Odysseyware®

CURRICULUM OVERVIEW

Power, Structural, and Technical Systems

Career and Technical Education Series

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Power, Structural, and Technical Systems Course Overview

Power, Structural, and Technical Systems provides students with an understanding of the field of agriculture power and will introduce them to concepts associated with producing the food and fiber required to meet today's and tomorrow's needs. This understanding gives students the opportunity to explore agriculture machinery, as well as structures and technological concepts.

Students will understand the historical changes in agriculture and how agriculture has changed to meet the needs of the future world population. Students will be introduced to machinery, structures, biotechnology, and ethical and professional standards applicable to agriculture power.

Students will understand the technological innovations that have contributed to changing the face of agriculture. Computers and other technological tools have given farmers the ability to utilize precision agriculture. Students will gain an understanding of the professional career opportunities and responsibilities of growers across the country. Additionally, students can learn about some of the resources available to professionals in the agriculture industry.

- **Unit 1: Introduction to Agriculture Power, Structural, and Technical Systems:** In this unit, students learn about equipment and skills necessary in agriculture, as well as safety practices used with agriculture power equipment.
- **Unit 2: Operation and Maintenance of Equipment and Power Systems:** In this unit, students learn about equipment operation and maintenance of power equipment used in agriculture.
- **Unit 3: Sources of Power and Engines and Equipment Efficiency and Powertrain:** In this unit, students learn about engine-powered tools and how they perform work.
- **Unit 4: Designing, Constructing, and Maintaining Structural Systems:** In this unit, students learn about the structures used on farms and for growing crops.
- **Unit 5: Impact and Use of Technologies in Power and Structural Systems:** In this unit, students learn about the technology used on modern farms including global positioning systems, smartphones, and use of open data sources to assist farmers in making decisions for production.

Power, Structural, and Technical Systems

Unit 1: Importance of Power, Structural, and Technical Systems

Assignments

1. Course Overview
2. Investigating Power, Structural, and Technical Systems Present in Agricultural Systems
3. Project: Agriculture through the Ages
4. Understanding Skills Needed for Professionals in the Power, Structural, and Technical Systems
5. Scientific Principles Associated with Agricultural Power, Structural, and Technical Systems
6. Project: Organic, No-Till, and Conventional Tillage in Farming

7 Quiz 1: Introduction

8. Identification of Tools and Equipment Used in Power, Structural, and Technical Systems
9. Project: Design Your Toolbox
10. Measuring and Layout of Projects
11. Safety and Associated Practices in Power, Structural, and Mechanical Systems
12. Project: Farm Safety Rules
13. Quiz 2: Equipment and Skills in Power, Structural, and Technical Systems
14. Special Project*
15. Test
16. Course Project Part 1: Developing a Productive Farm*
17. Glossary and Credits

Power, Structural, and Technical Systems

Unit 2: Operation and Maintenance of Equipment and Power Systems

Assignments

1. Importance of Maintenance in Power Equipment
2. Project: Visit a Mechanic
3. Principles of Operation in Engines and Motors
4. Project: Dust Bowl Argument
5. Tractor Safety and Maintenance
6. Quiz 1: Operation and Equipment of Power Systems
7. Importance of Maintenance in Small Power Equipment
8. Project: Visit a Shop for Job-Shadowing
9. Transmitting Power and Energy Produced into Usable Outputs
10. Project: Job-shadowing in a Large-Engine Repair Shop
11. Understanding Regulations of Materials and Safe Handling
12. Quiz 2: Operation and Equipment of Power Systems
13. Special Project*
14. Test
15. Course Project Part 2: Developing Safety Policies and Procedures*
16. Glossary and Credits

Power, Structural, and Technical Systems

Unit 3: Sources of Power and Engines and Equipment Efficiency and Powertrain

Assignments

1. Selecting Power Sources
2. Project: Greenhouse Gases Project
3. Evaluating Resources
4. Theory of How Power Is Produced by Engines and Motors
5. Project: Interview an Engine Repair Person
6. Quiz 1: Repairing Equipment and Power Systems
7. Transferring Power to Work
8. Identifying Power Transmissions and How They Work
9. Project: How Gears Work
10. Evaluation of Engine Power and Efficiency
11. Project: Purchasing a New Tractor
12. Quiz 2: Transferring Power and Efficiency
13. Special Project*
14. Test
15. Course Project Part 3: Selection of Power Equipment*
16. Glossary and Credits

Power, Structural, and Technical Systems

Unit 4: Designing, Constructing, and Maintaining Structural Systems

Assignments

1. Designing Structures for Different Uses
2. Project: Comparison Shopping for Tools
3. Designing Structures for Different Animals and Uses
4. Basic Construction Techniques and Evaluating Structural Systems
5. Project: Internship with a Shed Company
6. Quiz 1: Designing and Planning Structures
7. Using Construction Equipment
8. Project: Construction Job Research
9. Safety Practices Associated with Construction Equipment
10. Common Structural Techniques Used to Design and Build Greenhouses
11. Project: Purchase a Greenhouse
12. Quiz 2: Construction and Maintenance of Structures
13. Special Project*
14. Test
15. Course Project Part 4: A Modern Barn-Raising*
16. Glossary and Credits

Power, Structural, and Technical Systems

Unit 5: Impact and Use of Technologies in Power and Structural Systems

Assignments

1. Computers and Their Role in Agricultural Power, Structural, and Technical Systems
2. Data Management and Use in Agricultural Production
3. Project: Summary of Growing Conditions
4. Evaluating Technical Systems
5. Project: Fantasy Farm Spreadsheet
6. Quiz 1: Control and Monitoring Systems
7. Advanced Technology in Agricultural Power and Production Systems
8. Project: Design a New Plant
9. Biotechnology Impact in Agricultural Power and Production Systems
10. Project: Agriculture of the Future
11. Precision Technology Use in Power and Technical Systems
12. Quiz 2: Advanced Technologies
13. Special Project*
14. Test
15. Course Project Part 5: Selecting High Technology Tools and Systems*
16. Glossary and Credits

Unit 6: Course Project, Review, and Exam	
Assignments	
1. Course Project Part 6: Fitting the Systems Together—Farm Planning*	2. Course Review 3. Exam

(*) Indicates alternative assignment