



The Global Energy Challenge, a 21st Century Students Guide to Ethical Energy Usage

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This curriculum unit is recommended for:
Grades 6-8 Science and Social Studies

Key Terms: Commons, Cosmopolitanism, CMO, climate, ethics, energy, GDP, globalization, morality, non-renewable resource, population, renewable resource

Teaching Standards: See [Appendix 1](#) for teaching standards addressed in this unit.

Synopsis: This is a cross-curricular unit developed to facilitate a conversation on ethical [energy](#) usage in the 21st Century. The unit could be taught to 6-8 grade students in either science or social studies. Three countries will become the primary focus of the investigation. The students will use the United States, China, and India for research purposes. Students will establish background knowledge on each country's primary religion or ethical system, immigration trends, current energy usage, and future trends. Students will use their knowledge of the five themes of geography and eight factors of civilization to determine patterns and possible future energy needs and allocations. Students will look at various energy sources and then use scientific data to make recommendations for moral energy usage by creating a code of ethics incorporating themes from both social studies and science. The goal or objective of this unit is to help students understand the challenges ahead and to empower them to make a difference in the world.

I plan to teach this unit during the 2014-2015 school year to 100 students in science and social studies.

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The Global Energy Challenge **A 21st Century Student's Guide to Ethical Energy Usage**

Robin Mitchell

School Background Information

The [Golden Rule](#) (Appendix 2) or universal truth is generally accepted by most of the world's [population](#). For example, "*Hurt not others in ways that you, yourself, would find hurtful,*" a statement by the Buddha, from India, is similar to a statement made by Confucius, from China: "*Do not do to others what you would not like yourself. Then there will be no resentment against you, either in the family or in the state*". Jesus, of Nazareth said, "*Do unto others as you would have them do to you*" and the indigenous people of the Americas believed, "*people are part of the web of life, what one does affects all.*" Four corners of the world came to the same truth before forms of mass communication were available.

6th grade students in North Carolina study the common themes found in major religions and ethical systems. At Randolph Middle School in Charlotte, NC, Social Studies (Individuals and Society – The IB name) is an amazing class to teach. Randolph Middle is an International Baccalaureate magnet, with students from all over the world. Throughout the day there are Jewish children sitting next to Muslim children and Buddhists sitting with Christians. There are Mormons, 7th Day Adventists, agnostics, atheists, and practicing wiccans; the closest church to our campus is a Universalist Unitarian. Economically we are diverse as well. 43% of the student population qualifies for free and/or reduced lunch. However, a large percentage of the remaining 57% are quite wealthy. The students learn to respect and value each other through the lens of their IB training. Each student is required to learn a second language by 8th grade and many students are fluent in several languages. This is a multi-cultural community that celebrates diversity. Focusing on universal truths and common stories helps the students see that people are much more alike than different.

The students use IB principals as a way to understand the world. In fact, the beginning portion of the International Baccalaureate mission statement encourages the staff to "develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect." ⁱ

Randolph Middle School uses two curriculums. Teachers are expected to integrate IB curriculum with the North Carolina Essential Standards. Science and Social Studies are both considered survey courses and are taught in tandem on an A/B schedule.

Neither science nor social studies students have a hard bound text book. The students bring their own electronic devices or use a class room set of Google chrome books for research purposes. Students use Discovery Education tech books on-line. In science, the students use an investigative approach to problem solving, known as CL-EV-R, which stands for Claim + Evidence + Reasoning =Explanation. This is taught in lieu of the Scientific Method. The students are not in a typical science classroom. In fact, the classroom was once used for home economics.

There is an average of 32 students per class and the classroom is approximately 20x20 ft. in size. As part of the current teacher evaluation method used in the state of North Carolina, Science and Social studies classes are now subject to End of Year testing. Individual teachers are held accountable for their student's test scores on the EOY tests. If students do not make or exceed predicted growth then the teacher and his/her department can be placed on an action plan, first step toward dismissal. This makes both courses very content heavy, with many research opportunities, but not much time for hands on activities. High stakes testing drives the delivery method of the content for these two classes. The small classroom size and large number of students in tight quarters makes it difficult to do much more than demonstrations for either course.

One of the requirements of attending an IB School in Charlotte is that each student must complete community and Service hours so that he/she can develop an awareness of self and the role that he/she plays in the local and global community. These core values help us develop 21st Century leaders for tomorrow.

