GEORGIA MIDDLE SCHOOL Instructional Resources

CAREER, TECHNICAL, & AGRICULTURAL EDUCATION

AGRICULTURE

COURSE: Exploring Agriculture Education

UNIT 5: The Nuts and Bolts of Agriculture

INTRODUCTION

Annotation:

This lesson identifies the importance of mechanics in agriculture. Students will learn mechanical skills and safety procedures used in agriculture. They will also complete a PVC plumbing project as well as prepare a bill of materials to accompany the project. Students will learn about the mathematics needed in plumbing projects through a mathematics connection worksheet and the importance of mathematics in agriculture mechanics.

Grade(s):

	6th
X	7th
	8th

Time:

Ten 50 minute class periods

Author:

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Students with Disabilities:

For students with disabilities, the instructor should refer to the student's IEP to be sure that the accommodations specified are being provided appropriately. Instructors should also familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation. Many students (both with and without disabilities) who struggle with reading may benefit from the use of text reading software or other technological aids to provide access to printed materials. Many of these are available at little or no cost on the internet.

FOCUS STANDARDS

GPS Focus Standards:

MSAGED7-6 **Critique the area of agricultural mechanics.**
a) Identify and explain the careers in agricultural mechanics.
b) Specify and explain the mechanical skills used in agriculture.
c) Describe and demonstrate safe operation of agricultural lab equipment.
d) Identify and explain the function of basic hand tools.
e) Demonstrate knowledge of measurement tools.

GPS Academic Standards:

S7CS2 **Students will use standard safety practices for all classroom laboratory and field investigations.**

S7CS4 **Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities.**

M7D1 **Students will pose questions, collect data, represent and analyze the data, and interpret results.**

M7P4 **Students will make connections among mathematical ideas and to other disciplines.**

UNDERSTANDING & GOALS

Enduring Understandings:

Agriculture Mechanics provides us with practical skills we can use everyday whether in a career, for a home improvement project, with a hobby, or just for fun.

Essential Questions:

- What can agriculture mechanics do for you?
- What are some of the advancements/ inventions in agriculture mechanics?
- What are some careers involved with agriculture mechanics?
- Why is safety important?
- Why are plumbing skills important to agriculture mechanics?

Knowledge from this Unit:

Students will:

- Identify the influence agriculture mechanics has had on America
- Explain the correct lab safety procedures
- Describe and explain the correct way to use plumbing materials
- Explain lab safety procedures

Skills from this Unit:

Students will:

- Complete a plumbing PVC project
- Prepare a bill of materials

ASSESSMENTS

Assessment Method Type:

_____ Pre-test
_____ Objective assessment - multiple-choice, true- false, etc.
__ Quizzes/Tests
__ Unit test
_X_ Group project
_____ Individual project
_X_ Self-assessment - May include practice quizzes, games, simulations, checklists, etc.
__ Self-check rubrics
__ Self-check during writing/planning process
__ Journal reflections on concepts, personal experiences and impact on one's life
__ Reflect on evaluations of work from teachers, business partners, and competition judges
__ Academic prompts
__ Practice quizzes/tests
_____ Subjective assessment/Informal observations
__ Essay tests
__ Observe students working with partners
__ Observe students role playing
_____ Peer-assessment
__ Peer editing and commentary of products/projects/presentations using rubrics
__ Peer editing and/or critiquing
_X_ Dialogue and Discussion
__ Student/teacher conferences
_X_ Partner and small group discussions
__ Whole group discussions
__ Interaction with/feedback from community members/speakers and business partners
_____ Constructed Responses
__ Chart good reading/writing/listening/speaking habits
__ Application of skills to real-life situations/scenarios
_X_ Post-test

Assessment(s) Title:

Unit Exam – **Introduction to Ag Mechanics**

INTRODUCTION

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

MSAGED7-6	**Critique the area of agricultural mechanics.** a) Identify and explain the careers in agricultural mechanics. b) Specify and explain the mechanical skills used in agriculture. c) Describe and demonstrate safe operation of agricultural lab equipment. d) Identify and explain the function of basic hand tools. e) Demonstrate knowledge of measurement tools.
S7CS2	**Students will use standard safety practices for all classroom laboratory and field investigations.**
S7CS4	**Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities.**
M7D1	**Students will pose questions, collect data, represent and analyze the data, and interpret results.**
M7P4	**Students will make connections among mathematical ideas and to other disciplines.**

2. Review Essential Questions. Post Essential Questions in the classroom.

- What can agriculture mechanics do for you?
- Who are some important people in the agriculture mechanics field?
- What are some of the advancements/ inventions in agriculture mechanics?
- What are some careers involved with agriculture mechanics?
- Why is safety important?
- Why are plumbing skills important to agriculture mechanics?

3. Identify and review the unit vocabulary.

Equipment	Inventor	Mechanics	Productivity
Fixture	Invoice	Pipe	Safety
Hazard	Machinery	Plumbing	Tool

• LESSON 1: IMPORTANCE OF AGRICULTURE MECHANICS

1. Review Essential Questions. Post Essential Questions in the classroom.

- What can agriculture mechanics do for you?

2. Lead a brief discussion about agriculture mechanics.
   - Ask students, "Do any of you have mechanics skills?"
   - How did you learn those skills?
   - What is agriculture mechanics?
   - How can mechanic skills relate to agriculture?

