the relationships among concepts in a text.	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc. PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writingappropriate to task, purpose, and audience. Standard CC.3.6.9-10 D Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce,	

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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G

Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H

Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I

Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

Standard CC.3.5.11-12. G

Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H

Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I

Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12 Standard CC.3.5.9-10.J Standard CC.3.5.11-12.J By the end of grades 9-10

By the end of grades 9- 10, AND 11-12, read and comprehend technical texts independently and proficiently.

publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12 Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F

Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G

Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H.

Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12 Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I.

Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

400	BLUEPRINT READING.				
401 402	Compare types of blueprint plans. Read and interpret blueprint plans.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE: Maintenance, Installation and Repair Career Pathway (Choose Standards) 1-2-3-4-5-6 NOTE: Refer to the Common Career Technical Core Standards booklet if you wish to add more Career Pathways to meet the needs of your local Area.	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.9-10. A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc. CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D Standard CC.3.5.9-10. D Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words. Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc. Standard CC.3.5.9-10.F Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedureand Analyze the structure of the relationships among concepts in a text. INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10 Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.9-10.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc. PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.9-10.C Standard CC.3.6.9-10.D Standard CC.3.6.11-12 D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products. RESEARCH GRADES 9-10-11-12 Standard CC.3.6.9-10.F	NUMBERS AND OPERATIONS Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems. Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems. Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers. ALGEBRA Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios. GEOMETRY Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles. Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to Geometric figures. Standard 2.3.HS.A.13

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	into visual form (e.g. a table or chart). Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem. Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc. INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12 Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formatsto solve a problem. Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible. Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding. RANGE OF READING GRADES 9-10-11-12 Standard CC.3.5.9-10.J Standard CC.3.5.11-12.J By the end of grades 9- 10, AND 11-12, read and comprehend technical texts independently and proficiently.	Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem. Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation. Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research. RANGE OF WRITING GRADES 9-10-11-12 Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiencesetc.	Analyze relationships between two dimensional and three dimensional objects.
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500	PIPING PRACTICES.				
501 502	Identify piping materials. Select, measure, cut, ream, swage and flare piping and tubing projects.	CAREER CLUSTER Manufacturing Career Cluster	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.11-12 A	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A	NUMBERS AND OPERATIONS Standard 2.1.HS.F.2

503	Cut, ream, thread and assemble steel piping projects and pressure test.
504	Assemble non-metallic pipe and fittings and pressure test.
505	Assemble copper tubing projects and pressure test according to trade standards.
506	Solder copper tubing.
507	Braze ACR tubing.
508	Identify and use fittings and tools for steel pipe.
509	RESERVED
510	Assemble corrugated stainless steel gas tubing (CSST) projects.
511	RESERVED

(Choose Standards) 1-2-3-4-5-6-7

CAREER PATHWAYS INCLUDE: Maintenance.

Installation and Repair Career Pathway

(Choose Standards) 1-2-3-4-5-6

NOTE:

Refer to the Common Career Technical Core Standards booklet if you wish to add more Career Pathways to meet the needs of your local Area. Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D Standard CC.3.5.11-12.D Determine the meaning of

Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E

Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F Standard CC.3.5.11-12.F

Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G

Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H

Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I

Standard CC.3.6.11-12.A

Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent

Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D

Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E.

Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12 Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F

Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4

Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5

Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6

Extend the knowledge of arithmetic operations and apply to complex numbers.

ALGEBRA

Standard 2.2.HS.C.9

Prove the Pythagorean identity and use it to calculate trigonometric ratios.

GEOMETRY Standard 2.3.HS.A.7

Apply trigonometric ratios to solve problems involving right triangles.

Standard 2.3.HS.A.3

Verify and apply geometric theorems as they relate to Geometric figures.

Standard 2.3.HS.A.13

Analyze relationships between two dimensional and three dimensional objects.