Content Objectives

The objective of this unit is to integrate science, social studies and International Baccalaureate standards to explore some of the ethical dilemmas surrounding the need for greater energy resources to fuel our expanding world. Students will use research to determine whether or not energy expansion is a positive goal for humanity and the planet.

Introduction

There is compelling scientific evidence that shows if the citizens of the world had acted in 1992 at the first Earth Summit to reduce global warming, scientists could have contained worldwide warming to plus 2 degrees Celsius.

Background: The first Earth Summit was initiated by the United Nations with the principal theme of addressing environmental and sustainable development issues. There were 172,108 heads of state or governments present, 2,400 non-governmental organizations represented (NGOs) and 10,000 journalists who helped spread the message to millions of people around the world.ⁱⁱ The Summit's message stated that nothing less

than a transformation of our attitudes and behavior would bring about the necessary changes needed to maintain a healthy world.

History: Despite over a quarter of a century of scientific data supporting evidence of a planet in decline, many people have yet to heed or believe the warnings issued in 1992. Science alone has been unable to transform the attitudes of enough people to bring about the change needed.

Remedy: In Naomi Klein's book, [This Changes Everything: Capitalism Vs. The Climate](#), she concedes that civilization is not interested in the science of global warming. Yet, change is necessary if the planet is to be saved. So, if scientific evidence is not enough to change attitudes and behavior then perhaps making [climate](#) change a moral issue might bring the world to action.

Introducing [Morality](#) and [Ethics](#)

Introducing morality and ethics to sixth graders is not as daunting a task as it would seem. In Social Studies class, students are introduced to both World Religions and Ancient Civilizations. Not only do students learn about the common themes found in many religions and cultures, they are introduced to the factors that define healthy civilizations. Students discover how “push/pull” factors relate to migration and immigration of people. For example, religious persecution was a *push* factor to those early Puritans and Separatists that left Plymouth, England on the Mayflower and moved to the United States in the early 1600's. People who were persecuted for openly practicing banned religions were *pulled* toward the United States because it promised a more tolerant society. There are other examples of “push/pull” factors that the students explore for example, scarcity of food would be a *push*, abundance would be a *pull*, unclean water would be a *push*, clean clear water a *pull*, lack of energy resources would be a *push*, abundant energy resources would be a *pull*.

In 6th grade Science class the students learn how humans impact the environment. The key concept is pollution-its sources, usually trash or chemical, and the harmful effects it can have on the environment. Pollution can also be a *limiting factor* in an ecosystem, similar to *push/pull* factors found in Social Studies class, like scarcity/abundance of food. Pollution does not have to harm or kill all the species in an ecosystem to cause damage. Pollution that reduces the number of one sensitive species can upset the entire food web and cause population changes in all parts of the system.ⁱⁱⁱ

With those concepts established teachers can then transition into morality and ethical codes. We investigate Hammurabi's code (written in Iraq) and the 10 Commandments(found in both the Hebrew and Christian Bibles) in sixth grade. Those moral laws became the basis for Western Civilization's codified law.

Indigenous cultures often adhered to similar ethical codes. A Native American elder once said, “Humankind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect.”

Students will be introduced to the term, [cosmopolitanism](#) – referring to an ideology that all members of the human race belong to a single community, based on a shared morality. That concept or thread also seems to be a common theme both in Eastern and Western thought. The idea of Karma – what goes around, comes around, is seen around the world.

The [Commons](#)

Another ancient Native American proverb states, “Treat the earth well: it was not given to you by your parents; it was loaned to you by your children. We do not inherit the earth from our Ancestors; we borrow it from our children.”^{iv}

Ancient civilizations and pre-capitalist societies embraced the concept of *common* areas; Areas that belonged to all people, no matter their wealth or status in a community.

