

Career & Technical Education (CTE) Standards Revision Project

Cluster: Agriculture & Natural Resources

Pathways: Animal Science, Agribusiness Systems, Environmental Service Systems, Food Products & Processing Systems, Natural Resources, Plant Science, Power, Structural & Technology Systems

The standards for this cluster were created under the direction of Dr. Kellie Enns with countless hours provided by the agriculture education instructors of Colorado. The finished product is the result of a compilation of existing Colorado secondary ag education standards, National AFNR standards created by the National Council on Agriculture Education and introductory course standards from Colorado community colleges. The attached standards for each of the pathways identify links to Colorado core content standards which have been validated by content specialists in each of the core content areas. Future work with this project will include linkage of the new standards to current Colorado curriculum in agriculture education, identification or development of curriculum in new areas and the creation of a course development website to facilitate effective utilization of the information by Colorado Agriculture Education instructors.

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Career Cluster/Cluster Grouping:	Agriculture, Natural Resources & Energy
Pathway(s):	Power, Structure and Technical Systems
Prepared Completer Competencies: PST 01. agriculture mechanical and technical system and its relationship to the industry of agriculture	
High School Expectations	
Concepts and skills students know include: PST 01.01 Understanding the World Food Supply Situation	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 01.01.a. Define the difference in food supply and food need</p> <p>PST 01.01.a. Analyze global trends (population, societal, income, health, environmental) and its impact to food supply and food need</p> <p>(MAT3.1.c)(RWC 04.02.a; RWC04.02.e; RWC04.10.c RWC 4.11.m)</p> <p>PST 01.01.a. Analyze how Ag Mechanics and technology has increased production capabilities</p> <p>(MAT3.1c; MAT3.3c; RWC04.02.a; RWC04.02.b; RWC04.10.c;)</p>	<p>Academic Content Knowledge Alignment:</p> <p>RWC04.02.a - Research and Reasoning - Logical arguments distinguish facts from opinions, and evidence defines reasoned judgment - <i>Synthesize information to support a logical argument</i></p> <p>RWC04.02.e - Research and Reasoning - Logical arguments distinguish facts from opinions, and evidence defines reasoned judgment - <i>Summarize ideas that include alternate views, rich detail, well developed paragraphs, and logical argumentation</i></p> <p>RWC04.10.c - Research and Reasoning - Effective problem-solving strategies require high-quality reasoning - <i>Implement a purposeful and articulated process to solve a problem</i></p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 01.02 The student will understand the history and global significance of agricultural mechanical and technical systems	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 01.02.a. Define major components of ag mechanical and technical systems (engineers, producers, fabricators, retailers)</p> <p>PST 01.02.b Define the major historical events and trends and in agriculture mechanics and technology to global agriculture production</p> <p>PST 01.02.c Compare industrialized nations to non-industrialized nations and their ability to produce food)</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 01.03. relate the efficiency of the agriculture industry to the advances of agriculture technology and mechanization	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 01.03.a Describe how mechanical and technical systems have improved agriculture industry segments (producers, processors, consumers, etc) and distribution channels</p> <p>PST 01.03.b Explain the local, regional, national and global agriculture production and the role of ag mechanics at each level</p> <p>PST 01.03.c Describe the movement of agriculture products through industry segments and the mechanical systems found at each level</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include:	
PST 01.04. individualized career and academic plan (ICAP) correlating to opportunities in ag mechanical and technical systems	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 01.04.a. Identify careers in ag mechanical and technical systems and explore advantages and disadvantages of each</p> <p>PST 01.04.a. Choose a career based upon skills and education necessary for a career</p> <p>PST 01.04.a. Develop an ICAP specific to an ag mechanical and technical systems</p> <p>(RWC03.05.a; RWC03.05.b; RWC03.02g; RWC03.03.a)</p> <p>PST 01.04.a. Review, modify and implement ag mechanical and technical system ICAP</p>	<p>Academic Content Knowledge Alignment:</p> <p>RWC03.02.g - Writing and Composition - Ideas, evidence, structure, and style create persuasive, academic, and technical texts for particular audiences and specific purposes - <i>Draw a conclusion by synthesizing information</i></p> <p>RWC03.03.a - Writing and Composition - Standard English conventions effectively communicate to targeted audiences and purposes - <i>Follow the conventions of Standard English to write varied, strong, correct, complete sentences</i></p> <p>RWC03.05.a - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Articulate a position through a concise and focused claim or thesis statement, and advance it using evidence, examples, and counterarguments</i></p> <p>RWC03.05.b - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Locate and select appropriate information that clearly supports a definite purpose, topic, or position</i></p>

Career Cluster/Cluster Grouping:	Agriculture, Natural Resources & Energy
Pathway(s):	Power, Structure and Technical Systems
Prepared Completer Competencies: PST 02. understand and apply safety procedures in the work environment	
High School Expectations	
Concepts and skills students know include: PST 02.01 understand and use established laboratory procedures (policies)	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 02.01.a. Students will pass safety tests with 100%</p> <p>PST 02.01.b. Pass safety tests with 100% accuracy and have zero safety violations</p> <p>PST 02.01.c. Maintain safe environment in school laboratory setting in an on-going fashion</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 02.02. organize and maintain a clean, orderly work environment	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 02.02.a. Student will identify factors of a clean and orderly work environment</p> <p>PST 02.02.a. Distinguish safe and unsafe work environments</p> <p>PST 02.02.a. Students will assess work environments for cleanliness and orderliness</p> <p>PST 02.02.a. Student will assess a work environment and make recommendations to improve it</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 02.03 use appropriate personal safety equipment	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 02.03.a. Identify personal protective equipment and attire</p> <p>PST 02.03.b. Demonstrate safety in personal equipment and attire by wearing safety glasses and coveralls at all times</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 02.03 identify and locate emergency equipment (fire extinguishers, eye wash, etc)	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 02.03.a. Identify and locate the emergency equipment in the shop; distinguish different types of safety equipment (types of fire extinguishers)</p> <p>PST 02.03.b. Demonstrate use of emergency equipment</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 02.04 Interpret and comply with Material Safety Data Sheets	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 02.04.a. Read MSDS and understand purposes of MSDS</p> <p>(RWC03.05.a; RWC03.05.b; RWC03.02.g; RWC03.03.a; RWC 3.4.e; RWC 3.4.f; RWC 3.4.g;)</p> <p>PST 02.04.b. Apply all principles of a MSDS</p>	<p>Academic Content Knowledge Alignment:</p> <p>RWC03.02.g - Writing and Composition - Ideas, evidence, structure, and style create persuasive, academic, and technical texts for particular audiences and specific purposes - <i>Draw a conclusion by synthesizing information</i></p> <p>RWC03.03.a - Writing and Composition - Standard English conventions effectively communicate to targeted audiences and purposes - <i>Follow the conventions of Standard English to write varied, strong, correct, complete sentences</i></p> <p>RWC03.05.a - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Articulate a position through a concise and focused claim or thesis statement, and advance it using evidence, examples, and counterarguments</i></p> <p>RWC03.05.b - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Locate and select appropriate information that clearly supports a definite purpose, topic, or position</i></p>