I a	
Compare and contrast findings	Gather relevant information
presented in a text to those from	from multiple authoritative
other sources, etc.	print and digital sources,
	following a standard format
INTEGRATE KNOWLEDGE	for citation.
& IDEAS	Standard CC.3.6.9-10.H.
GRADES 11-12	Standard CC.3.6.11-12.H.
Standard CC.3.5.11-12. G	Draw evidence from
Integrate and evaluate multiple	informational texts to support
sources of information presented	analysis, reflection, and
in diverse formatsto solve a	research.
problem.	
Standard CC.3.5.11-12. H	RANGE OF WRITING
Evaluate the hypotheses, data,	GRADES 9-10-11-12
analysis, and conclusions in a	Standard CC.3.5.9-10.I &
technical text, verifying the data	Standard CC.3.5.11-12.I.
when possible.	Write routinely over
Standard CC.3.5.11-12. I	extended time frames and
Synthesize information from a	shorter time frames for a
range of sources into a coherent	range of tasks, purposes and
	audiencesetc.
understanding.	
RANGE OF READING	
GRADES 9-10-11-12	
GRADES 9-10-11-12 Standard CC.3.5.9-10.J	
Standard CC.3.5.9-10.J Standard CC.3.5.11-12.J	
By the end of grades 9-10, AND	
11-12, read and comprehend	
technical texts independently and	
proficiently.	

600	BASIC ELECTRICITY.				
601 602 603 604 605 606	Compare and analyze methods of producing electricity using appropriate terms. Calculate basic electrical quantities using Ohm's law. Explain how magnetism is used in different HVAC components. Implement safe electrical practices. Interpret and draw various types of electrical schematics and symbols. Apply proper wiring techniques.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE:	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.11-12 A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including	NUMBERS AND OPERATIONS Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems. Standard 2.1.HS.F.4 Use units as a way to understand problems and to

607	Perform electrical testing to include	Maintenance,	Follow precisely a complex	the narration of technical	guide the solution of
	mechanical/electronic relays on energized and De-	Installation and Repair	multistep procedure, etc.	processes, etc.	multistep problems.
	energized circuits.	Career Pathway		DD ODVIGORADA A	Standard 2.1.HS.F.5
608	Wire series circuit, parallel circuit, and series/parallel	(Choose Standards)	CRAFT & STRUCTURE	PRODUCTION &	Choose a level of accuracy
	circuit.	1-2-3-4-5-6	GRADES 9-10-11-12	DISTRIBUTION OF	appropriate to limitations on
609	Install and size electric disconnects, circuit breakers and		Standard CC.3.5.9-10. D	WRITING GRADES 9-10-11-12	measurement when reporting
	fuses.	NOTE:	Standard CC.3.5.11-12.D	Standard CC.3.6.9-10.C	quantities.
610	Classify and test various types of capacitors.	Refer to the Common	Determine the meaning of	Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C	Standard 2.1.HS.F.6
611	Identify electrical motors and their applications.	Career Technical Core	symbols, key terms, and other	Produce clear and coherent	Extend the knowledge of
612	Differentiate motor control protection and start devices.	Standards booklet if you	domain specific words.	writingappropriate to task,	arithmetic operations and
613	Apply electrical codes.	wish to add more Career	*	purpose, and audience.	apply to complex numbers.
614	Determine transformers and their applications.	Pathways to meet the	Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E	Standard CC.3.6.9-10 D	
615	Size, apply, and ground electrical circuits and raceways.	needs of your local Area.	Analyze the structure of the	Standard CC.3.6.11-12.D	ALGEBRA
		needs of your room recom	relationships among concepts in a	Develop and strengthen	Standard 2.2.HS.C.9
			text, etc.	writing as needed by	Prove the Pythagorean
			Standard CC.3.5.9-10.F	planning, revising, editing,	identity and use it to
			Standard CC.3.5.11-12.F	rewriting, or trying a new	calculate trigonometric
			Analyze the author's purpose in	approach, focusing on	ratios.
			providing an explanation,	addressing what is most	
			describing a procedureand	significant for a specific	GEOMETRY
			Analyze the structure of the	purpose and audience.	Standard 2.3.HS.A.7
			relationships among concepts in a	Standard CC.3.6.9-10.E	Apply trigonometric ratios to
			text.	Standard CC.3.6.11-12.E.	solve problems involving
				Use technology, including	right triangles.
			INTEGRATE KNOWLEDGE	the internet, to produce,	Standard 2.3.HS.A.3
			& IDEAS	publish, and update	Verify and apply geometric
			GRADES 9-10	individual or shared writing	theorems as they relate to
			Standard CC.3.5.9-10.G	products.	Geometric figures.
				RESEARCH CRAPES 0 10 11 12	Standard 2.3.HS.A.13
			Translate quantitative or technical	GRADES 9-10-11-12	Analyze relationships
			information expressed in a text	Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F	between two dimensional and
			into visual form (e.g. a table or	Conduct short and more	three dimensional objects.
			chart). Standard CC.3.5.9-10. H	sustained research to answer	
			Assess the reasoning in a text to	a question or solve a	
			support the author's claim for	problem.	
			solving a technical problem.	Standard CC.3.6.9-10.G.	
			Standard CC.3.5.9-10. I	Standard CC.3.6.11-12.G	
				Gather relevant information	
			Compare and contrast findings	from multiple authoritative	
			presented in a text to those from	print and digital sources,	
			other sources, etc.	following a standard format	

