Energy Resources in Agriculture
Kansas Agricultural Education 18507

Hours Completed _____ Competencies Completed _____/151
Verification Signatures:

Student: _____ Date: _____

Instructor: _____ Date: _____

Name: _____

Instructor: _____ School Year:_____

Key to Integrated Competencies
(CD)- Career Development
(L)- Leadership
(E) - Experienced Based
(LK) - LifeKnowledge Lessons
(LA) – Language Arts
(M) - Math
(S) – Science
(SS) – Social Science

Circle to indicate level of competency achieved:
3 - Skilled-Works Independently **2** Limited skill-Needs assistance **1** -Skill undeveloped-but received instruction **0** -No

Introduction to Energy Use Past and Present

1. Define the following terms: (LA)

3 2 1 0 a. Alternative Energy
3 2 1 0 b. Bio Mass
3 2 1 0 c. Compost
3 2 1 0 d. Energy
3 2 1 0 e. Fuel Crops
3 2 1 0 f. Geothermal Energy
3 2 1 0 g. Global Warming
3 2 1 0 h. Greenhouse Effect
3 2 1 0 i. Hydroelectric Energy
3 2 1 0 j. Kinetic Entergy
3 2 1 0 k. Methanol
3 2 1 0 l. Natural Resources
3 2 1 0 m. Net Energy Efficiency
3 2 1 0 n. Non-Renewable Resources
3 2 1 0 o. Potential Energy
3 2 1 0 p. Renewable Resources
3 2 1 0 q. Solar Energy
3 2 1 0 r. Wind Energy

Careers in Alternative Energy

3 2 1 0 1. List potential careers in alternative energy. (CD) (LK HS 123)
3 2 1 0 2. Select a career of interest and research education required, salary, and job description. (CD) (LK MS 66)
3 2 1 0 3. Present over the career you researched.(CD,LA)

Energy Calculations

1. Calculate the following terms:

3 2 1 0 a. Joule (M,S)
3 2 1 0 b. Work (M,S)
3 2 1 0 c. Power (M,S)
3 2 1 0 d. Force (M,S)
3 2 1 0 e. Torque (M,S)
3 2 1 0 f. Pressure (M,S)
3 2 1 0 g. Heat (M,S)

Sources of Energy

3 2 1 0 1. Identify three characteristics of energy (S)
3 2 1 0 2. Differentiate between potential and kinetic energy (S)
3 2 1 0 3. Identify the 6 types of energy (S)
3 2 1 0 4. Calculate energy conversion efficiencies (M,S)
3 2 1 0 5. Identify the proportions of the four uses of energy (S)
3 2 1 0 6. List examples of solar energy (S)
3 2 1 0 7. List examples of wind energy (S)
3 2 1 0 8. Identify examples of hydropower (S)
3 2 1 0 9. Identify examples of geothermal power (S)
3 2 1 0 10. Identify examples for biomass (S)
3 2 1 0 11. Identify common biofuels (S)
3 2 1 0 12. Identify fossil fuels (S)
3 2 1 0 13. Create a timeline of historical uses in energy patterns (S,SS)

Bio Fuels

1. Define the following terms: (LA)

3 2 1 0 a. Biofuel
3 2 1 0 b. By-Product
3 2 1 0 c. Ethanol
3 2 1 0 d. Biodiesel
3 2 1 0 e. Pollutant
3 2 1 0 f. Cellulose
3 2 1 0 g. Methane

3 2 1 0 2. Describe at least three careers in the biofuel industry. (CD)

Ethanol

3 2 1 0 1. Write the chemical formula for Ethanol. (S)
3 2 1 0 2. Describe the location of ethanol plants in the United State and Kansas. (SS, LA)
3 2 1 0 3. List inputs that are required for ethanol production.
3 2 1 0 4. Describe the difference between a Wet Mill and a Dry Mill ethanol plant.(LA)
3 2 1 0 5. List by-products created in ethanol production.
3 2 1 0 6. Describe where the greatest amount of energy is used in ethanol production. (LA)
3 2 1 0 7. Describe threats to quality assurance in ethanol production. (LA)
3 2 1 0 8. Describe potential threats to natural resources related to ethanol production. (S, LA)

Bio Diesel

3 2 1 0 1. What is the chemical formula for biodiesel. (S)
3 2 1 0 2. Describe where biodiesel plants are located in the US and Kansas.(SS, LA)
3 2 1 0 3. List the inputs that are required to create biodiesel.
3 2 1 0 4. List the steps required for biodiesel manufacturing.

3 2 1 0 5. Describe by-products created in biodiesel manufacturing.(LA)
3 2 1 0 6. Discuss the energy used to created biodiesel. (LA)
3 2 1 0 7. Describe potential threats to quality assurance in biodiesel production. (LA)
3 2 1 0 8. Describe potential threats to natural resources related to biodiesel production.(S, LA)

Methane

3 2 1 0 1. What is the chemical formula for Methane (S)
3 2 1 0 2. Describe where methane is used for energy in the US and Kansas.(SS, LA)
3 2 1 0 3. List the inputs that are required to create methane.
3 2 1 0 4. List the steps required for methane harvesting.
3 2 1 0 5. Describe by-products created in methane production. (LA)
3 2 1 0 6. Discuss the energy used to harvest methane. (LA)
3 2 1 0 7. Describe potential threats to quality assurance in harvesting of methane gas. (LA)
3 2 1 0 8. Describe potential threats to natural resources related to methane harvesting. (S, LA)
3 2 1 0 9. Research the impact of pollution as a result of biofuel production and use. (S, LA, E)

Renewable Resources

Environmental Impact

3 2 1 0 1. Identify the negative effects of various fuel choice decisions to the environment and economy. (SS) (LK AHS 22)
3 2 1 0 2. Identify the positive effects of various fuel choice decisions to the environment and economy.(SS)