	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):
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High School Expectations	
Concepts and skills students know include: PST 02.05. Interpret information on labels and signs	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 02.05.a.Read labels, signs and understand common safety symbols</p> <p>(RWC03.05.a; RWC03.05.b; RWC03.02.g; RWC03.03.a)</p>	<p>Academic Content Knowledge Alignment:</p> <p>RWC03.02.g - Writing and Composition - Ideas, evidence, structure, and style create persuasive, academic, and technical texts for particular audiences and specific purposes - <i>Draw a conclusion by synthesizing information</i></p> <p>RWC03.03.a - Writing and Composition - Standard English conventions effectively communicate to targeted audiences and purposes - <i>Follow the conventions of Standard English to write varied, strong, correct, complete sentences</i></p> <p>RWC03.05.a - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Articulate a position through a concise and focused claim or thesis statement, and advance it using evidence, examples, and counterarguments</i></p> <p>RWC03.05.b - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Locate and select appropriate information that clearly supports a definite purpose, topic, or position</i></p>

	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):
Career Cluster/Cluster Grouping:	Agriculture, Natural Resources & Energy
Pathway(s):	Power, Structure and Technical Systems
Prepared Completer Competencies: PST 03. identify, use and store/maintain tools and materials	
High School Expectations	
Concepts and skills students know include: PST 03.01 identify and use hand tools	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
PST 03.01.a Identify tools and their uses Demonstrate proper and safe operation of tool Maintain and store tools appropriately	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 03.02. identify and use power tools	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 03.02.a. Identify tools and their uses</p> <p>PST 03.02.b. Demonstrate proper and safe operation of tool</p> <p>PST 03.02.c. Maintain and store tools appropriately</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 03.03. identify and use specialty tools	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 03.03.a. Identify specialty tools (engines, cabinetmaking, hard surfacing, plumbing, electrical)</p> <p>PST 03.03.b. Demonstrate proper and safe operation of specialty tools</p> <p>PST 03.03.c. Maintain and store tools appropriately</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 03.04. identify proper tools for the job requirement	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
PST 03.04.a. Students will identify the tools necessary to complete their project/job	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

Career Cluster/Cluster Grouping:	Agriculture, Natural Resources & Energy
Pathway(s):	Power, Structure and Technical Systems
Prepared Completer Competencies: PST 04. demonstrate skills in project completion on individual and group projects	
High School Expectations	
Concepts and skills students know include: PST 04.01. utilize blueprints in completing an agricultural mechanics project	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 04.01.a Student will identify blueprints, their components and describe their purpose</p> <p>PST 04.01.b Read blueprints with accuracy</p> <p>PST 04.01.c Draw their own blueprints and use blueprints to build a project</p> <p>(MAT1.4a; MAT 4.1d MAT 4.1e MAT 4.2c MAT 4.2d MAT 4.2e MAT 4.2f)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.4.a-Mathematics, Number Sense, Properties, and Operations, Application of computation and estimation. - Use appropriate computation methods that encompasses estimation, calculation, and degree of precision.</p> <p>MAT4.1.d-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Apply the effect of dimensional change of length, area, and volume and utilize appropriate units and scales for problem solving situations involving perimeter, area, and volume.</p>

MAT4.1.e-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Analyze real-world situations involving perimeter and area of irregular shapes and volume of cones/pyramids, cylinders/prisms, and spheres.

MAT4.2.c-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Know and apply properties of angles including corresponding, exterior, interior, vertical, complementary, and supplementary angles to solve problems and logically justify results.

MAT4.2.d-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Develop and justify conjectures and solve problems about geometric figures including definitions and properties (congruence, similarity, and symmetry).

MAT4.2.e-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Design a geometric structure with accurate and appropriate units of measure.

	<p>MAT4.2.f-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Develop and justify conjectures about relationships among properties of shapes in two dimensions (polygons and circles) and three dimensions (cones and pyramids, cylinders and prisms, and spheres) using construction tools, including technology.</p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 04.02. develop working drawings	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 04.02.a. Identify and describe different views, scales, and tools necessary for a working drawing</p> <p>(MAT4.1.d)</p> <p>PST 04.02.b. Use a drawing to complete a project</p> <p>(MAT 4.2c MAT 4.2d MAT 4.2e MAT 4.2f)</p> <p>PST 04.02.c. Complete a drawing for a personal agricultural mechanics project</p> <p>(MAT 4.1b MAT 4.1c Mat 4.1d MAT 4.1e MAT 4.2c MAT 4.2d MAT 4.2e MAT 4.2f)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT4.1.b-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Justify, interpret, and apply the use of formulas for the area, surface area, and volume of cones/pyramids, spheres, and cylinders/prisms.</p> <p>MAT4.1.c-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Solve for unknown quantities of two-dimensional shapes involving area and perimeter and with three-dimensional shapes involving volume and surface area.</p> <p>MAT4.1.d-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Apply the effect of dimensional change of length, area, and volume and utilize appropriate units and scales for problem solving situations involving perimeter, area, and volume.</p>

MAT4.1.e-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Analyze real-world situations involving perimeter and area of irregular shapes and volume of cones/pyramids, cylinders/prisms, and spheres.

MAT4.1.f-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Develop and justify conjectures about relationships among properties of shapes in two- and three-dimensions using construction tools, including technology.