for citation.

INTEGRATE KNOWLEDGE

& IDEAS GRADES 11-12 **Standard CC.3.6.9-10.H.**

Standard CC.3.6.11-12.H.

Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formatsto solve a problem. Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible. Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.	Draw evidence from informational texts to support analysis, reflection, and research. RANGE OF WRITING GRADES 9-10-11-12 Standard CC.3.5.9-10.1 & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiencesetc.	
RANGE OF READING GRADES 9-10-11-12 Standard CC.3.5.9-10.J Standard CC.3.5.11-12.J By the end of grades 9- 10, AND 11-12, read and comprehend technical texts independently and proficiently.		

700	INTRODUCTION TO COOLING.				
701 702 703 704 705 706 707 708 709 710	Measure temperature and pressure of a cooling system. Calculate superheat and subcooling. Locate and describe components of the basic refrigeration cycle. Evaluate refrigerants using temperature and pressure charts for various refrigerants. Analyze and test the operations of various compressors. Analyze and test the operations of various condensers. Analyze and test the operations of various evaporators. Analyze, test and adjust the operations of various metering devices. Identify secondary components used in the air conditioning and refrigeration industry. Evaluate effects of airflow on cooling system performance. Categorize and manipulate service valves.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE: Maintenance, Installation and Repair Career Pathway (Choose Standards) 1-2-3-4-5-6 NOTE: Refer to the Common	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.11-12 A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc. CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc. PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12	NUMBERS AND OPERATIONS Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems. Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems. Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
		Career Technical Core	Standard CC.3.5.11-12.D	Standard CC.3.6.9-10.C	

Standards booklet if you Standard CC.3.6.11-12 C Standard 2.1.HS.F.6 Determine the meaning of wish to add more Career symbols, key terms, and other Produce clear and coherent Extend the knowledge of domain specific words. Pathways to meet the writing...appropriate to task, arithmetic operations and needs of your local Area. purpose, and audience. Standard CC.3.5.9-10.E apply to complex numbers. Standard CC.3.6.9-10 D Standard CC.3.5.11-12.E Standard CC.3.6.11-12.D Analyze the structure of the **ALGEBRA** Develop and strengthen relationships among concepts in a Standard 2.2.HS.C.9 writing as needed by text, etc. Prove the Pythagorean planning, revising, editing, Standard CC.3.5.9-10.F identity and use it to rewriting, or trying a new Standard CC.3.5.11-12.F calculate trigonometric approach, focusing on Analyze the author's purpose in ratios. addressing what is most providing an explanation, significant for a specific describing a procedure...and **GEOMETRY** purpose and audience. Analyze the structure of the Standard 2.3.HS.A.7 **Standard CC.3.6.9-10.E** relationships among concepts in a Apply trigonometric ratios to Standard CC.3.6.11-12.E. solve problems involving Use technology, including right triangles. the internet, to produce, INTEGRATE KNOWLEDGE Standard 2.3.HS.A.3 publish, and update & IDEAS Verify and apply geometric individual or shared writing **GRADES 9-10** theorems as they relate to products. Geometric figures. Standard CC.3.5.9-10.G RESEARCH Standard 2.3.HS.A.13 GRADES 9-10-11-12 Translate quantitative or technical Analyze relationships Standard CC.3.6.9-10.F information expressed in a text between two dimensional and Standard CC.3.6.11-12.F into visual form (e.g. a table or three dimensional objects. Conduct short and more chart). sustained research to answer Standard CC.3.5.9-10. H a question or solve a Assess the reasoning in a text to problem. support the author's claim for Standard CC.3.6.9-10.G. solving a technical problem. Standard CC.3.6.11-12.G Standard CC.3.5.9-10. I Gather relevant information Compare and contrast findings from multiple authoritative presented in a text to those from print and digital sources, other sources, etc. following a standard format for citation. **Standard CC.3.6.9-10.H.** INTEGRATE KNOWLEDGE Standard CC.3.6.11-12.H. & IDEAS Draw evidence from **GRADES 11-12** informational texts to support Standard CC.3.5.11-12. G analysis, reflection, and Integrate and evaluate multiple research. sources of information presented in diverse formats...to solve a RANGE OF WRITING problem. GRADES 9-10-11-12 Standard CC.3.5.11-12. H Standard CC.3.5.9-10.I & Evaluate the hypotheses, data, Standard CC.3.5.11-12.I.

