Middle-level CTE Learning Experience Title: Faulty System

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CTE Area: Agriculture

CTE Theme: Problem Solving and Innovation

repair and propose preventative maintenance solution

Essential Question(s)	What knowledge and skills are necessary to demonstrate introductory understanding of the application of problem-solving
	processes and the acquisition, evaluation and application of the products of research for informed decision making? What knowledge and skills are necessary to demonstrate introductory understanding of how power, mechanical and technical systems support efficient work in the agriculture industry?
National Standards	Common Career Technical Core Standards https://www.careertech.org/career-ready-practices Career Ready Practices 2. Apply appropriate and academic and technical skills 4. Communicate clearly and effectively and with reason 6. Demonstrate creativity and innovation 7. Employ valid and reliable research strategies 8. Utilize critical thinking to make sense of problems and persevere in solving them 11. Use technology to enhance productivity 12. Work productively in teams while using cultural global competence National Agricultural Education Standards https://thecouncil.ffa.org/afnr PST.01. Apply physical science principles and engineering applications to solve problems and improve performance AFNR power, structural and technical systems CRP.02. Apply appropriate academic and technical skills CRP.06. Demonstrate creativity and innovation CRP.07. Employ valid and reliable research strategies CRP.08. Utilize critical thinking to make sense of problems and persevere in solving them CRP.11. Use technology to enhance productivity

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NYS	Standards			http:// Stand	<mark>//www.p1</mark> lard 1: Ca	2.nysed. reer Deve	gov/ct elopme	<u>e/</u> ent Stude	•	know	Studies (CDOS) Standards Intermediate Level redgeable about the world of work, explore career options, and relate decisions.
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	systems in the agriculture industry						
	2. Safety						
	Students will						
	a) Explain hazards associated with the tools, equipment, machinery and technology used in a mechanical and technical systems						
	b) Follow guidelines for safe use of agriculture tools, equipment, machinery and technology						
	c) Demonstrate appropriate and consistent use of safety features found on agricultural tools, equipment and machinery						
	I care of Personal Protective Equipment (PPE) and safety apparel in						
	agriculture 3. Tools, Equipment and Machinery						
	Students will						
	a) Identify and select the appropriate tools, equipment and machinery for use in specific agricultural tasks						
	6. Careers in Agriculture Power, Mechanics and T	echnical Fields					
	Students will						
	a) Investigate a career in agriculture power, mechanics or technical fields and identify the pathways used to reach that career						
Vocabulary	Academic	Content					
Innovation, Troubleshoot, Technology GPS, Robotics, Power, Mechanical, Technology Technology							
Materials and Resources	Agriscience notebook (Day 1, 2, 3, 5, 6)	1 33					

Comparing Agriculture of the Past with Today (Day 1)

https://www.animalsmart.org/animals-and-the-environment/comparing-agriculture-of-the-past-with-today

Poster paper, tape, pictures of: tools, equipment, machinery, computers, 2 or 4 stroke single cylinder engine, etc.(Day 1)

5 Ways Technology Has Changed Agriculture (Day 1)

https://www.businessinsider.com/15-emerging-agriculture-technologies-2014-4

New Mexico Agricultural Mechanics and Technology Lesson Plan Library. Unit A. Problem Area 1. Lesson 7. Page 3.(Day2)

https://www.nmffa.org/uploads/4/1/0/7/41075673/a1_7_exploring_careers_in_agricultural_mechanics_and_technology_sy stems.pdf

Purdue University Safety in Agricultural Mechanics (Day 3)

https://ag.purdue.edu/ipia/hasil/Unit%20B%20Lesson%202%20Personal%20Safety%20in%20Agricultural%20Mechanics%20Lesson%20Plan%20-%20English.pdf

> als-and-theenvironment/comparingagriculture-of-the-past-with-today



airborne crop-spraying equipment; cutting equipment; tractors; planting and harvesting equipment; power sources and systems for silos, irrigation, pumping, and applications such as dairy, feeding and shearing operations and processing equipment.