MAT4.2.c-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Know and apply properties of angles including corresponding, exterior, interior, vertical, complementary, and supplementary angles to solve problems and logically justify results.

MAT4.2.d-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Develop and justify conjectures and solve problems about geometric figures including definitions and properties (congruence, similarity, and symmetry).

	<p>MAT4.2.e-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Design a geometric structure with accurate and appropriate units of measure.</p> <p>MAT4.2.f-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Develop and justify conjectures about relationships among properties of shapes in two dimensions (polygons and circles) and three dimensions (cones and pyramids, cylinders and prisms, and spheres) using construction tools, including technology.</p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 04.03. Utilize computer aided design programs in designing a project	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 04.03.a. Learn the basic functions of CAD</p> <p>(MAT 4.1b MAT 4.1c MAT 4.1d MAT 4.1e MAT 4.2c MAT 4.2d MAT 4.2e MAT 4.2f)</p> <p>PST 04.03.b. Understand and design simple projects using CAD</p> <p>PST 04.03.c. Understand and design a small structure using CAD</p> <p>PST 04.03.d. Understand, design and build a structure</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT4.1.b-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Justify, interpret, and apply the use of formulas for the area, surface area, and volume of cones/pyramids, spheres, and cylinders/prisms.</p> <p>MAT4.1.c-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Solve for unknown quantities of two-dimensional shapes involving area and perimeter and with three-dimensional shapes involving volume and surface area.</p> <p>MAT4.1.d-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Apply the effect of dimensional change of length, area, and volume and utilize appropriate units and scales for problem solving situations involving perimeter, area, and volume.</p>

MAT4.1.e-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Analyze real-world situations involving perimeter and area of irregular shapes and volume of cones/pyramids, cylinders/prisms, and spheres.

MAT4.1.f-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Develop and justify conjectures about relationships among properties of shapes in two- and three-dimensions using construction tools, including technology.

MAT4.2.c-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Know and apply properties of angles including corresponding, exterior, interior, vertical, complementary, and supplementary angles to solve problems and logically justify results.

MAT4.2.d-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Develop and justify conjectures and solve problems about geometric figures including definitions and properties (congruence, similarity, and symmetry).

MAT4.2.e-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Design a geometric structure with accurate and appropriate units of measure.

MAT4.2.f-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Develop and justify conjectures about relationships among properties of shapes in two dimensions (polygons and circles) and three dimensions (cones and pyramids, cylinders and prisms, and spheres) using construction tools, including technology.

Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 04.04. utilize a bill of materials to complete an agricultural mechanics project	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 04.04.a. Describe a bill of materials and the purpose for having a bill of materials</p> <p>PST 04.04.b. Complete a bill of materials including prices and quantities (MAT1.4.a; MAT2.6.c)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.1.a-Mathematics, Number Sense, Properties, and Operations, Analysis of the properties of the system of real numbers, including a comparison of the rational and real number systems. - Explain that between any two rational numbers there is a countable and infinite number of rational numbers and that between any two irrational numbers there is an uncountable and infinite number of irrational numbers.</p> <p>MAT2.6.c-Mathematics, Patterns, Functions, and Algebraic Structures, Use of elementary functions (linear, quadratic, power, and exponential and their inverses) and their transformations to identify essential quantitative relationships in a situation and to model real world situations, using all available tools, including technology. - Analyze the reasonableness of a solution in its given context and compare the solution to appropriate graphical and numerical estimates.</p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 04.05. develop a procedure list and an order of fabrication	
Evidence Outcomes - Students can:	21st Century Skills and Readiness Competencies
<p>PST 04.05.a. Describe the importance of a procedure list and order of fabrication</p> <p>PST 04.05.b. Student will develop a list of procedures and a timeline for project completion</p> <p>(RWC03.05.a; RWC03.05.b; RWC03.02.g; RWC03.02.g; RWC 3.4.c)</p>	<p>Academic Content Knowledge Alignment:</p> <p>RWC03.05.a - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Articulate a position through a concise and focused claim or thesis statement, and advance it using evidence, examples, and counterarguments</i></p> <p>RWC03.05.b - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Locate and select appropriate information that clearly supports a definite purpose, topic, or position</i></p> <p>RWC03.02.g - Writing and Composition - Ideas, evidence, structure, and style create persuasive, academic, and technical texts for particular audiences and specific purposes - <i>Draw a conclusion by synthesizing information</i></p> <p>RWC03.03.a - Writing and Composition - Standard English conventions effectively communicate to targeted audiences and purposes - <i>Follow the conventions of Standard English to write varied, strong, correct, complete sentences</i></p> <p>RWC3.4.c-Reading, Writing and Communicating, Writing and Composition, Self-edit work for grammar, usage, and mechanics appropriate to audience, purpose, and context. - Use word processing software tools (e.g., dictionary, thesaurus, spellchecker, grammar check)</p>

	to edit work.
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 04.06. Accurately measure building materials (i.e. steel, wood, concrete, etc)	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 04.06.a. Identify increments on a tape measure (MAT1.1.a;)</p> <p>PST 04.05.b. Students will measure materials using the correct methods based on the material being measured (MAT1.4.a; MAT2.6.c)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.1.a-Mathematics, Number Sense, Properties, and Operations, Analysis of the properties of the system of real numbers, including a comparison of the rational and real number systems. - Explain that between any two rational numbers there is a countable and infinite number of rational numbers and that between any two irrational numbers there is an uncountable and infinite number of irrational numbers.</p> <p>MAT1.4.a-Mathematics, Number Sense, Properties, and Operations, Application of computation and estimation. - Use appropriate computation methods that encompasses estimation, calculation, and degree of precision.</p> <p>MAT2.6.c-Mathematics, Patterns, Functions, and Algebraic Structures, Use of elementary functions (linear, quadratic, power, and exponential and their inverses) and their transformations to identify essential quantitative relationships in a situation and to model real world situations, using all available tools, including technology. - Analyze the reasonableness of a solution in its given context and compare the solution to appropriate graphical and numerical estimates.</p>

	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):
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High School Expectations	
Concepts and skills students know include: PST 04.06. Demonstrate effective work habits individually and in group work	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 04.06.a. Identify effective work habits</p> <p>PST 04.06.b. Demonstrate habits that increase efficiency and craftsmanship</p> <p>PST 04.06.c. Evaluate performance individually and in group and make improvement</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