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analysis, and conclusions in a

technical text, verifying the data when possible. Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.	Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiencesetc.	
RANGE OF READING GRADES 9-10-11-12 Standard CC.3.5.9-10.J Standard CC.3.5.11-12.J By the end of grades 9- 10, AND 11-12, read and comprehend technical texts independently and proficiently.		

800	INTRODUCTION TO HEATING.				
801 802 803 804 805 806 807 808 809 810 811 812 813	Describe the principles of combustion. Evaluate temperatures and pressures of various heating systems. Identify components and fuel properties of various heating systems. Perform maintenance on a gas furnace. RESERVED Identify oil heating equipment. Install and adjust oil, gas (condensing & noncondensing), and electric heating equipment. Perform annual preventive maintenance on oil fired equipment. RESERVED Identify and size electric heating equipment. Install heating/air conditioning thermostats. RESERVED Perform combustion analysis on oil and gas fired equipment. Identify the sequence of operations of various warm air furnaces.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE: Maintenance, Installation and Repair Career Pathway (Choose Standards) 1-2-3-4-5-6 NOTE: Refer to the Common Career Technical Core Standards booklet if you wish to add more Career Pathways to meet the needs of your local Area.	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.9-10. A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.9-10 B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc. CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D Standard CC.3.5.9-10. D Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words. Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc. PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writingappropriate to task, purpose, and audience. Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by	NUMBERS AND OPERATIONS Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems. Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems. Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers.

Standard CC.3.5.9-10.F Standard CC.3.5.11-12.F

Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G

Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H

Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I

Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

Standard CC.3.5.11-12. G

Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H

Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I

Synthesize information from a range of sources into a coherent understanding.

planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E.

Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12 Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F

Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G

Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H.

Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12 Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over

extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

RANGE OF READING	
GRADES 9-10-11-12	
Standard CC.3.5.9-10.J	
Standard CC.3.5.11-12.J	
By the end of grades 9- 10, AND	
11-12, read and comprehend	
technical texts independently and	
proficiently.	

900	AIR DISTRIBUTION SYSTEMS.				
901 902 903 904 905 906 907 908	Identify and design different types of duct systems. Identify and describe the different types of duct system components. Test velocity, static pressures, temperature, humidity, and volume in a duct system. RESERVED RESERVED Compare, identify and fabricate using various duct materials. Perform basic installation practices including duct sealing and leak testing. Identify and compare the application air distribution secondary accessories to increase air quality and comfort.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE: Maintenance, Installation and Repair Career Pathway (Choose Standards) 1-2-3-4-5-6 NOTE: Refer to the Common Career Technical Core Standards booklet if you wish to add more Career Pathways to meet the needs of your local Area.	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.11-12 A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc. CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words. Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc. Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedureand	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc. PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writingappropriate to task, purpose, and audience. Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E.	NUMBERS AND OPERATIONS Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems. Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems. Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers. ALGEBRA Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios. GEOMETRY Standard 2.3.HS.A.7