Wind Power

3 2 1 0 1. List brief history of wind power.
3 2 1 0 2. Identify two types of wind machines.
3 2 1 0 3. Identify the parts of a horizontal turbine.
3 2 1 0 4. Identify factors in wind power and those that limit efficiencies.
3 2 1 0 5. Discuss economics of wind turbines.(LA)

Solar Power

3 2 1 0 1. Distinguish between solar energy and solar power.
3 2 1 0 2. Discuss how solar energy is stored.(LA)
3 2 1 0 3. Discuss economics of solar power.(LA)

Water Power

3 2 1 0 1. Discuss brief history of water power. (LA)
3 2 1 0 2. Discuss ways that water is used for power. (LA)
3 2 1 0 3. Discuss economic choices for water power. (LA, SS)

Bio Fuels

3 2 1 0 1. Discuss brief history of bio-fuels. (LA)
3 2 1 0 2. List types of bio-fuels.
3 2 1 0 3. Discuss economic choices of bio-fuels. (LA)

Conservation

1. Define the following terms: (LA)

3 2 1 0 a. Aerobic
3 2 1 0 b. Anaerobic
3 2 1 0 c. Biodegradable
3 2 1 0 d. Compost tumbler
3 2 1 0 e. Composting
3 2 1 0 f. Degradation
3 2 1 0 g. Depletion
3 2 1 0 h. Economic threshold of conservation
3 2 1 0 i. Environmental impact
3 2 1 0 j. Farming practices
3 2 1 0 k. Fossil fuels
3 2 1 0 l. Global
3 2 1 0 m. Hazardous waste
3 2 1 0 n. Natural Resources
3 2 1 0 o. Organic
3 2 1 0 p. Ozone layer
3 2 1 0 q. Pollution
3 2 1 0 r. Protected species
3 2 1 0 s. Recycling
3 2 1 0 t. Waste

3 2 1 0 2. Describe at least four careers in the conservation area (CD, LA)

Recycling

3 2 1 0 1. Identify the three primary types of recycling products.
3 2 1 0 2. Cite local, state, and federal recycling policies.(SS)
3 2 1 0 3. Collect items that are recyclable. (E)

Composting

3 2 1 0 1. Breakdown the processes of composting. (S)
3 2 1 0 2. Compare and contrast aerobic and anaerobic composting. (S)
3 2 1 0 3. List the types of composting.
3 2 1 0 4. Categorize items as composting material or non-composting material
3 2 1 0 5. Describe the benefits of composting (LA)
3 2 1 0 6. Invent small composting models. (E)

Water Conservation

3 2 1 0 1. List five water conservation methods used in the home.(S)
3 2 1 0 2. List three water conservation methods used on the farm.(S)
3 2 1 0 3. Calculate savings on water bills by applying conservation methods. (M,E)

Conservation Tillage

3 2 1 0 1. List three soil conservation methods(S)
3 2 1 0 2. Discuss benefits from using carbon credits.(S, LA)
3 2 1 0 3. Describe three tractor maintenance practices that conserve energy. (LA)
3 2 1 0 4. Compare costs of nutrient loss (through burning) versus tillage costs.(M,E)
3 2 1 0 5. Calculate the costs of burning versus no-till. (M)

Opportunities in FFA

FFA Opportu

3 2 1 0 1. Research and present a 4-6 minute speech on an agricultural topic.(L, LA, E) (LK HS 86 & 90)
3 2 1 0 2. Serve on a POA committee. (L, E) (LK AHS 47)
3 2 1 0 3. Participate in at least one activity above the chapter level.(L, E)
3 2 1 0 4. Demonstrate concise, impromptu speaking skills. (LA, L, E) (LK HS 84)
3 2 1 0 5. Conduct strengths assessment to determine possible career options. (L, CD, E) (LK HS 31)

SAE

3 2 1 0 1. Maintain records on income and expense. (M, CD, E) (LK HS 129)
3 2 1 0 2. Complete a cash flow statement. (M, CD, E)
3 2 1 0 3. Complete year end records. (M, CD, E)
3 2 1 0 4. Complete a SAE packet. (M, CD, E)
3 2 1 0 5. Complete a proficiency award application. (M, CD, E) (LK AHS 53)

Work Place Skills

Resource Management

3 2 1 0 1. Locate information and select the materials, tools, and equipment needed to perform an activity or build a project. (CD)
3 2 1 0 2. Determine cost, time, and resources needed to complete a task within an industry or occupation.(CD)
3 2 1 0 3. Explain the relationship between setting goals and managing money. (L)
3 2 1 0 4. Identify fixed a flexible expenses.(CD)
3 2 1 0 5. Identify planned and impulse buying.

Decision Making/Problem Solving

1. Describe the factors that impact on decision making: (LA)

3 2 1 0 a. Needs and wants
3 2 1 0 b. Values
3 2 1 0 c. Goals
3 2 1 0 d. Standards

3 2 1 0 2. Distinguish between types of decisions: economic and/or technical.(LA)
3 2 1 0 3. Apply the steps In interpreting a problem, coming up with a plan and then a result.(S)

Writing

3 2 1 0 1. Use language, organization, and format appropriate to the subject matter, purpose, and audience.(L, CD)
3 2 1 0 2. Check, edit, and revise for correct information, appropriate emphasis, grammar, spelling, and punctuation.(LA, CD)
3 2 1 0 3. Create and present technical information in common graphs and charts. (M, CD, LA, E)
3 2 1 0 4. Compile and maintain record, logs, lab notebooks, and other documents.(M, CD)
3 2 1 0 5. Use style manuals or software to prepare documentation and reference lists.(CD)