Career Cluster/Cluster Grouping:	Agriculture, Natural Resources & Energy
Pathway(s):	Power, Structure and Technical Systems
Prepared Completer Competencies: PST 05. Utilize construction principles in building a agricultural mechanics construction project	
High School Expectations	
Concepts and skills students know include: PST 05.01. Define construction terminology	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 05.01.a. Define basic terms used in construction</p> <p>PST 05.01.a. Define and utilize appropriate construction terminology</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 05.02. Select construction materials	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 05.02.a. Identify different construction materials</p> <p>PST 05.02.b. Identify construction materials and their common dimensions</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 05.03. Identify local building permit requirements	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 05.03.a.Read local permit requirements</p> <p>PST 05.03.a.Read and understand the different aspects of building requirements</p> <p>(RWC03.05.a; RWC03.05.b; RWC03.02.g; RWC 3.4.a; RWC 3.4.b)</p> <p>PST 05.03.a.Prepare and apply for a construction permit</p> <p>(MAT1.4.a; MAT2.6.c)</p> <p>PST 05.03.a.Build and be inspected by local authorities</p> <p>(MAT1.4.a; MAT2.6.c)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.4.a-Mathematics, Number Sense, Properties, and Operations, Application of computation and estimation. - Use appropriate computation methods that encompasses estimation, calculation, and degree of precision.</p> <p>MAT2.6.c-Mathematics, Patterns, Functions, and Algebraic Structures, Use of elementary functions (linear, quadratic, power, and exponential and their inverses) and their transformations to identify essential quantitative relationships in a situation and to model real world situations, using all available tools, including technology. - Analyze the reasonableness of a solution in its given context and compare the solution to appropriate graphical and numerical estimates.</p> <p>RWC03.02.g - Writing and Composition - Ideas, evidence, structure, and style create persuasive, academic, and technical texts for particular audiences and specific purposes - <i>Draw a conclusion by synthesizing information</i></p> <p>RWC03.03.a - Writing and Composition - Standard English conventions effectively communicate to targeted audiences and purposes - <i>Follow the conventions of Standard English to write varied, strong, correct, complete sentences</i></p> <p>RWC03.05.a - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Articulate a position through a concise and focused claim or thesis statement, and</i></p>

	<p><i>advance it using evidence, examples, and counterarguments</i></p> <p>RWC03.05.b - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Locate and select appropriate information that clearly supports a definite purpose, topic, or position</i></p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 05.04.a. Operate a transit/ level for surveying and layout purposes	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 05.04.a. Learn the different types of levels and transits</p> <p>PST 05.04.b. Learn the parts of a level and transit</p> <p>PST 05.04.c. Measure elevation using differential survey, lay out a contour line (MAT 1.4a; MAT 4.3a MAT 4.3c)</p> <p>PST 05.04.d. Lay out a foundation, lay out a ditch to grade (MAT 4.1b MAT 4.1c MAT 4.1d MAT 4.1e MAT 4.2 c; MAT 4.3a MAT 4.3c)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.4.a-Mathematics, Number Sense, Properties, and Operations, Application of computation and estimation. - Use appropriate computation methods that encompasses estimation, calculation, and degree of precision.</p> <p>MAT4.1.b-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Justify, interpret, and apply the use of formulas for the area, surface area, and volume of cones/pyramids, spheres, and cylinders/prisms.</p> <p>MAT4.1.c-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Solve for unknown quantities of two-dimensional shapes involving area and perimeter and with three-dimensional shapes involving volume and surface area.</p>

	<p>MAT4.1.d-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Apply the effect of dimensional change of length, area, and volume and utilize appropriate units and scales for problem solving situations involving perimeter, area, and volume.</p> <p>MAT4.1.e-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Analyze real-world situations involving perimeter and area of irregular shapes and volume of cones/pyramids, cylinders/prisms, and spheres.</p> <p>MAT4.2.c-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Know and apply properties of angles including corresponding, exterior, interior, vertical, complementary, and supplementary angles to solve problems and logically justify results.</p> <p>MAT4.3.a-Mathematics, Shape, Dimension, and Geometric Relationships, Utilization of Cartesian coordinate system in geometric contexts. - Determine the midpoint of a line and the distance between two points in the Cartesian coordinate plane.</p> <p>MAT4.3.c- Represent transformations (reflection about the x- and y-axes, translation, rotation about the origin, and dilations) using the Cartesian coordinates.</p>
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	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 05.05. Select, identify, and use lumber	
Evidence Outcomes - Students can:	21st Century Skills and Readiness Competencies
<p>PST 05.05.a. Learn the different types of lumber and characteristics of each</p> <p>PST 05.05.b. Learn what types of lumber to use for different applications</p> <p>PST 05.05.c. Select a project and type of lumber needed</p> <p>PST 05.05.d. Construct project</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: S PST 05.06. Identify, select, and use fasteners and hardware	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 05.06.a. Identify the different types of hardware fasteners and their uses</p> <p>PST 05.06.b. Select and utilize appropriate hardware for in agricultural mechanics situations</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 05.07.a. Frame structures	
Evidence Outcomes Students can	21st Century Skills and Readiness Competencies
<p>PST 05.07.a. Identify correct spacing for joists, studs and rafters.</p> <p>PST 05.07.b. Define and describe procedures for framing a floor, wall and rafters (MAT1.4a; MAT2.1b; MAT4.1.b; MAT4.1C; MAT4.6.a; MAT4.6.c)</p> <p>PST 05.07.c. Frame a floor and wall with doors and windows (MAT 4.1.b; MAT 4.1.c)</p> <p>PST 05.07.c. Layout and cut rafters (MAT4.1.b; MAT4.1C; MAT4.2e; MAT4.6.c)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.4.a-Mathematics, Number Sense, Properties, and Operations, Application of computation and estimation. - Use appropriate computation methods that encompasses estimation, calculation, and degree of precision.</p> <p>MAT2.1.b-Mathematics, Patterns, Functions, and Algebraic Structures, Representation of continuous relations and elementary functions (linear, quadratic, absolute value, power, and exponential functions and their inverses) and of discrete relations and elementary functions (arithmetic and geometric sequences) using tables, graphs, symbols, text, and geometric models. - Demonstrate the relationship between all representations of linear functions using point-slope, slope-intercept, and standard form of a line.</p> <p>MAT4.1.b-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Justify, interpret, and apply the use of formulas for the area, surface area, and volume of cones/pyramids, spheres, and cylinders/prisms.</p>