Analyze the structure of the Use technology, including the Apply trigonometric ratios to solve problems involving relationships among concepts in a internet, to produce, publish, and update individual or right triangles. shared writing products. RESEARCH INTEGRATE KNOWLEDGE **GRADES 9-10-11-12** & IDEAS **Standard CC.3.6.9-10.F GRADES 9-10** Standard CC.3.6.11-12.F **Standard CC.3.5.9-10.G** Conduct short and more Translate quantitative or sustained research to answer a technical information expressed question or solve a problem. in a text into visual form (e.g. a **Standard CC.3.6.9-10.G.** table or chart). Standard CC.3.6.11-12.G Standard CC.3.5.9-10. H Gather relevant information from multiple authoritative Assess the reasoning in a text to print and digital sources, support the author's claim for following a standard format solving a technical problem. for citation. Standard CC.3.5.9-10. I **Standard CC.3.6.9-10.H.** Compare and contrast findings Standard CC.3.6.11-12.H. presented in a text to those from Draw evidence from other sources, etc. informational texts to support analysis, reflection, and INTEGRATE KNOWLEDGE research. & IDEAS **GRADES 11-12** RANGE OF WRITING Standard CC.3.5.11-12. G GRADES 9-10-11-12 Standard CC.3.5.9-10.I & Integrate and evaluate multiple sources of information presented Standard CC.3.5.11-12.I. Write routinely over extended in diverse formats...to solve a problem. time frames and shorter time Standard CC.3.5.11-12. H frames for a range of tasks, Evaluate the hypotheses, data, purposes and audiences...etc. analysis, and conclusions in a technical text, verifying the data when possible. Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding. RANGE OF READING GRADES 9-10-11-12 Standard CC.3.5.9-10.J Standard CC.3.5.11-12.J By the end of grades 9- 10, AND 11-12, read and comprehend

technical texts independently and	
proficiently.	

	T	T	Τ	I
1000 INTRODUCTION TO HYDRONIC SYSTEMS.				
1001 Identify and compare various hot water heating system components, piping schemes, and their applications. 1002 Service and maintain hydronic systems.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE: Maintenance, Installation and Repair Career Pathway (Choose Standards) 1-2-3-4-5-6 NOTE: Refer to the Common Career Technical Core Standards booklet if you wish to add more Career Pathways to meet the needs of your local Area.	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.9-10. A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc. CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D Standard CC.3.5.9-10. D Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words. Standard CC.3.5.9-10.E Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc. Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedureand Analyze the structure of the relationships among concepts in a text. INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.9-10.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc. PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.9-10.C Standard CC.3.6.9-10.D Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. Standard CC.3.6.9-10.E Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.	NUMBERS AND OPERATIONS Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems. Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems. Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers. ALGEBRA Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios. GEOMETRY Standard 2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles. Standard 2.3.HS.A.3 Verify and apply geometric theorems as they relate to Geometric figures.