Villages, tribes, and nomadic people were all sustained by the [commons](#). These were areas where it was free to hunt, fish, gather medicinal herbs, wash, obtain drinking water, harvest berries and fruit trees, etc. The idea of someone owning these areas was inconceivable to the indigenous people of the land. People shared land, however they did not own it. For example, when the Dutch “discovered” New York in the early 1600’s they struck a deal with the natives to purchase land. The Native Americans sold Manhattan to the Dutch for 60 guilders worth of goods. The current exchange rate would put the dollar amount at the equivalent of \$734.77 euros or \$951.08 USD.^v Manhattan was sold on November 5, 1626, however, which tribe sold it or whether they had the right to sell it was not documented. Some historians believe a nomadic tribe from Long Island traded Manhattan for goods and then went back to Long Island, thinking they pulled a fast one on the Dutch. The sales agreement was written in Dutch, filed in the Netherlands and inconsequential to the daily life of the natives. What the Native Americans gained was valuable cutting edge technology, supplies and fur trading partners for life. They were satisfied with the trade. Historians often note that the Indians had a concept of land ownership different from that of the Europeans. The Natives regarded land, like air and water, as something you could use but not own or sell. It has been suggested that they thought of this transaction more of a sharing agreement, than a sale and it benefitted both parties at the time.^{vi}

Native Americans and other indigenous cultures embraced the idea that Mother Earth provided for all the creatures of the world and that ownership of the land by one

person or entity was not possible. The core belief being that people borrow the land from their children, they don't inherit from their ancestors.

Historians often say, "History repeats itself". It is possible that the indigenous people of the 21st century are being duped again. In 1626, Manhattan was sold for 60 guilders. It is 2014 and areas of West Virginia and Oklahoma are being sold for fracking rights. The people in those states are benefitting short term, however, the damage to the earth will be long term, both from polluted waste water and damaged tectonic plates. We are fracking the land, polluting ecosystems, mining toxins, and destroying the oceans to produce energy. Some would still say that forests, mountains, oceans, rivers, lakes, air, and underground mining rights should be shared by all, not sold to countries or private corporations. Children should inherit good natural resources and a clean environment. Good stewardship of the resources should be the priority not exploitation.

One model used in the 21st century of sharing vs. ownership of our natural resources and common areas can be found in Alaska, U.S.A. Alaska does share its abundance of resources with the people who are affected by the drilling and piping of its oil. In doing so, they have one of the lowest poverty rates in the United States. Each person receives a basic income based on publically owned resources. This yearly bonus can be from \$4,000-\$8,000 per person. Opendemocracy.net proposes that Communities should be the owners of their resources; Governments should be the brokers and corporations should become the hired help. Communities should seize the opportunity at privatization to fight poverty and promote equality by claiming ownership of their resources and common areas.

The [Commons](#), Part II

"In pre-capitalist times, shared commons were the source of sustenance for people. Families could feed themselves, clothe themselves, and barter for necessities. Though corporations have now privatized and depleted much of the commons, it survives in three portfolios. First is what is left of our natural wealth: air, water, seeds, ecosystems, and other species. Second, we have community wealth: streets, parks, internet access, money, and social insurance. Last, we have cultural wealth: music, art, science, and open source software. These are gifts we share and we are obliged to preserve for future generations" as referenced in <http://ThisChangesEverything.org>

Energy Issues

One of the issues that face modern society is whether or not energy and the right to its unregulated use has now become a part of the commons, like air, water, or land. Who or what should be the guiding force for decision making at this time in our world's history? If we believe that the world belongs to the children, then maybe they should be making these decisions. Adults have not fared well. The United Nations tried to be a voice of

reason in 1992 at the Earth Summit, yet, the health of our planet and her people continues to decline as more and more common areas are being polluted and abandoned. There have been many natural and man-made disasters that have threatened the life of our planet in the past 50 years. Production of energy for an ever growing population seems to be at the root of the most of these disasters.

Chernobyl

The Chernobyl Nuclear Power Plant meltdown occurred in 1986, the effects still evident through satellite imagery today.^{vii}

So, Chernobyl was fresh in the minds of those who attended the first Earth Summit. The Chernobyl plant was next to a large water supply as this was used to generate the steam to drive the power plant turbines. Common water supplies, land and animals were destroyed by this man-made disaster. Radioactive waste was leaked into the Black Sea and winds carried waste into the Baltic Sea. 25 years later Chernobyl is a ghost town where once 300,000 flourished.

