



Curriculum Units by Fellows of the Yale-New Haven Teachers Institute  
2010 Volume IV: Renewable Energy

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## **Attributes of Renewable Energy: From Nanopossibilities to Solar Power**

Guide for Curriculum Unit 10.04.09  
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Renewable energies challenge the sciences for strategic solutions to both energy generation and energy application. This curriculum unit introduces and integrates renewable energy as a sample study subject for the mathematics curriculum and physics curriculum of high-school grade levels within the New Haven Public Schools. Selected goals and objectives are cited in the appended lesson plans that will enable students to respond to a series of associated assessments.

Consequently, students experiment with alternate solar energy models that compare and contrast the risk-benefit analyses of collecting, storing, distributing, and applying solar energy to create self-sustaining energy plans for environmental equilibrium, hydrocarbon reductions, and real-time energy problem solving. The attributes of solar collector materials and time-lapsed performance patterns harvesting solar energy, storing solar energy, and calculating solar angles, comprise the data that will be popular with math students. Exploring alternative materials implicit to material science, performance specifications for managing and converting the Sun's photons, and the future designs of both active and passive systems, comprise the data that will be most popular with science students. Pedagogical approaches to nanomaterials and nanotechnologies are also presented, demonstrating more flexible, more stable, and higher performing solar energy generator-candidates to power our planet with lower costs, smaller dimensions, and a more predictable future.

(Recommended for Algebra, Geometry, Trigonometry, and Calculus, grades 9-12; and Physics, grades 11 and 12)

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