	Standard CC.3.5.9-10.G		Standard 2.3.HS.A.13
	Translate quantitative or technical	RESEARCH	Analyze relationships
	information expressed in a text	GRADES 9-10-11-12	between two dimensional and
	into visual form (e.g. a table or	Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F	three dimensional objects.
	chart).	Conduct short and more	
	Standard CC.3.5.9-10. H	sustained research to answer	
	Assess the reasoning in a text to	a question or solve a	
	support the author's claim for	problem.	
	solving a technical problem.	Standard CC.3.6.9-10.G.	
	Standard CC.3.5.9-10. I	Standard CC.3.6.11-12.G	
	Compare and contrast findings	Gather relevant information	
	presented in a text to those from	from multiple authoritative	
	other sources, etc.	print and digital sources, following a standard format	
		for citation.	
	INTEGRATE KNOWLEDGE	Standard CC.3.6.9-10.H.	
	& IDEAS	Standard CC.3.6.11-12.H.	
	GRADES 11-12 Standard CC.3.5.11-12, G	Draw evidence from	
	Integrate and evaluate multiple	informational texts to support	
	sources of information presented	analysis, reflection, and	
	in diverse formatsto solve a	research.	
	problem.		
	Standard CC.3.5.11-12. H	RANGE OF WRITING	
	Evaluate the hypotheses, data,	GRADES 9-10-11-12	
	analysis, and conclusions in a	Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I.	
	technical text, verifying the data	Write routinely over	
	when possible.	extended time frames and	
	Standard CC.3.5.11-12. I	shorter time frames for a	
	Synthesize information from a	range of tasks, purposes and	
	range of sources into a coherent	audiencesetc.	
	understanding.		
	RANGE OF READING		
	GRADES 9-10-11-12		
	Standard CC.3.5.9-10.J		
	Standard CC.3.5.11-12.J		
	By the end of grades 9- 10, AND		
	11-12, read and comprehend		
	technical texts independently and		
	proficiently.		
1100 LEAK DETECTION, EVACUATION,			
RECOVERY, AND CHARGING.			
RECOVERT, AND CHARGING.			

- 1101 Locate refrigerant leaks using common types of leak detectors.
- 1102 Perform refrigerant recovery.
- 1103 Perform system evacuation and dehydration.
- 1104 Determine when to charge with liquid versus vapor.
- 1105 Weigh in correct system charge (when appropriate).
- 1106 Charge systems using superheat method when appropriate (e.g., fixed restriction).
- 1107 Charge systems using subcooling method when appropriate (e.g., TXV, AXV).
- 1108 Apply knowledge of EPA Section 608.
- 1109 Identify pump down applications and perform system pump down operations.

CAREER CLUSTER Manufacturing Career Cluster

(Choose Standards) 1-2-3-4-5-6-7

CAREER PATHWAYS INCLUDE:

Maintenance, Installation and Repair Career Pathway

(Choose Standards) 1-2-3-4-5-6

NOTE:

Refer to the Common Career Technical Core Standards booklet if you wish to add more Career Pathways to meet the needs of your local Area. KEY IDEAS/DETAILS
GRADES 9-10-11-12
Standard CC.3.5.9-10. A
Standard CC.3.5.11-12 A
Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B
Standard CC.3.5.11-12. B
Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C
Standard CC.3.5.11-12.C
Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D

Standard CC.3.5.11-12.D

Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E

Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F Standard CC.3.5.11-12.F

Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G

Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H

TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on

discipline specific content.

Standard CC.3.6.9-10.B

Standard CC.3.6.11-12.B

Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task,

purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D

Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E.

Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12

Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F

Conduct short and more sustained research to answer

NUMBERS AND OPERATIONS

Standard 2.1.HS.F.2

Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4

Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5

Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6

Extend the knowledge of arithmetic operations and apply to complex numbers.

	Assess the reasoning in a text to support the author's claim for solving a technical problem. Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc. INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12 Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formatsto solve a problem. Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible. Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding. RANGE OF READING GRADES 9-10-11-12 Standard CC.3.5.9-10.J Standard CC.3.5.11-12.J	a question or solve a problem. Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation. Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research. RANGE OF WRITING GRADES 9-10-11-12 Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiencesetc.	
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1200	TROUBLESHOOT HEATING.				
1201 1202 1203	Perform gas burner flame proving tests according to trade standards. Troubleshoot, and service gas heating equipment. Troubleshoot oil fired equipment.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.11-12 A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.	NUMBERS AND OPERATIONS Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

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CAREER PATHWAYS INCLUDE:

Maintenance, Installation and Repair Career Pathway

(Choose Standards) 1-2-3-4-5-6

NOTE:

Refer to the Common Career Technical Core Standards booklet if you wish to add more Career Pathways to meet the needs of your local Area. Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D Standard CC.3.5.11-12.D

Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E

Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F Standard CC.3.5.11-12.F

Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G

Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H

Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I

Compare and contrast findings presented in a text to those from other sources, etc.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B

Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C

Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D

Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E.

Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12 Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F

Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G

Gather relevant information from multiple authoritative print and digital sources,

Standard 2.1.HS.F.4

Use units as a way to understand problems and to guide the solution of multistep problems.