Fukuma Daiichi

The Fukushima Daiichi Nuclear Power Plant Accident occurred on March 11, 2011. This was 19 years after the first Earth Summit. A major earthquake (9.0 on the Richter scale) occurred 80 miles off the coast of Japan causing a series of Tsunamis (harbor waves) with the largest estimated at 30 feet tall to hit Japan. The waves damaged the power supply and cooling systems of four nuclear reactors. Three reactors melted in the first three days. A fourth reactor was later written off as unsalvageable. Contaminated radioactive waste was released into the air and into the fresh water supply. Radioactive waste eventually leaked into the Pacific Ocean. 100,000 people were evacuated from their homes.^{viii}

How radioactive is the ocean now?

“We live in a sea of radioactivity. The danger is the dose.” Ken Buessler, Marine Chemist, Woods Hole Oceanographic Institution. Two of the radioactive substances leaked from the Fukushima reactors are iodine-131 and cesium-137. In large doses, both of these isotopes or radionuclides, as they are called, can cause long-term health problems. For more information on iodine-131 or cesium-137 check www.epa.gov. Approximately 300,000 gallons of contaminated water leaked into the Pacific Ocean in 2011. For the general public the exposure is not as much of an issue as the uptake by the food web and the potential for human consumption of contaminated fish.^{ix}

The ocean has natural occurring radioactivity and there is evidence of radioactive deposits from nuclear testing as far back as the 1950's and 1960's. The U.S., Great Britain, and France conducted nuclear testing over the Marshall Islands, which received a

high concentration of nuclear fallout from the testing, yet there are no known issues associated with eating fish from the Pacific at this time.^x

At issue then is the question: How much radioactivity is too much? Ukraine scientists were able to track the spread of radioactive material from Chernobyl for months and years after the incident. Within a week after the explosions at the Fukushima plant, there were reports of very small increases in the Pacific waters on the coast of the western continental U.S. The “normal” radioactivity of the world’s oceans varies depending on the natural protection offered by the earth’s atmosphere and the coastline composition. Naturally occurring radioactive rocks cause higher spikes in some areas. Naturally occurring radiation can be found in substances such as potassium-40 and uranium-238 at levels 1,000 to 10,000 times higher than human sources have contributed. Sea water also has naturally occurring radiation such as polonium-210, which is measurable in fish caught off the west coast of the U.S. as well as those caught in Japan.^{xi}

As of November 2014, fisheries near Fukushima in Japan are closed because of the levels of cesium in the fish are too high for human consumption, especially for the bottom dwelling fish.

Both Japan and the Ukraine are highly populated areas which required nuclear power to supply their energy demands. The need for energy is increasing world-wide in both developed and developing countries. Questions for future research: At what cost to the planet do we feed the need for more energy? Should there be a per capita energy allotment? Or, should there be a per country allotment for energy? Where does the desire for more technology intersect with the issue of protecting our environment for future generations? Do *developed* nations have the right to restrict *developing* nation’s energy sources? Is providing energy to *all* of the inhabitants of earth possible or environmentally feasible? What are the basic minimum energy needs per person? How is that established? Should everyone own a computer or have electricity? Do we centralize computers so that everyone has access?

Exxon Valdese

Energy centered disasters are not limited to the nuclear category. Closer to home, was the Exxon Valdese oil spill. It occurred in Prince William Sound, Alaska on March 29, 1989. The ship, an oil tanker, slammed into Bligh Reef and spilled more than 11 million gallons of crude oil into the sound and out into the Gulf of Alaska. It damaged more than 1,300 miles of shoreline. 25 years later the sound’s coastal eco-system has proven to be permanently damaged. Thousands of gallons of toxic oil still pollutes the beaches. A pod of Orcas was destroyed. Schools of a million or more herrings were wiped out. Fisheries were closed. The 40 species that depended on the fish for survival included the indigenous people of Alaska, bald eagles, brown bears, seals, and whales. We learned from this spill that no more than 10% of an oil spill is recoverable, whether it is in Alaska

or the Gulf of Mexico, according to Mary Beth Holleman, the author of “The Heart of the Sound” and a contributor to “Oil and Water: The Exxon Valdez Wreck,” a CNN documentary.

