GIFTED EDUCATION NEWS-PAGE ***(VOLUME 20, NUMBER 4)***
Published by GIFTED EDUCATION PRESS; 10201 YUMA COURT;
P.O. BOX 1586; MANASSAS, VA 20108; 703-369-5017 **www.giftededpress.com**

Some Classroom Projects and Activities on Energy Production and Conservation

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(from *Exploring Energy & Alternative Energy Technologies and Issues: Resource Guide for the Gifted Middle and High School Classroom*, 2010, Gifted Education Press)

1) What is the history of energy consumption and the range of energy sources the United States has used since it started as a nation? Can your students name the basic energy sources our country uses, and also for what purposes? This is a most interesting exercise to do. Much can be learned from visiting the Energy Information Administration at http://www.eia.doe.gov/ and looking through the various statistics there. It might be possible to construct a graph or chart that shows when the various energy sources started to be used and when they might have been phased out. How much of all this energy use is now attributable to alternate energy forms? When will a significant amount come from them? What are some of the barriers with changing the nation's mix of energy sources it uses? How might these barriers be overcome?

2) Have your gifted students do some research and compile a chart showing the energy content of different fuels, on a common basis like Btu/lb. Here are the fuels they should have shown in their chart:

●Wood ●Coal ●Natural Gas ●Propane ●Gasoline ●Oil ●Nuclear

Point out that coal itself has several different types, such as lignite, sub-bituminous, bituminous, and anthracite. Also show that fuel oils come in different grades as well from heavy oils to light oils to gasoline and kerosene.

3) We have a wonderful national infrastructure that delivers natural gas to our homes, and oil products to us for heating, and gasoline for our cars. How does the oil and gas get from the wells to our homes and gas stations? How does a refinery work, and how do the engineers know what kinds of oil fuels to make at what time of the year? How are these infrastructures repaired after they age or become damaged in a storm like when hurricane Katrina hit New Orleans and knocked out some refineries?

4) One of my favorite ways to visualize energy is the venerable matchstick. A wooden matchstick is just about one (1) Btu when it burns. Use this unit of measure to have your gifted students try and visually construct something to see how much energy this represents. For instance, a peanut butter and jelly sandwich when eaten will provide about 1000 Btu to power the human body. How big a pile of matchsticks would this energy represent? A gallon of fuel oil contains about 138,000 Btu. How big is that pile of matchsticks? By the way, a box of matchsticks may contain 50 or 100 matchsticks. So use a little math and mentally pile up those boxes to see how much energy various fuel sources contain!

5) Just what is the definition of a "Btu"? How do scientists and engineers measure energy? What are the differences between energy and work and heat? Have the students look back in history to discover some of the great names in this area…the scientists, engineers, inventors, and businessmen who first turned ideas and theories into energy saving devices and machines we use every day. How about a big time line on the wall of the classroom to show how all these folks and their discoveries and inventions fit together?

6) Have your students survey their own homes and energy use habits to identify the ways they use energy and perhaps what fuel form they use it in. Here are some examples to get the investigative work underway:

●Family Car gasoline ●Kitchen Appliances electricity ●Cooking Food natural gas ●Heating the House natural gas, or oil, or propane, or electricity

After the students identify the various methods and uses of energy, make some pie charts that look at: How many student homes use oil or natural gas or electricity for home heating? How many homes use oil, or natural gas, or electricity for heating their water? Work in some discussion on statistics too!

7) What changes to our lifestyles would result in energy savings and reduced use of fossil fuels? How likely is this to occur? Why don't people use more mass transit? Is everyone in the class ready to change their lifestyle to save energy? What are the pros and cons on this topic?

8) Using activity 1) above, can the students also look at other countries and their energy use to see what similarities and differences are likely to be evident. For instance, how does France differ from the U.S, or maybe Spain, and Germany? Do the countries have the same social/environmental concerns? France uses much more nuclear energy than the U.S. Why?

9) What is likely to happen to the world energy situation, especially oil, when China and India progress up the curve to modernization and their huge economies need a continual supply of fuel resources? China and India combined have a population that is about 10 times that of the U.S. Discuss what impacts will be felt and what actions might be taken by various countries to address this new and intense competition.

10) How will computers help us monitor and save energy? This is the right technology to come along at just the right time for our energy future. How do companies use computers today to control their energy use? How might your gifted students use these computer techniques to design an energy saving and monitoring system for the school? What do they envision checking and monitoring on a regular basis so as to control daily energy consumption? Let them express their ideas in diagrams and pictures. Have them design an energy smart house using advanced computer technology.

Highlights of Articles and Books from Gifted Education Press

See information about **Heroes of Giftedness** (2009, Maurice and Eugenia Fisher, Editors) at www.giftededpress.com/HEROESOFGIFTEDNESS.htm http://amzn.to/i8Mwsu – an inspirational book for teachers, parents and students.

See our 111th issue (Feb.-March 2010) of ***Gifted Education News-Page*** containing essays on two Heroes of Giftedness – Walter Alvarez & Neil Armstrong – http://bit.ly/hs5jlJ.

Two wonderful books for increasing gifted students' creativity – ***Snibbles*** and ***More Snibbles*** by Judy Micheletti. www.giftededpress.com/SNIBBLES.htm http://amzn.to/hgg3Gl http://amzn.to/fcOdb7.

Golden Quills by Robert E. Myers – An exciting book for teaching Creative Language Arts Skills to Gifted Students. www.giftededpress.com/REMYERS.htm http://amzn.to/eCP3yj.

Interview with a **Hero of Giftedness – Makoto Nakura, Master of the Marimba.** http://bit.ly/dhnKO3.

See the Renzulli & Reis article on The Renzulli Learning System in the Fall 2007 issue of ***Gifted Education Press Quarterly*** http://bit.ly/hoaNX0. Join ***GEPQ*** at www.GiftedEdPress.com.

Read articles by Dr. Donna Y. Ford & Her Colleagues from *Gifted Education Press Quarterly* on Identifying Minority Students for Gifted Education Programs:

"Under-Representation and Gifted Education: The More Things Change, the More They Must Not Stay the Same" (***GEPQ***, Fall 2010) – http://bit.ly/aBbtBP..

"Under-Representation of African American Students in Gifted Education: Nine Theories and Frameworks for Information, Understanding, and Change" (Michelle Trotman Scott, Co-Author) (***GEPQ***, Summer 2010) – http://bit.ly/d6ZEg4.

"AP Classes: Advanced Placement or Advancing the Privileged?" (Gilman W. Whiting, Co-Author) (GEPQ, Summer 2008) – http://bit.ly/9buNEs.

"Conducting Cross-Cultural Research: Implications for Gifted Education" (Gilman W. Whiting, James L. Moore III, and Tarek C. Grantham, Co-Authors) (***GEPQ***, Winter 2008) – http://bit.ly/ij4YG6.