

Alternative Energy Systems

Career Cluster	STEM
Course Code	21060
Prerequisite(s)	None
Credit	.5
Program of Study and Sequence	Foundational Courses, Cluster Courses, Pathway Courses, Capstone Experience
Student Organization	None
Coordinating Work-Based Learning	None
Industry Certifications	None
Dual Credit or Dual Enrollment	TBD
Teacher Certification	STEM Cluster Endorsement; Energy Pathway Endorsement; 7-12 Technology Education Endorsement
Resources	Teaching Renewable Energy: http://www.ucsus.org/sites/default/files/legacy/assets/documents/clean_energy/renewablesready_fullreport.pdf National Renewable Energy Laboratory: http://www.nrel.gov/docs/gen/fy01/30927.pdf http://www.nrel.gov/education/educational_resources.html

Course Description:

This course serves as an introductory course in alternative energy. This is a survey of wind, biomass, solar, geothermal, and other non-traditional energy sources.

Program of Study Application

This is a STEM Pathway Course for the Energy Pathway, preceded by a Foundational Course(s) and a Cluster Course(s).

Course Standards

Indicator # AES 1 Understand the historical development of alternative energy systems

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Three Strategic thinking	<p>AES.1.1 Understand the historical background of alternative energy generation</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Define alternative, renewable, and nonrenewable energy. • Identify various energy generation technologies throughout history • Analyze the significance of energy generation and the growth of society • Explain the relationship between energy production and public demand 	
Three Strategic Thinking	<p>AES.1.2 Analyze the role of society in the use of energy generation methods</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Evaluate the demand levels for energy usage for industrialized nations • Summarize the influence energy has had on developing nations • Summarize the influence energy systems had on technological advancements 	
Four Extended thinking	<p>AES.1.3 Analyze the cultural, socioeconomic and political effects of alternative energy technologies</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Identify factors affecting the price of electricity • Analyze resource allocation, such as using renewable resources (like ethanol) for energy as compared to using these resources for other uses (like food). 	

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Three Strategic thinking	AES.1.4 Understand the environmental impact of energy production and consumption. <i>Examples:</i> <ul style="list-style-type: none">• Identify the relationship between fossil fuels and greenhouse gases• Investigate extraction processes of raw materials used for fuel• Evaluate the impact individuals can have on the environment from the reduction of energy use	Algebra, geography
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Notes:

Indicator # AES 2 Understand the types of major energy systems

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Three Strategic Thinking	<p>AES.2.1 Analyze the characteristics of wind energy generation systems</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Identify various types of wind energy systems • Analyze structures in wind energy systems • State that wind energy can be used to generate electricity 	
Four Extended thinking	<p>AES.2.2 Analyze the characteristics biomass energy generation systems</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Identify the various types of biomass systems • Identify the types of biomass • Analyze the various processes used to convert biomass into energy 	
Four Extended thinking	<p>AES.2.3 Analyze the characteristics of solar energy generation systems</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • State that solar energy can be used to generate electricity • State the energy conversion taking place in solar panels • Analyze the environmental benefits for using solar energy systems 	marine & hydrokinetic energy
Four Extended thinking	<p>AES.2.4 Analyze the characteristics of geothermal energy generation systems</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> • Identify the various types of geothermal systems • Compare the advantages and disadvantages of using geothermal energy • Analyze the various processes used to convert geothermal into energy 	

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Two Skill/Concept	AES.2.5 Analyze the characteristics of traditional energy generation systems <i>Examples:</i> <ul style="list-style-type: none">• Identify the processes involved when using nuclear energy to generate electricity• Identify the processes involved when using hydroelectric approaches to generate electricity• State the environmental benefits for using traditional energy systems	
Four Extended thinking	AES 2.6 Model an alternative energy system. <i>Examples:</i> <ul style="list-style-type: none">• Build a device to lift a weight with the most appropriate alternative power supply.• Create a functioning scale model of an alternative energy system	

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Indicator # AES 3 Research alternative energy careers and trends in energy development

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Three Strategic thinking	AES3.1 Identify careers in alternative energy. <i>Example:</i> <ul style="list-style-type: none">• Investigate jobs in each of the alternative energy fields.• Research, create a report, and present your findings on a career of interest in alternative energy.	
One Recall	AES3.2 Identify future energy resources. <i>Example:</i> <ul style="list-style-type: none">• Identify new fields of study, such as Marine Hydrokinetic Energy.	

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