	<p>MAT4.1.c-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Solve for unknown quantities of two-dimensional shapes involving area and perimeter and with three-dimensional shapes involving volume and surface area.</p> <p>MAT4.2.e-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Design a geometric structure with accurate and appropriate units of measure.</p> <p>MAT4.6.a-Mathematics, Shape, Dimension, and Geometric Relationships, Indirect measurement of quantities using techniques of algebra or geometry. - Apply right triangle trigonometry to find indirect measures of lengths and angles.</p> <p>MAT4.6.c- Apply the Pythagorean theorem, sine, cosine and tangent functions to analyze and propose a solution to a real-world situation.</p> <p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>
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High School Expectations	
Concepts and skills students know include: PST 05.08. Select appropriate insulation materials	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 05.08.a. Identify the different types of insulation</p> <p>PST 05.08.b. Describe safety precautions used while installing insulation</p> <p>(RWC04.10.c)</p> <p>PST 05.08.c. Distinguish the different "R" ratings for insulation</p> <p>(RWC04.10.c)</p> <p>PST 05.08.d. Install insulation</p> <p>(MAT4.1.b, MAT4.1.c; MAT4.1.d; MAT4.1.e)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT4.1.b-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Justify, interpret, and apply the use of formulas for the area, surface area, and volume of cones/pyramids, spheres, and cylinders/prisms.</p> <p>MAT4.1.c-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Solve for unknown quantities of two-dimensional shapes involving area and perimeter and with three-dimensional shapes involving volume and surface area.</p> <p>MAT4.1.d-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Apply the effect of dimensional change of length, area, and volume and utilize appropriate units and scales for problem solving situations involving perimeter, area, and volume.</p>

	<p>MAT4.1.e-Mathematics, Shape, Dimension, and Geometric Relationships, Determination and utilization of the area of irregular shapes, and surface area and volume of cones and pyramids, cylinders and prisms, and spheres. - Analyze real-world situations involving perimeter and area of irregular shapes and volume of cones/pyramids, cylinders/prisms, and spheres.</p> <p>RWC04.10.c - Research and Reasoning - Effective problem-solving strategies require high-quality reasoning - <i>Implement a purposeful and articulated process to solve a problem</i></p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 05.09. Select appropriate and apply appropriate roofing materials	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 05.09.a. Identify different types of roofing materials</p> <p>PST 05.09.b. Calculate and figure square feet for roofing (100 square feet = 1 square)</p> <p>(MAT 1.4.a; MAT 4.1b MAT 4.1 c MAT 4.1d MAT 4.1e)</p> <p>PST 05.09.c. Describe proper procedures install shingles and steel roofing materials</p> <p>PST 05.09.d. Install shingles and steel roofing</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT4.1.b- Justify, interpret, and apply the use of formulas for the area, surface area, and volume of cones/pyramids, spheres, and cylinders/prisms.</p> <p>MAT4.1.c- Solve for unknown quantities of two-dimensional shapes involving area and perimeter and with three-dimensional shapes involving volume and surface area.</p> <p>MAT4.1.d- Apply the effect of dimensional change of length, area, and volume and utilize appropriate units and scales for problem solving situations involving perimeter, area, and volume.</p> <p>MAT4.1.e- Analyze real-world situations involving perimeter and area of irregular shapes and volume of cones/pyramids, cylinders/prisms, and spheres.</p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 05.10. Select and apply siding and sheathing	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 05.10.a. Identify procedures for applying siding and sheathing</p> <p>PST 05.10.a. Describe procedures for installing siding and sheathing</p> <p>PST 05.10.a. Calculate amount of material needed to install siding and sheathing</p> <p>(MAT1.4a;MAT 4.1b MAT 4.1 c MAT 4.1d MAT 4.1e)</p> <p>PST 05.10.a. Install siding and sheathing</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT4.1.b- Justify, interpret, and apply the use of formulas for the area, surface area, and volume of cones/pyramids, spheres, and cylinders/prisms.</p> <p>MAT4.1.c- Solve for unknown quantities of two-dimensional shapes involving area and perimeter and with three-dimensional shapes involving volume and surface area.</p> <p>MAT4.1.d- Apply the effect of dimensional change of length, area, and volume and utilize appropriate units and scales for problem solving situations involving perimeter, area, and volume.</p> <p>MAT4.1.e- Analyze real-world situations involving perimeter and area of irregular shapes and volume of cones/pyramids, cylinders/prisms, and spheres.</p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 05.11. Install doors and windows	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 05.11.a. Identify the different types of doors and windows</p> <p>PST 05.11.b. Install windows and doors (MAT1.4.a)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.4.a-Mathematics, Number Sense, Properties, and Operations, Application of computation and estimation. - Use appropriate computation methods that encompasses estimation, calculation, and degree of precision.</p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 05.12. Selecting and applying wood finishes	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 05.12.a. Learn the different types and uses of paint</p> <p>PST 05.12.b. Calculate quantity of paint needed to trim and paint a building</p> <p>(MAT1.4a; mat 4.1b mat 4.1 c mat 4.1d mat 4.1e)</p> <p>PST 05.12.c. Apply paint/finish with brushes and rollers building</p> <p>PST 05.12.c. Apply paint/finish with low and high pressure sprayers</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.4.a-Mathematics, Number Sense, Properties, and Operations, Application of computation and estimation. - Use appropriate computation methods that encompasses estimation, calculation, and degree of precision.</p> <p>MAT4.1.b- Justify, interpret, and apply the use of formulas for the area, surface area, and volume of cones/pyramids, spheres, and cylinders/prisms.</p> <p>MAT4.1.c- Solve for unknown quantities of two-dimensional shapes involving area and perimeter and with three-dimensional shapes involving volume and surface area.</p> <p>MAT4.1.d- Apply the effect of dimensional change of length, area, and volume and utilize appropriate units and scales for problem solving situations involving perimeter, area, and volume.</p> <p>MAT4.1.e- Analyze real-world situations involving perimeter and area of irregular shapes and volume of cones/pyramids, cylinders</p> <p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