BP Oil Spill

The worst oil spill in U.S. history occurred in the Gulf of Mexico. Within days of the April 20, 2010, explosion and sinking of the Deepwater Horizon oil rig in the Gulf of Mexico underwater cameras revealed the BP pipeline was leaking oil and gas on the ocean floor. The explosion killed 11 people. The gas leak was about 42 miles off the coast of Louisiana. By the time the well was capped, 87 days later, an estimated 4.9 million barrels of oil had leaked into the deep sea.^{xii}

Harmful toxins were used to contain the spill, fisheries were closed, and tourism to Louisiana, Alabama, Florida, and Texas was curtailed costing the indigenous people their very livelihoods. As of December 31, 2013, BP’s payments related to Gulf Coast recovery were as follows: response and clean-up (done by locals) \$14 billion+, Claims, advances and settlements \$12.5 billion, funding for the resources damage assessment process \$1 billion, state-led tourism campaigns \$178 Million, State-led seafood marketing programs \$47 million, Early restoration projects \$698 million, State-led seafood testing \$24 million.^{xiii}

Resources

In Geography, the students learn historical patterns of migration. Those patterns often show that people are pulled to the closest natural resources. In 2013, the inflow of new legal permanent residents to the United States came from the following countries:

Country	# of people
Mexico	135,028
China	71,798
India	68,458

Source: US Department of Homeland Security, Office of Immigration Statistics.
www.us-immigration.com

The United States is known throughout the world to have an abundance of resources but modern day immigration to the United States may also be fueled by a need to escape pollution. The U.S. has stricter environmental protection laws than Mexico, China and India. Those laws have protected some of our natural areas and resources from harm. The movement to protect the environment in the United States began with the book

Silent Spring, written by Rachel Carson and published in 1962. It detailed the danger of synthetic chemical pesticides on the environment and led to a ban on the pesticide DDT. Rachel Carson's book helped to spur an environmental movement that led to the creation of the EPA (Environmental Protection Agency). Froma Harrop at www.frommaharrop.com has written about "environmental immigration", specifically wealthier Chinese nationals moving to the U.S. to avoid China's heavy industrial pollution. The Chinese authorities in Beijing are taking drastic measures to limit smog, traffic and dissent ahead of an annual economic summit (APEC) that includes President Obama and 20 other world leaders. Schools are closed, polluting factories in neighboring provinces are closed, hospitals are on ½ day shifts, and central heating to college dorms is being shut down.^{xiv} However, after the leaders are gone the people of Beijing, China, will put their surgical masks back on to protect themselves from the smog. New terms are being coined to address these phenomena, such as environmental migrant and [climate](#) refugee. These are people who are forced to migrate from or flee their home region due to sudden or long term changes to their environment which compromises their well-being or secure livelihood.

There seems to be a growing disconnect between the wealthy and the poor. Not only is there a widening gap in income distribution, there is a widening gap in [ethics](#) as well. Wealthy individuals and corporations appear to believe, it is acceptable to make a mess, as long as it is not in their back yard. *See* BP and Environmental Immigrants. If one can afford to pay others to clean up the pollution, the process becomes not only acceptable but morally righteous.

Trickle Down Economics

Vast wealth will "trickle down" to the poor and improve their lot in life. "Trickle Down Economics" is often associated with the policies put in place by former U.S. president Ronald Reagan in the 1980's. He believed giving tax breaks to the wealthy would help them earn more, thus increasing productivity, which would provide jobs for those in lower tax brackets.^{xv}

Wal-Mart

Sam Walton (1918-1992) and his family exemplify this policy. Sam Walton started a small store in 1962, which grew into an international discount chain over the next 30 years. In 1985, Forbes magazine named Sam Walton the wealthiest man in the United States. By 2010, Wal-Mart was the largest company in the world.^{xvi} the Walton family, who own Wal-Mart, controls a fortune equal to the wealth of the bottom 40% of Americans, combined. According to Sen. Bernie Sanders (I-VT), the international retailer had \$469 billion in sales and 2.2 million employees; including 1.3 million in the U.S.^{xvii} The corporation has been criticized for employing people at wages so low that an employee working a 40 hour week qualifies for government subsidies such as Medicaid

and food stamps.^{xviii} In NC, the minimum wage is \$7.25 an hour (Wal-Mart's starting salary) yet the living wage for one adult to live without a subsidy is \$9.12 based on the living wage calculator found at www.livingwage.mit.edu. If the adult has one child he/she needs to make \$18.92 per hour to live without requiring a government subsidy. "Trickledown Economics" seems to be contributing to the growing income disparity world-wide, not just in the U.S. "Sam Walton bought goods wherever he could get them cheapest, with any other considerations secondary" writes Bob Ortega, author of the Wal-Mart history, In Sam We Trust. In the 1980's Wal-Mart was importing about 40% of its product from Asia, "which were usually cheaper because factory workers were paid so much less in China and Asian countries". Wal-Mart is an international company paying low wages not only in NC but across the globe. As Walton's heirs get richer, the poor get poorer; with tax payers subsidizing the difference.