Standard 2.1.HS.F.5

Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6

Extend the knowledge of arithmetic operations and apply to complex numbers.

	INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12 Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formatsto solve a problem. Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible. Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding. RANGE OF READING GRADES 9-10-11-12 Standard CC.3.5.9-10.J Standard CC.3.5.11-12.J By the end of grades 9- 10, AND 11-12, read and comprehend technical texts independently and proficiently.	following a standard format for citation. Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research. RANGE OF WRITING GRADES 9-10-11-12 Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiencesetc.	
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1300	TROUBLESHOOT COOLING.				
1301 1302 1303	Identify control system components. Install, troubleshoot, and service cooling equipment. Install electrical components.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE: Maintenance, Installation and Repair Career Pathway (Choose Standards) 1-2-3-4-5-6	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.11-12 A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc. CRAFT & STRUCTURE	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.	NUMBERS AND OPERATIONS Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems. Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems. Standard 2.1.HS.F.5

NOTE:

Refer to the Common Career Technical Core Standards booklet if you wish to add more Career Pathways to meet the needs of your local Area.

GRADES 9-10-11-12

Standard CC.3.5.9-10. D Standard CC.3.5.11-12.D

Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E

Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F Standard CC.3.5.11-12.F

Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G

Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H

Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I

Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

Standard CC.3.5.11-12. G

Integrate and evaluate multiple sources of information presented

PRODUCTION & DISTRIBUTION OF WRITING

GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C

Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D

Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E.

Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12 Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F

Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G

Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H.

Draw evidence from informational texts to support

Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standard 2.1.HS.F.6

Extend the knowledge of arithmetic operations and apply to complex numbers.

in diverse formatsto solve a	analysis, reflection, and
	· · ·
problem.	research.
Standard CC.3.5.11-12. H	
Evaluate the hypotheses, data,	RANGE OF WRITING
analysis, and conclusions in a	GRADES 9-10-11-12
technical text, verifying the data	Standard CC.3.5.9-10.I &
when possible.	Standard CC.3.5.11-12.I.
Standard CC.3.5.11-12. I	Write routinely over
Synthesize information from a	extended time frames and
range of sources into a coherent	shorter time frames for a
understanding.	range of tasks, purposes and
_	audiencesetc.
RANGE OF READING	
GRADES 9-10-11-12	
Standard CC.3.5.9-10.J	
Standard CC.3.5.11-12.J	
By the end of grades 9- 10, AND	
11-12, read and comprehend	
technical texts independently and	
proficiently.	

1400	HEAT PUMPS.				
1401 1402 1403	Explain heat pump modes of operation. Identify and describe heat pump components. Install comfort cooling systems.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE: Maintenance, Installation and Repair Career Pathway (Choose Standards) 1-2-3-4-5-6 NOTE: Refer to the Common Career Technical Core Standards booklet if you wish to add more Career	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.9-10. A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10. C Standard CC.3.5.11-12. C Follow precisely a complex multistep procedure, etc. CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc. PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C	NUMBERS AND OPERATIONS Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems. Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems. Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Standard 2.1.HS.F.6