3. Show students **The Importance of Ag Mechanics** PowerPoint presentation.
    - See attached supplementary files
    - During the PowerPoint, emphasize how mechanic skills relate to agriculture.
    - Have students point out important inventions in agriculture mechanics.
    - Discuss careers associated with the agriculture mechanics field.

• LESSON 2: RESEARCH AN IMPORTANT PERSON IN AGRICULTURE MECHANICS

1. Review Essential Questions. Post Essential Questions in the classroom.

    - Who are some important people in the agriculture mechanics field?

2. Briefly review agriculture mechanics.
    - Ask students, "Who remembers what agriculture mechanics is?"
    - What are some of the technology involved in agriculture mechanics today?
    - What are some of the careers associated with agriculture mechanics?

3. Agriculture Mechanics Research Project
    - Give each student a copy of the **Research an Important Person in Ag Mechanics** worksheet.
        - See attached supplementary files
    - Instruct students to pick one person from the worksheet to research and answer questions about.
    - Have students share their research to the class.

• LESSON 3: LAB SAFETY RULES

1. Review Essential Questions. Post Essential Questions in the classroom.

    - Why is safety important?

2. Lead a discussion about safety in the workplace.
    - Ask students, "Why do you think safety is important in the workplace?"
    - Has anything ever happened to you or someone you know because proper lab safety was not practiced?
    - What are some possible lab safety tips we should follow?

3. Lab Safety Rules Activities
    - Show students the **Lab Safety Rules** PowerPoint presentation.
        - See attached supplementary files
        - Emphasize how research and experiments can be extremely dangerous if safety rules are not followed while working in a lab.
        - Discuss each safety rule with the class.
    - Give each student a copy of the **Lab Safety Worksheets**, which has two student worksheets and a page of teacher instructions.
        - See attached supplementary files
        - Have students complete the first worksheet, either while viewing the **Name the Hazards** PowerPoint or by visiting lab stations containing the slides from the PowerPoint.
            - See attached supplementary files
        - Students should also complete the second worksheet, which requires stations of chemicals to be set up around the classroom.
        - Discuss the answers to both worksheets as a class.

• LESSON 4: PLUMBING AND AGRICULTURE MECHANICS

1. Review Essential Questions. Post Essential Questions in the classroom.

    - Why are plumbing skills important to agriculture mechanics?

2. Lead a brief discussion about plumbing.
    - Ask students, "How is plumbing related to agriculture mechanics?"
    - How do we use plumbing at home and at school?
    - How do these skills relate to agriculture?

3. Lead students through the **Plumbing** PowerPoint presentation, making sure to emphasize the different fittings and tools.
    - See attached supplementary files

• LESSON 5: PVC PROJECT

1. Review Essential Questions. Post Essential Questions in the classroom.

    - Why are plumbing skills important to agriculture mechanics?

2. Review the different fittings and tools used in plumbing.

3. PVC Project
    - Give each student a hacksaw, pipe, sandpaper, and the **PVC Project** instruction sheet.
        - See attached supplementary files
    - Monitor the students as they make the seven cuts required to complete the project.
    - After the cutting is complete, pass out glue and rags. Students should follow the diagram on the instruction sheet to put the piping into the correct shape.
    - Give each student a copy of the **Bill of Materials** worksheet to complete.
        - See attached supplementary files
        - Instruct students to figure out the quantities used, the total prices per unit, and the subtotal.
    - Allow each student to hook their pipe to a water hose to test whether it holds together and does not leak.

4. Incorporate Math Activity
    - Pass out the **PVC Project Math Connection** worksheet.
        - See attached supplementary files
    - Students can either split into groups or work individually to complete the worksheet.

• LESSON 6: INTRODUCTION TO AGRICULTURE MECHANICS TEST

1. Unit Exam
    - Give each student a copy of the **Intro to Ag Mechanics Test**.
        - See attached supplementary files
    - Read over the directions and make sure there are no questions.
    - After the test is over, review answers with the students.

Attachments for Learning Experiences:

Research an Important Person in Ag Mechanics
Lab Safety Rules
Plumbing
The Importance of Ag Mechanics
Intro to Ag Mechanics Test
Lab Safety Worksheets
PVC Project
Bill of Materials
PVC Project Math Connection
Name the Hazards

Notes & Reflections:

CULMINATING PERFORMANCE TASK

Culminating Unit Performance Task Title:

Students complete the PVC project.

Culminating Unit Performance Task Description/Directions/Differentiated Instruction:

The PVC project requires students to correctly cut PVC pipe to specific lengths and glue the pipes together using the correct fitting in the correct location in order to configure the shape that is illustrated on the instruction sheet. They must then complete a bill of materials for the project just as if they were a plumbing company.

Attachments for Culminating Performance Task:

PVC Project
PVC Project Math Connection
Bill of Materials

UNIT RESOURCES

Materials & Equipment:

- Computer
- 8 Clear containers with lids
- Safety Substances to go inside containers (see **Lab Safety Worksheets** for a complete list)
- PVC Pipe for all groups
- Saws, sand paper, and tape measures for all groups
- Fittings for all groups
- Glue, paper towels, and Teflon Tape for all groups
- Water & water hose available for PVC Project

What 21st Century Technology was used in this unit:

X	Slide Show Software		Graphing Software		Audio File(s)
	Interactive Whiteboard	X	Calculator		Graphic Organizer
	Student Response System		Desktop Publishing		Image File(s)
	Web Design Software		Blog		Video
	Animation Software		Wiki		Electronic Game or Puzzle Maker
	Email		Website		