Career Cluster/Cluster Grouping:	Agriculture, Natural Resources & Energy
Pathway(s):	Power, Structure and Technical Systems
Prepared Completer Competencies: PST 06. Electrical principals, circuit theory and will apply them in practical settings	
High School Expectations	
Concepts and skills students know include: PST 06.01. Electrical terminology and calculations	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 06.01.a. Define electrical terms (current, conductor, volt, watt, amp, alternating vs. direct current)</p> <p>PST 06.01.b. Calculate the cost of electrical power (MAT1.4.a; MAT3.3.c: SCI1.5.a; SCI1.5b; SCI1.5c; SCI1.5d)</p> <p>PST 06.01.c. Perform Ohms law calculations for series and parallel circuits (MAT1.4.a; MAT3.3.c: SCI1.5.a; SCI1.5.d)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.4.a-Mathematics, Number Sense, Properties, and Operations, Application of computation and estimation. - Use appropriate computation methods that encompasses estimation, calculation, and degree of precision.</p> <p>MAT3.3.c-Mathematics, Data Analysis, Statistics, and Probability, Selection of appropriate methods to collect, organize and analyze data (numerical and categorical, univariate and bivariate) using tables, graphical displays, and numerical summary statistics. - Recognize association between two categorical variables.</p> <p>RWC04.10.c - Research and Reasoning - Effective problem-solving strategies require high-quality reasoning - <i>Implement a purposeful and articulated process to solve a problem</i></p>

<p>PST 06.01.d. Analyze circuits for malfunctions including over or under current; understand applications of the National Electric Code (MAT1.4.a; MAT3.3.c) (RWC04.10.c)</p>	<p>SCI1.5.a-Science, Physical Science, Energy exists in many forms (mechanical, chemical, electrical, radiant, thermal, and nuclear) that can be quantified and experimentally determined - Develop, communicate, and justify an evidence-based scientific explanation regarding the potential and kinetic nature of mechanical energy.</p> <p>SCI1.5.b-Science, Physical Science - Use appropriate measurements, equations and graphs to gather, analyze, and interpret data on the quantity of energy in a system or an object.</p> <p>SCI1.5.c-Science, Physical Science - Use direct and indirect evidence to develop predictions of the types of energy associated with objects.</p> <p>SCI1.5.d-Science, Physical Science - Identify different energy forms, and calculate their amounts by measuring their defining characteristics.</p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 06.02. Wiring alternating current electrical circuits (see also ag power electric motors)	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 06.02.a. Diagram a common electrical circuit for outlets, lights and switches</p> <p>PST 06.02.b. Wire simple circuits (single-pole switch to light, source to receptacle, etc)</p> <p>PST 06.02.c. Wire various single pole and double pole switch circuits utilizing switch loops</p> <p>PST 06.02.d. Wire a wall according to code</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 06.03.Wiring direct current electrical circuits	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 06.03.a. Diagram a common direct current electrical circuit</p> <p>PST 06.03.b. Wire simple direct current circuit (battery to light)</p> <p>PST 06.03.c. Install vehicle or implement lighting and brake system</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

Career Cluster/Cluster Grouping:	Agriculture, Natural Resources & Energy
Pathway(s):	Power, Structure and Technical Systems
Prepared Completer Competencies: PST 07. Understanding and utilizing plumbing skills	
High School Expectations	
Concepts and skills students know include: PST 07.01. Identify tools and equipment used in plumbing processes	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 07.01.a. Identify tools to be used in plumbing projects</p> <p>PST 07.01.b. Identify different plumbing materials (pipe) and joints (i.e. couplings)</p> <p>PST 07.01.c. Utilize tools and calculate needed materials to complete a plumbing project (MAT1.4.a)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.4.a-Mathematics, Number Sense, Properties, and Operations, Application of computation and estimation. - Use appropriate computation methods that encompasses estimation, calculation, and degree of precision.</p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 07.02. Joining plumbing pipe	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 07.02.a. Determine type of plumbing pipe and indentify proper supplies needed for process</p> <p>PST 07.02.b. Determine length & cut pieces of pipe to size (MAT1.4.a)</p> <p>PST 07.02.c. Utilize proper procedures for joining pipe</p> <p>PST 07.02.d. Analyze processes for inconsistencies and joining defects</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.4.a-Mathematics, Number Sense, Properties, and Operations, Application of computation and estimation. - Use appropriate computation methods that encompasses estimation, calculation, and degree of precision.</p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

Career Cluster/Cluster Grouping:	Agriculture, Natural Resources & Energy
Pathway(s):	Power, Structure and Technical Systems
Prepared Completer Competencies: PST 08. Understand and operate power and mechanical systems for agriculture use	
High School Expectations	
Concepts and skills students know include: PST 08.01. Identify uses of power systems in agriculture	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 08.01.a. Identify electric motors, small gas engines and farm power systems and their application in agriculture</p> <p>PST 08.01.b. select the appropriate the power system given different scenarios</p> <p>PST 08.01.c. Determine capability of each type of power system</p> <p>(SCI 1.5b; SCI 1.6b)</p>	<p>Academic Content Knowledge Alignment:</p> <p>SCI1.5.b-Science, Physical Science, Energy exists in many forms (mechanical, chemical, electrical, radiant, thermal, and nuclear) that can be quantified and experimentally determined. - Use appropriate measurements, equations and graphs to gather, analyze, and interpret data on the quantity of energy in a system or an object.</p> <p>SCI1.6.b-Science, Physical Science, When energy changes form, it is neither created not destroyed; however, because some is necessarily lost as heat, the amount of energy available to do work decreases - Evaluate the energy conversion efficiency of a variety of energy transformations.</p>

