



the CEED

THE CENTER FOR ENERGY EFFICIENT DESIGN

Title: CEED Home

Grade Level	Sixth	Subject	Science
<p>Objective(s):</p> <ul style="list-style-type: none"> Design a home model using energy conservation materials, engineering and design. Understand the function of a green roof system. Conduct a cost benefit analysis to various types of photovoltaic cells 		<p>SOL Addressed:</p> <p>6.2 The student will investigate and understand basic sources of energy, their origins, transformations, and uses. Key concepts include</p> <ul style="list-style-type: none"> a) potential and kinetic energy; b) the role of the sun in the formation of most energy sources on Earth; c) nonrenewable energy sources; d) renewable energy sources; and e) energy transformations. <p>6.3The student will investigate and understand the role of solar energy in driving most natural processes within the atmosphere, the hydrosphere, and on Earth’s surface. Key concepts include</p> <ul style="list-style-type: none"> a) Earth’s energy budget; b) the role of radiation and convection in the distribution of energy; <p>6.9 The student will investigate and understand public policy decisions relating to the environment. Key concepts include</p> <ul style="list-style-type: none"> a) management of renewable resources; b) management of nonrenewable resources; c) cost/benefit tradeoffs in conservation policies. 	
		<p>Common Core Standards:</p> <p>MS-PS3-3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer</p> <p>MS-PS3-4 Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.</p> <p>MS-PS3-5 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.</p>	

CEED
Instructional Activities

<p>Materials Needed Per Class of 30</p> <p style="text-align: center;">and</p> <p>Prior Knowledge</p>	<p>1 poster board per group for the building base colored poster board (assorted pieces for home building) construction paper (various sizes and colors) chenille Stems (pipe cleaners) glue, tape, scissors, rulers markers, crayons, or colored Pencils</p> <p>This is a cumulative activity that is best used at the end of an energy unit. However, given time to research energy efficient features, it could be used as an introductory classroom activity. A virtual tour of the CEED building through the website will give students background knowledge, spark interest, and generate design ideas.</p>	
<p>Ways to differentiate this lesson plan</p>	<ul style="list-style-type: none"> ● EXTENSION for Higher Level Learners <ul style="list-style-type: none"> - Design and add a green roof to the model home. - Design and add a ground source heating/cooling system to the model home. - Extend the home design to include landscape features that may improve energy efficiency. - Using the CEED Dashboard, compare the cost benefits of the different types of photovoltaic panels. Determine which type of panel is best for your home design. ● MODIFICATIONS <ul style="list-style-type: none"> - Technology Modification – Instead of using poster board and construction paper, the model can be created using a computer software program. 	
<p>Introduction/ Anticipatory Set</p>	<p>Anticipatory Set: Class Discussion – Spend some time discussing the importance of energy in your lives and the cost of energy to your family. Discuss the idea of energy conservation and how you can limit the amount of energy used in your home.</p> <p>Questions to ask students:</p> <ul style="list-style-type: none"> ● What is energy? ● How much do you think your family spends on energy each month? ● Energy for your car (gasoline)? Energy for your bodies (food)? ● Energy for your home (electric bill, propane, heating oil, wood)? ● What is energy conservation? ● How can you reduce the amount of energy used in a home? ● What does going green mean? 	<p>Introduction:</p> <p>The students will learn about solar energy, wind energy, water conservation methods, and insulation materials. They will use this information to help them design a more energy efficient home.</p>

CEED
Instructional Activities

<p>Guided Practice</p>	<p>Use the following websites to research energy efficient home designs. Gather information about solar energy, wind energy, water conservation, and insulation materials. Record your information in the document below.</p> <p>Design Fact Sheet (to be attached)</p> <ul style="list-style-type: none"> • CEED Website http://dashboard.intellergy.us/ceed/index.php • Energy Efficiency in 90 Seconds- Educational YouTube Video • Solar Energy <ul style="list-style-type: none"> Energy 101: Solar Energy – Educational YouTube Video How Solar Power Works – Educational YouTube Video • Wind Energy <ul style="list-style-type: none"> Wind Energy - Educational YouTube Video Wind Farm - Educational YouTube Video
<p>Independent Practice</p>	<ul style="list-style-type: none"> • Divide the students into groups of 2 or 3. • Have the students create a preliminary design on paper that incorporates the use of the solar panels, wind energy, water conservation methods, and improved insulation materials which were researched earlier. • Students should obtain teacher approval before picking up the actual building materials. • Students should construct their energy efficient home and label according to the grading rubric. • Allow two hours to complete the independent practice, including the preliminary design, teacher approval, and construction.
<p>Closure (Summary of Lesson)</p>	<ul style="list-style-type: none"> • Students will present their energy efficient home models to the class. The students will explain their choices for the placement of solar panels, wind turbines, water conservation methods, and insulation choices during their presentation.
<p>CEED Building Application/ Sensor Data</p>	<p>Students will access the CEED Building Application Website to gain information about energy efficient design.</p>

CEED
Instructional Activities

Assessment	<ul style="list-style-type: none">• Rubric• Classroom Presentation
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CEED Home Fact Sheet

Solar Energy / Solar Photovoltaic Cells

Type	Function	Image/ Design	Best Location