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Do	athways to meet the	Standard CC.3.5.9-10.E	Produce clear and coherent	Extend the knowledge of
	eeds of your local Area.	Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E	writingappropriate to task,	arithmetic operations and
ne ne	ccus of your focal Area.	Analyze the structure of the	purpose, and audience.	apply to complex numbers.
		relationships among concepts in a	Standard CC.3.6.9-10 D	appry to complex numbers.
		text, etc.	Standard CC.3.6.11-12.D	
		Standard CC.3.5.9-10.F	Develop and strengthen	
		Standard CC.3.5.11-12.F	writing as needed by	
		Analyze the author's purpose in	planning, revising, editing,	
		providing an explanation,	rewriting, or trying a new	
		describing a procedureand	approach, focusing on	
		Analyze the structure of the	addressing what is most	
		relationships among concepts in a	significant for a specific	
		text.	purpose and audience.	
			Standard CC.3.6.9-10.E	
		INTEGRATE KNOWLEDGE	Standard CC.3.6.11-12.E.	
		& IDEAS	Use technology, including	
			the internet, to produce,	
		GRADES 9-10	publish, and update	
		Standard CC.3.5.9-10.G	individual or shared writing	
		Translate quantitative or technical	products.	
		information expressed in a text		
		into visual form (e.g. a table or chart).	RESEARCH	
		,	GRADES 9-10-11-12	
		Standard CC.3.5.9-10. H	Standard CC.3.6.9-10.F	
		Assess the reasoning in a text to	Standard CC.3.6.11-12.F Conduct short and more	
		support the author's claim for	sustained research to answer	
		solving a technical problem.	a question or solve a	
		Standard CC.3.5.9-10. I	problem.	
		Compare and contrast findings	Standard CC.3.6.9-10.G.	
		presented in a text to those from	Standard CC.3.6.11-12.G	
		other sources, etc.	Gather relevant information	
			from multiple authoritative	
		INTEGRATE KNOWLEDGE	print and digital sources,	
		& IDEAS	following a standard format	
		GRADES 11-12	for citation.	
		Standard CC.3.5.11-12. G	Standard CC.3.6.9-10.H.	
		Integrate and evaluate multiple	Standard CC.3.6.11-12.H.	
		sources of information presented	Draw evidence from	
		in diverse formatsto solve a	informational texts to	
		problem.	support analysis, reflection,	
		Standard CC.3.5.11-12. H	and research.	
		Evaluate the hypotheses, data,		
		analysis, and conclusions in a	RANGE OF WRITING	
		technical text, verifying the data	GRADES 9-10-11-12	
		when possible.	Standard CC.3.5.9-10.I &	
		Standard CC.3.5.11-12. I	Standard CC.3.5.11-12.I.	

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		Synthesize information from a range of sources into a coherent understanding. RANGE OF READING GRADES 9-10-11-12 Standard CC.3.5.9-10.J Standard CC.3.5.11-12.J By the end of grades 9- 10, AND 11-12, read and comprehend technical texts independently and proficiently.	Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiencesetc.	
1500 COMPUTER FUNDAMENTALS.				
1501 RESERVED 1502 Utilize the Internet for research. 1503 Use HVAC computer software.	CAREER CLUSTER Manufacturing Career Cluster (Choose Standards) 1-2-3-4-5-6-7 CAREER PATHWAYS INCLUDE: Maintenance, Installation and Repair Career Pathway (Choose Standards) 1-2-3-4-5-6 NOTE: Refer to the Common Career Technical Core Standards booklet if you wish to add more Career Pathways to meet the needs of your local Area.	KEY IDEAS/DETAILS GRADES 9-10-11-12 Standard CC.3.5.9-10. A Standard CC.3.5.9-10. A Cite specific textual evidence, etc. Standard CC.3.5.9-10 B Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc. Standard CC.3.5.9-10.C Standard CC.3.5.9-10.C Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc. CRAFT & STRUCTURE GRADES 9-10-11-12 Standard CC.3.5.9-10. D Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words. Standard CC.3.5.9-10.E Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc. Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedureand	TEXT TYPES AND PURPOSE GRADES 9-10-11-12 Standard CC.3.6.9-10.A Standard CC.3.6.9-10.A Write arguments focused on discipline specific content. Standard CC.3.6.9-10.B Standard CC.3.6.9-10.B Write informative or explanatory texts, including the narration of technical processes, etc. PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12 Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writingappropriate to task, purpose, and audience. Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most	

Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G

Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

Standard CC.3.5.9-10. H

Assess the reasoning in a text to support the author's claim for solving a technical problem.

Standard CC.3.5.9-10. I

Compare and contrast findings presented in a text to those from other sources, etc.

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

Standard CC.3.5.11-12. G

Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Standard CC.3.5.11-12. H

Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.

Standard CC.3.5.11-12. I

Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12 Standard CC.3.5.9-10.J Standard CC.3.5.11-12.J

By the end of grades 9- 10, AND 11-12, read and comprehend

significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E.

Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12 Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F

Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G

Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H.

Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12 Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I.

Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

	technical texts independently and	
	proficiently.	