

## **Holton-Arms Global Interdisciplinary Energy Unit**

### ***Renewable Resources in an Age of Change***

#### **Essential Questions:**

*Reading and analysis of "The Boy Who Harnessed the Wind"*

1. How do we overcome adversity in our lives?
2. How can I be an agent of change in my community?
3. How does education open doors?

*Engineering blades for the model wind turbine*

1. How can model wind turbine blades be designed, tested and compared?
2. What modifications can be made to improve the efficiency and power of the wind turbine?

*Culminating Town Hall Meeting*

1. Is wind power always the most appropriate energy source?
2. How can renewable energy bring about positive change in the world?

**Project Description:** The entire project takes place over a six week period in both language arts and science. In science class, students spend 5-6 class periods reviewing electrical circuits and learning about energy forms and energy transformation. Then it takes about four weeks for the students to design, create, test, modify and retest their blades, and write their lab report. At the same time in language arts, the students will be reading and discussing the true story *The Boy Who Harnessed the Wind* by William Kamkwamba. The culmination of the project is a mock town hall meeting where students are assigned roles and debate the merits of a proposed wind farm off the coast of their town.

**Global Connection:** This inspiring autobiography details how at 14, William was able to build a working wind turbine from scraps in his native country of Malawi, bringing irrigation to his farm and saving his family from starvation. Analysis of the story in language arts deepens and broadens students' understanding of the implications of developing wind power in both the United States and around the world. At the same time, the design and testing of blades in science fosters a sense of agency, helping students to see themselves a part of the solution to our global energy problem.

**Interdisciplinary Aspect:** As students read, write and discuss in language arts, they are also using those same skills to explain their design choices, describe modifications they plan to make to their blades and analyze their results in lab reports. Math skills are clearly integrated throughout the unit in the measurement and calculation of volts, amps, power and efficiency. The town hall meeting dovetails nicely with social studies civics lessons as well. In addition, each lab group of 3-4 students is required to choose a creative way to communicate a message that explains how wind energy could be a part of a solution to the global energy issue. Students may decorate their blades (after testing is completed), write and perform a song, skit or dance, accompanied by an artist's statement, or create a PowerPoint or Prezi.

**Resources:**

Dispezio, Michael A. *Science Fusion; Earth's Water and Atmosphere*. Orlando, FL: Holt McDougal/Houghton Mifflin Harcourt, 2012. Print.

Kamkwamba, William, et al. *The Boy Who Harnessed the Wind: Young Readers Edition*. New York: Dial Books for Young Readers, 2012. Print.

Kamkwamba, William, Moving Windmills project: [www.williamkamkwamba.com/](http://www.williamkamkwamba.com/)

Kidwind Windwise Education: <http://www.kidwind.org/windwise-1>; Kidwind Project and Recharge Labs

Science of Everyday Life Virtual Wind Turbine Lab:  
<http://scienceofeverydaylife.com/innovation/>; Discovery Education and 3M

Learning Law and Democracy  
Foundation: <http://civics.sites.unc.edu/files/2012/05/CityCouncilSimulationCURFEW.pdf>;  
City Council Simulation: Dogwood City's Proposed Curfew Ordinance

Technology Environmental and Energy Center: [ateec.org/wp-content/uploads/2011/09/cape\\_wind\\_simul.pdf](http://ateec.org/wp-content/uploads/2011/09/cape_wind_simul.pdf); Town Meeting on Offshore Wind Power in Cape Cod