	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):
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High School Expectations	
Concepts and skills students know include: PST 08.02 Installation, operation and maintenance of electrical motors	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 08.02.a. Identify components of electric motors</p> <p>PST 08.02.b. Describe the operation of electric motors and control devices</p> <p>PST 08.02.c. Safely install an electric motor and control devices based on procedures in operators manual</p> <p>(RWC03.05.a; RWC03.05.b; RWC03.02.g; RWC03.03.a)</p> <p>PST 08.02.d. Select the appropriate type of electric motor for given scenario</p>	<p>Academic Content Knowledge Alignment:</p> <p>RWC03.02.g - Writing and Composition - Ideas, evidence, structure, and style create persuasive, academic, and technical texts for particular audiences and specific purposes - <i>Draw a conclusion by synthesizing information</i></p> <p>RWC03.03.a - Writing and Composition - Standard English conventions effectively communicate to targeted audiences and purposes - <i>Follow the conventions of Standard English to write varied, strong, correct, complete sentences</i></p> <p>RWC03.05.a - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Articulate a position through a concise and focused claim or thesis statement, and advance it using evidence, examples, and counterarguments</i></p> <p>RWC03.05.b - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Locate and select appropriate information that clearly supports a definite purpose, topic, or position</i></p>

	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):
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High School Expectations	
Concepts and skills students know include: PST 08.03. identify and select electric motors based upon needs	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 08.03.a. Identify applications of use for electric motor</p> <p>PST 08.03.b. Describe the specifications of a particular electric motor based upon the mounted tab</p> <p>(RWC03.05.a; RWC03.05.b; RWC03.02.g; RWC03.03.a)</p> <p>PST 08.03.c. Determine horsepower and duty cycle requirements for required application (SCI 1.5d)</p> <p>PST 08.03.d. Select appropriate motor base for required applications</p>	<p>Academic Content Knowledge Alignment:</p> <p>RWC03.02.g - Writing and Composition - Ideas, evidence, structure, and style create persuasive, academic, and technical texts for particular audiences and specific purposes - <i>Draw a conclusion by synthesizing information</i></p> <p>RWC03.03.a - Writing and Composition - Standard English conventions effectively communicate to targeted audiences and purposes - <i>Follow the conventions of Standard English to write varied, strong, correct, complete sentences</i></p> <p>RWC03.05.a - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Articulate a position through a concise and focused claim or thesis statement, and advance it using evidence, examples, and counterarguments</i></p> <p>RWC03.05.b - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Locate and select appropriate information that clearly supports a definite purpose, topic, or position</i></p> <p>SCI1.5d- Science, Physical Science, Energy exists in many forms such as mechanical, chemical, electrical, radiant, thermal, and nuclear, that can be quantified and experimentally determined. – Identify different energy forms, and calculate their amounts by measuring their defining characteristics.</p>

	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):
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High School Expectations	
Concepts and skills students know include:	
PST 08.04. disassemble, repair and reassemble a small gas engine	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 08.04.a. Identify and describe functions of each small gas engine component</p> <p>PST 08.04.b. Disassemble and reassemble engine according to accepted procedures and required specifications</p> <p>(RWC03.05.a; RWC03.05.b; RWC03.02.g; RWC03.03.a)</p> <p>PST 08.04.c. Troubleshoot engine problems</p> <p>PST 08.04.d. Replace worn or damaged parts of engine and return it to proper functioning</p>	<p>Academic Content Knowledge Alignment:</p> <p>RWC03.02.g - Writing and Composition - Ideas, evidence, structure, and style create persuasive, academic, and technical texts for particular audiences and specific purposes - <i>Draw a conclusion by synthesizing information</i></p> <p>RWC03.03.a - Writing and Composition - Standard English conventions effectively communicate to targeted audiences and purposes - <i>Follow the conventions of Standard English to write varied, strong, correct, complete sentences</i></p> <p>RWC03.05.a - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Articulate a position through a concise and focused claim or thesis statement, and advance it using evidence, examples, and counterarguments</i></p> <p>RWC03.05.b - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Locate and select appropriate information that clearly supports a definite purpose, topic, or position</i></p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: service power mechanics engine systems (including ignition, exhaust, cooling, lubrication, and fuel systems)	
Evidence Outcomes - Students can:	21st Century Skills and Readiness Competencies
<p>PST 08.05.a Identify components of the system, engine nomenclature and operating principles of the system (including ignition, exhaust, cooling, lubrication, fuel)</p> <p>PST 08.05.a Determine service intervals and proper maintenance procedure for each system</p> <p>PST 08.05.c Troubleshoot engine problems within each system</p> <p>PST 08.05.d Replace worn or damaged parts of engine system and return it to proper functioning based on service manual recommendations</p> <p>(RWC03.05.a; RWC03.05.b; RWC03.02.g; RWC03.03.a)</p>	<p>Academic Content Knowledge Alignment:</p> <p>RWC03.02.g - Writing and Composition - Ideas, evidence, structure, and style create persuasive, academic, and technical texts for particular audiences and specific purposes - <i>Draw a conclusion by synthesizing information</i></p> <p>RWC03.03.a - Writing and Composition - Standard English conventions effectively communicate to targeted audiences and purposes - <i>Follow the conventions of Standard English to write varied, strong, correct, complete sentences</i></p> <p>RWC03.05.a - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Articulate a position through a concise and focused claim or thesis statement, and advance it using evidence, examples, and counterarguments</i></p> <p>RWC03.05.b - Writing and Composition - Elements of informational and persuasive texts can be refined to inform or influence an audience - <i>Locate and select appropriate information that clearly supports a definite purpose, topic, or position</i></p>

	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):
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High School Expectations	
Concepts and skills students know include: PST 08.06. Service schedules and the need for regular maintenance on power equipment systems	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 08.06.a. The student will identify wearable components of a power equipment system (belts, oil, battery, tires, hydraulics, spark plugs, wheel bearings)</p> <p>PST 08.06.b. Perform necessary preventative maintenance checks, check fluid levels, ensure safety equipment is in place and operational</p> <p>PST 08.06.c. Evaluate systems for wear and future maintenance needs</p> <p>PST 08.06.d. Perform necessary repair to identified components of power systems</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 08.07 Calibrate and operate implements attached to agriculture power equipment	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 08.07.a. Identify categories of implements and their uses (tillage and seed bed prep, planting, harvesting, transporting)</p> <p>PST 08.07.a. Indentify parts of implement; understand operation principles of implement including power needs (PTO, Hydraulic)</p> <p>PST 08.07.a. Safely hitch (attach) and operate safety equipment</p> <p>PST 08.07.a. Calibrate implement for intended use and troubleshoot implement malfunctions</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