DAY 2

Teacher asks the class "can you think of some direct examples of specific equipment/machinery changes that have resulted in more efficient operations in the agriculture field?"

Tractors
Harvesters
Irrigation
Automated feeders

Teacher asks students to break up into groups of 4, and informs them that they are now all part of an employment service. "Your job is to write several employment flyers advertising jobs that are available in the agricultural mechanics field. Try to think of as many areas of specialization in this field, make a flyer for each indicating name of specialization and jobs available in that specialization.

Teachers has the groups present

March 2019			
	- Agricultural Electrification, Power and Controls - Agricultural Power Machinery - Soil and Water Mechanical Practices - Agricultural Mechanics, Construction, and Maintenance Skills - Agricultural Structure, Equipment, and Facilities Source: New Mexico Agricultural Mechanics and Technology Lesson Plan Library. Unit A. Problem Area 1. Lesson 7. Page 3. https://www.nmffa.org/uploads/4/ 1/0/7/41075673/a1_7_exploring_c areers_in_agricultural_mechanics and_technology_systems.pdf		
	Teacher further illustrates the various job titles found within each specialization.	Students continue to take notes in their Agriscience notebooks.	
	DAY 3 Teacher assigns the following exercise to the students: "I want you to design a really dangerous shop. You heard me correctly, a dangerous one. List the elements of the shop that makes it dangerous. Feel free to construct a diagram/picture along with written descriptions of all its hazards."	DAY 3 Students take out their Agriscience notebooks and begin the assignment to design a dangerous shop.	DAY 3: 40 mins. 20 mins.
	Teacher asks for volunteers to share their shop designs with the class and indicate all the hazards	Students share their hazard-filled shops with the class.	20 mins.
	Teacher utilizes following	Students take notes in their Agriscience	



> students are to develop in their Agriscience notebooks a catalog of engine components with pictures, diagrams and descriptions of each component and their function(s).

Teacher has students gather around a 2-stroke or 4-stroke engine as he/she disassembles it, indicates each part and its function(s), eliciting students hands on assistance. (use a single cylinder engine)

Teacher has students identify and select the appropriate tools used in the repair and maintenance of the small gas engine.

Teacher and students reassemble the engine explaining all the steps along the way.
Source: Small Gas Engine Assembly https://www.icevonline.com/newsl

<u>etters/agricultural-</u> science/2018/09/interactive-

Teacher explains to the class that today we will be looking at a Faulty System- our small gas engine. Something is wrong with it preventing it from running. Your job is to solve the problem by identifying what is wrong and correcting it allowing the engine to run.

(teacher does a minor adjustment to the engine preventing it from starting)

Teacher explains to the class that this is called troubleshooting an engine.

Source: Small Engine
Troubleshooting
https://www.motherearthnews.co
https://www.motherearthnews.co
<a href="mailto:m/homesteading-and-livestock/small-engine-troubleshooting-and-livestock/small-engine-troubleshooting-and-live

https://www.4h.org/parents/curriculum/smallengines

https://www.georgiaffa.org/curriculum/topic.aspx?ID=8&TID=20

https://uen.org/core/core.do?cours eNum=470606

Teacher provides students with an exit ticket question: "How can understanding the trouble-shooting process help you solve mechanical problems you may run into in your future?"

Students gather around shop bench with the

Differentiation

Performance Measure	Exemplary	Proficient	Developing	Beginning
Resolves Problems that Arise in	Easily and quickly identifies	Identifies resources that may	Sometimes identifies resources	Neither identifies resources
Completing Tasks	resources that may help solve a	help solve a specific problem	that may help solve a specific	that may help solve a specific
	specific problem and applies	and applies critical thinking to	problem but does not apply	problem nor applies critical
	critical thinking to using those	using that resources correctly.	critical thinking to using that	thinking to aid in problem-
	resources effectively.		resources.	solving.