

Middle-level CTE Learning Experience Title: Faulty System

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CTE Area: Agriculture

CTE Theme: Problem Solving and Innovation

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repair and propose preventative maintenance solution

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| <p>Essential Question(s)</p> | <p>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?</p> <p>What knowledge and skills are necessary to demonstrate introductory understanding of how power, mechanical and technical systems support efficient work in the agriculture industry?</p> |
| <p>National Standards</p> | <p>Common Career Technical Core Standards https://www.careertech.org/career-ready-practices Career Ready Practices</p> <ul style="list-style-type: none"> 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 <p>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</p> |

NYS Standards

New York State Career Development and Occupational Studies (CDOS) Standards Intermediate Level

<http://www.p12.nysed.gov/cte/>

Standard 1: Career Development Students will be knowledgeable about the world of work, explore career options, and relate personal skills, aptitudes, and abilities to future career decisions.

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| | <p>systems in the agriculture industry</p> <p>2. Safety Students will</p> <ul style="list-style-type: none"> a) Explain hazards associated with the tools, equipment, machinery and technology used in agricultural power, 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 d) Demonstrate appropriate use and care of Personal Protective Equipment (PPE) and safety apparel in agriculture <p>3. Tools, Equipment and Machinery Students will</p> <ul style="list-style-type: none"> a) Identify and select the appropriate tools, equipment and machinery for use in specific agricultural tasks <p>6. Careers in Agriculture Power, Mechanics and Technical Fields Students will</p> <ul style="list-style-type: none"> a) Investigate a career in agriculture power, mechanics or technical fields and identify the pathways used to reach that career | |
| Vocabulary | Academic Innovation, Troubleshoot, Technology | Content GPS, Robotics, Power, Mechanical, Technical, Drones, Technology |
| Materials and Resources | <p>Agriscience notebook (Day 1, 2, 3, 5, 6)</p> <p>Comparing Agriculture of the Past with Today (Day 1) https://www.animalsmart.org/animals-and-the-environment/comparing-agriculture-of-the-past-with-today</p> <p>Poster paper, tape, pictures of: tools, equipment, machinery, computers, 2 or 4 stroke single cylinder engine, etc.(Day 1)</p> <p>5 Ways Technology Has Changed Agriculture (Day 1) https://www.businessinsider.com/15-emerging-agriculture-technologies-2014-4</p> <p>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_sytems.pdf</p> <p>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</p> | |

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environment/comparing-
agriculture-of-the-past-with-today](#)

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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

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| | <ul style="list-style-type: none"> - Agricultural Electrification, Power and Controls - Agricultural Power Machinery - Soil and Water Mechanical Practices - Agricultural Mechanics, Construction, and Maintenance Skills - Agricultural Structure, Equipment, and Facilities <p>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_careers_in_agricultural_mechanics_and_technology_systems.pdf</p> <p>Teacher further illustrates the various job titles found within each specialization.</p> <p>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."</p> <p>Teacher asks for volunteers to share their shop designs with the class and indicate all the hazards</p> <p>Teacher utilizes following</p> | <p>Students continue to take notes in their Agriscience notebooks.</p> <p>DAY 3 Students take out their Agriscience notebooks and begin the assignment to design a dangerous shop.</p> <p>Students share their hazard-filled shops with the class.</p> <p>Students take notes in their Agriscience</p> | <p>DAY 3: 40 mins. 20 mins.</p> <p>20 mins.</p> |
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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/newsletters/agricultural-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.com/homesteading-and-livestock/small-engine-troubleshooting-zmaz89mjzshe>

<https://www.4-h.org/parents/curriculum/small-engines>

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

<https://uen.org/core/core.do?courseNum=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

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