21st Century Living

Sociologists claim a healthy civilized nation needs eight characteristics to function well: crops to cultivate, domesticated animals, permanent cities and homes, a clean water source (or there would be no crops or animals), economic stability (a bartering or money system), art that represents the culture, an organized government with rules, laws, and specializations, intellectual achievements, and advances in technology. It was understood in pre-capitalist times that a full day's work would yield a sustainable wage. Since that is no longer a given, *see* Wal-Mart, I would add that we have to address the growing income disparity issue as well.

Comparing Energy Use in the United States, China and India per capita

According to the www.bp.com/statisticalreview, published in October, 2014: The world is using 3.64 CMO of oil per year, which is a nonrenewable resource. The United States uses .65 CMO, for a [population](http://www.worldbank.org) of 3.16 million (population numbers from www.worldbank.org 10/25/2014) China uses .81 CMO for a population of 1.375 billion people and India uses .17 for a population of 1.25 billion. The United States uses roughly 1/6 of the world's production of oil per year and China uses slightly more than the United States, however, the Chinese population is exponentially bigger. India, with the second largest population on earth uses a fraction of the United States energy.

Sources of Energy

Energy is broadly categorized into two main groups: Renewable and [Non-renewable](#).

Renewable energy can be found in nature. It is plentiful. Radiation from the sun can be used to power solar cells, wind farms can generate electricity, water/ hydropower and even the natural rhythm of the tides can be used to produce it. Mother Earth provides

geothermal energy. The sun in combination with plants produces biomass, yet another form of usable energy.

Pros: These sources of energy generally produce low carbon emissions, therefore they are considered environmentally friendly. Lower carbon emissions reduce the consumer's impact on the environment. The money used to set up solar plants, wind farms hydropower, et.al. should provide a living wage to workers . A nation's dependence on foreign energy sources would decline providing added insurance that quality of life could be maintained.

Cons: It is expensive to set up plants. Solar energy is good during the day, not at night. Geothermal energy can bring toxic chemicals beneath the earth surface to the top and create environmental hazards. Hydroelectric plants change the natural flow of water and can negatively affect wildlife and people on either side of the dam. Wind turbines can negatively affect bird populations and migrations patterns of other creatures, i.e. butterflies. They are also quite noisy and require windy conditions to be affective.

Non-renewable energy is not easily regenerated and in relatively short supply. It exists in the form of fossil fuels, natural gas, oil and coal.

Pros: They are cheap and easy to use. Systems are in place for the delivery of oil and gas from the field to your home or car. A small amount of nuclear energy can produce a large amount of power.

Cons: [Non-renewables](#) release toxic gases in the air which are contributing to climate change. Pollution from these sources is deadly to all life on earth. They are a finite resource, when they are gone they will have to be replaced by an alternative energy source.

Most of the information for this section (Energy Sources) was obtained from this source: www.conserve-energy-future.com

Summary

The students will be introduced to common themes in world religions and ethical systems. They will research and read passages on environmental and energy challenges. Common themes in geography and factors that define civilizations will be analyzed. Sources of energy and availability of resources will be investigated. The idea of protecting common areas will be visited. Students will research methods of distributing energy in fair and equitable ways that will reduce the impact of the current carbon footprint for two of the most populated places on earth, China and India. They will also look at ways to reduce the carbon footprint in one of the wealthiest places on earth, the United States. Students will address whether or not developing nations are entitled to a

greater share of the remaining [non-renewable](#) energy sources or if future energy consumption should be limited to renewable sources only.