Career Cluster/Cluster Grouping:	Agriculture, Natural Resources & Energy
Pathway(s):	Power, Structure and Technical Systems
Prepared Completer Competencies: PST 09. Understand the welding process and correctly demonstrate welding processes	
High School Expectations	
Concepts and skills students know include: PST 09.01 Welding Safety	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 09.01.a. Identify safe welding practices for each welding process</p> <p>PST 09.01.b. Demonstrate safe welding practices for each welding process</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 09.02. welding processes	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 09.02.a. Identify and describe uses of equipment and materials used for each welding process and the situation for each welding process (SCI 1.4.b)</p> <p>PST 09.02.a. Describe the reaction that occurs in each welding process (SCI 1.3b)</p> <p>PST 09.02.a. Identify quality welds based on knowledge of the welding process</p> <p>PST 09.02.a. Analyze processes for inconsistencies and defects</p>	<p>Academic Content Knowledge Alignment:</p> <p>SCI1.3.b-Science, Physical Science, Matter can change form through chemical or nuclear reactions abiding by the laws of conservation of mass and energy. - Predict reactants and products for different types of chemical and nuclear reactions</p> <p>SCI1.4.b- Science, Physical Science, Atoms bond in different ways to form molecules and compounds that have definite properties- Gather, analyze, and interpret data on chemical and physical properties of different compounds such as density, melting point, boiling point, pH, and conductivity</p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>

High School Expectations	
Concepts and skills students know include: PST 09.03. Allied cutting processes	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 09.03.a. Perform metal cutting operations utilizing an abrasive saw, hydraulic shear and band saw</p> <p>PST 09.03.b. Perform strait line cuts on mild steel plate utilizing oxyacetylene and plasma cutting processes</p> <p>PST 09.03.c. Perform beveled edge cuts and hole piercing on mild steel plate utilizing oxyacetylene and plasma cutting processes</p> <p>PST 09.03.d. Use heating tool (rose bud) utilizing oxyacetylene process Perform various cuts on stainless steel and aluminum utilizing the plasma cutting process</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 09.04. Oxyacetylene Joining Process	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 09.04.a. Demonstrate proper set up and neutral flame setting of the oxyacetylene torch system Perform outside corner and butt joint welds without filler metal in the flat position</p> <p>PST 09.03.a. Perform fillet welds in lap and tee joints with filler metal in the flat position</p> <p>PST 09.03.a. Perform open butt joint full penetration in the flat position</p> <p>PST 09.03.a. Perform all of level 2 competencies in the vertical position</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 09.04. Shielded Metal Arc Welding process (SMAW)	
Evidence Outcomes - Students can:	21st Century Skills and Readiness Competencies
<p>PST 09.04.a. Run a strait bead on flat plate utilizing 6010 and 7018 electrode Pad a plate utilizing 6010 and 7018 electrode</p> <p>PST 09.04.a. Perform a multi – pass fillet weld in a tee joint utilizing 6010 and 7018 electrodes</p> <p>PST 09.04.a. Perform a fillet weld in a tee joint utilizing 6010 electrode vertical down Perform an open butt joint full penetration utilizing 6010 for the root and 7018 for the cover pass in the flat position</p> <p>PST 09.04.a. Perform all of level 2 competencies in the vertical position</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 09.05. Gas Metal Arc Welding process (GMAW)	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 09.05.a. Demonstrate and explain machine settings for short circuit transfer GMAW welding Perform a fillet weld in a lap and tee joint in the flat and vertical down positions</p> <p>PST 09.05.b. Perform a fillet weld in a tee joint vertical up and over head positions</p> <p>PST 09.05.c. Perform an open butt joint full penetration in the flat and vertical positions</p> <p>PST 09.05.d. Demonstrate and explain machine settings for spray transfer GMAW welding</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 09.06.a. Gas Tungsten Arc Welding (GTAW)	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 09.06.a. Demonstrate proper machine and torch set up</p> <p>PST 09.06.b. Perform a fillet weld in a lap joint on stainless steel in the flat position</p> <p>PST 09.06.c. Perform a fillet weld in a lap joint on aluminum in the flat position</p>	Academic Content Knowledge Alignment:
	Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):

High School Expectations	
Concepts and skills students know include: PST 09.07. Develop a project incorporating all of the welding processes	
Evidence Outcomes Students can:	21st Century Skills and Readiness Competencies
<p>PST 09.07.a. Prepare a material list and cut list for metal fabrication or repair project. Select layout tools required for metal fabrication or repair project. Select welding process/es to be used for metal fabrication or repair project.</p> <p>(MAT1.4.a)</p> <p>PST 09.07.a. Demonstrate procedures to control distortion in a weldment. Construct jigs and or templates for metal fabrication or repair.</p> <p>(MAT1.4.a; MAT4.2.c; MAT4.2.d; MAT4.2.e; MAT4.2.f)</p> <p>PST 09.07.a. Cut, layout, weld, and complete fabrication project with craftsmanship quality.</p> <p>(MAT1.4.a ;MAT4.2.c; MAT4.2.d; MAT4.2.e; MAT4.2.f)</p>	<p>Academic Content Knowledge Alignment:</p> <p>MAT1.4.a-Mathematics, Number Sense, Properties, and Operations, Application of computation and estimation. - Use appropriate computation methods that encompasses estimation, calculation, and degree of precision.</p> <p>MAT4.2.c-Mathematics, Shape, Dimension, and Geometric Relationships, Relationships among two- and three-dimensional geometric figures, including congruence, similarity and symmetry. - Know and apply properties of angles including corresponding, exterior, interior, vertical, complementary, and supplementary angles to solve problems and logically justify results.</p> <p>MAT4.2.d- - Develop and justify conjectures and solve problems about geometric figures including definitions and properties (congruence, similarity, and symmetry).</p> <p>MAT4.2.e- - Design a geometric structure with accurate and appropriate units of measure.</p>

<p>PST 09.07.a. Perform a repair project with craftsmanship quality (MAT1.4.a ;MAT4.2.c; MAT4.2.d; MAT4.2.e; MAT4.2.f)</p>	<p>MAT4.2.f- Develop and justify conjectures about relationships among properties of shapes in two dimensions (polygons and circles) and three dimensions (cones and pyramids, cylinders and prisms, and spheres) using construction tools, including technology.</p>
	<p>Learning & Behavioral Skills (Inquiry, Application in Society & Technology & Nature of...):</p>