Classroom Activities

1. Students will demonstrate knowledge of the five themes of geography by creating a tri-fold brochure with at least two examples of each theme. See 5 Themes of Geography Appendix 3.
2. Students will demonstrate knowledge of the 8 factors of civilization by creating and illustrating an 8 fold brochure. See 8 factors of civilization Appendix 3.
3. Students will participate in a multi-cultural celebration day. Students will dress in authentic Chinese, North American, and Indian clothing to represent the various countries being researched in class. Students will receive a packet of information regarding each country. They will complete a graphic organizer to compare and contrast similarities and differences in the three countries. (triple Venn Diagram) Students will bring food to represent the country they are researching to share with one another.
4. Field Trip I: Students will attend a presentation on Energy Sources produced by the National Children's Theater. They will receive a booklet on practical ways to conserve energy at home.
5. Field Trip II: Students will travel by bus to an authentic gold mine, pan for gold, and be introduced to the concepts of density, diffusion, mixtures and compounds as they pan for gold. They will also see firsthand the impact that a mining operation has on the environment. (Reed Gold Mine in Cabarrus County, NC)
6. Create a Guide for Ethical Energy Usage. See Guide for [Ethical Energy Usage](#) for in Appendix 3.

List of materials for classroom use

A Google chrome book for each student
Copy paper
Markers

Reading list for students

Students will use the following approved sites to conduct research: www.epa.gov, www.us-immigration.com, www.thischangeseverything.org, www.bp.com, www.worldbank.org, www.livingwage.mit.edu, www.bio.com, www.opendemocracy.net, www.howstuffworks.com, www.politifact.com, www.bpstatisticalreview.com

Key Terms

Commons – the cultural and natural resources accessible to all members of society, including natural materials such as air, water and habitable earth.

Cosmopolitanism - ideology that all members of the human race belong to a single community, based on a shared morality

CMO-Cubic Mile of Oil

Climate – the weather average of a region as temperature, air pressure, humidity, sunshine, cloudiness, and winds throughout the year, which is then averaged over a series of years.

Ethics - a set of moral principles, especially ones relating to or affirming a specified group, field, or form of conduct.

Energy – the ability to do work

GDP – gross domestic product- The monetary value of all of the finished goods and services produced within a countries border within a specific time period.

Globalization - ongoing process by which regional economies, societies, and cultures have become integrated.

Morality - is the differentiation of intentions, decisions, and actions between those that are "good" (or right) and those that are "bad" (or wrong). Morality can be a body of standards or principles derived from a code of conduct from a particular philosophy, religion, or culture, etc., or it can derive from an ethical standard that a person believes should be universal.

Non-renewable resource – A resource that exists in a limited supply; for example, coal and oil.

Population – All inhabitants of a particular town or country.

Renewable resource – A resource that is continually resupplied; for example, light energy from the sun.

Appendix 1: Implementing Teaching Standards

North Carolina Essential Standards

6-8 Science

Note on strands: Physical Science (P) Earth Science (E) Life Science (L)

6th Grade Essential Standard: Energy Conservation and Transfer

6. P.3.0 Understand the characteristics of energy transfer and interactions of matter and energy

6. P.3.3 Explain the suitability of materials for use in technological design based on a response to heat and electrical energy.

Students will look at different types of energy to determine efficiency and scalability for their final presentation on ethical energy usage.

7th Grade Essential Standard: Energy Conservation and Transfer

7. E.1.6 Conclude that the good health of humans requires: monitoring the atmosphere, maintaining air quality and stewardship.

Students will investigate the various ways that scientists monitor the environment and investigate air quality. The concept of stewardship will be defined as it pertains to ethical energy usage.

8th Grade Essential Standard: Energy Conservation and Transfer

8. P.2 Explain the environmental implications associated with the various methods of obtaining, managing, and using energy

8. P.2.1 Explain the environmental consequences of the various methods of obtaining, transforming and distributing energy.

8. P.2.2 Explain the implications of the depletion of renewable and nonrenewable energy resources and the importance of conservation.

Students will determine the efficacy of using renewable and nonrenewable energy sources when creating their final document.

North Carolina Essential Standards

6-8 Social Studies

Note on strands: History (H) Geography and Environmental Literacy (G) Economics and Financial Literacy (E) Civics and Government (CG) Culture (C)

6th Grade Essential Standard: History

6. H.2 Understand the political, economic and/or social significance of historical events, issues, individuals and cultural groups

6. H.1.2 Summarize the literal meaning of historical documents in order to establish context.

6. H.1.3 Use primary and secondary sources to interpret various historical perspectives

6. H.2.2 Compare historical and contemporary events and understand continuity and change.

6. H.2.3 Explain how innovation and/or technology transformed civilizations, societies and regions over time (e.g. agricultural technology, weaponry, transportation and communication)

Students will look at three different societies: China, U.S. and India to put in context the historical and contemporary background needed for the creation of the ethical energy usage guidelines. Students will analyze historical documents and use primary and secondary sources to create the 8 factors of civilization brochure.

6th Grade Essential Standard: Geography and Environment

6. G.1.2 Explain the factors that influenced the movement of people, goods and ideas and the effects of that movement on societies and regions over time (e.g. scarcity of resources, conquests, desire for wealth, disease and trade.)

6th Grade Essential Standard: Economics and Financial Literacy

6. E.1. Understand how the physical environment and human interaction affected the economic activities of various civilizations, societies and regions.

6. E.1.1 Explain how conflict, compromise and negotiation over the availability of resources (i.e. natural, human and capital) impacted the economic development of various civilizations, societies and regions.

6. E.1.2 Explain how quality of life is impacted by economic choices of civilizations, societies and regions.

Students need to understand how quality of life is impacted by the economic choices of civilizations, societies and regions in order to create their ethical energy use document. Students will analyze the factors that influence movement of people in their 5 themes of geography brochures to help them understand the choices societies make to remain self sustaining.

Appendix 2

'Golden Rule' / Ethical Codes

Each of the major religions and ethical systems of the world teach the universality of the Golden Rule, examples are below:

- Christianity** *All things whatsoever ye would that men should do to you, do ye so to them; for this is the law and the prophets.*
Matthew 7:1
- Confucianism** *Do not do to others what you would not like yourself. Then there will be no resentment against you, either in the family or in the state.*
Analects 12:2
- Buddhism** *Hurt not others in ways that you yourself would find hurtful.*
Udana-Varga 5,1
- Hinduism** *This is the sum of duty; do naught onto others what you would not have them do unto you.*
Mahabharata 5,1517
- Islam** *No one of you is a believer until he desires for his brother that which he desires for himself.*
Sunnah
- Judaism** *What is hateful to you, do not do to your fellowman. This is the entire Law; all the rest is commentary.*
Talmud, Shabbat 31d
- Taoism** *Regard your neighbor's gain as your gain, and your neighbor's loss as your own loss.*
Tai Shang Kan Yin
- Zoroastrianism** *That nature alone is good which refrains from doing another whatsoever is not good*

Appendix 3: Teaching Strategies

Five Themes of Geography – Brochure

CATEGORY	(25 - 23) Excellent	(22 - 21) Good	(20- 18) Almost	(17 - 15) Not Yet
Attractiveness & Organization	The brochure has exceptionally attractive formatting and well-organized information.	The brochure has attractive formatting and well-organized information.	The brochure has organized information.	The brochure's formatting and organization of material are confusing to the reader.
Content - Accuracy	The brochure has all of the required information (see checklist) and some additional information	The brochure has all of the required information (see checklist).	The brochure has most of the required information (see checklist).	The brochure has little of the required information (see checklist).
Writing - Mechanics	All of the writing is done in complete sentences. Capitalization and punctuation are correct throughout the brochure.	Most of the writing is done in complete sentences. Most of the capitalization and punctuation are correct throughout the brochure.	Some of the writing is done in complete sentences. Some of the capitalization and punctuation are correct throughout the brochure.	Most of the writing is not done in complete sentences. Most of the capitalization and punctuation are not correct throughout the brochure.
Graphics/Pictures	The graphics go well with the text and there is a good mix of text and graphics.	The graphics go well with the text, but there are very broad.	The graphics go well with the text, but there are too few.	The graphics do not go with the accompanying text or appear to be randomly chosen.

Five Themes of Geography

Checklist for Five Themes of Geography

Directions: 1. You will make a brochure with an 8 x 11 ½ in sheet of paper folded into thirds that explain the five themes of geography. You will use both sides of the paper. The first section will have a title with your name, class, and date. There will be five pages remaining for the 5 themes of geography! Each section will have one theme with its definition and a colorful illustration. You may design your brochure on the computer and print it out, print some pictures, or create it completely by hand.

Section 1- **Title page** with name, class, date and Title

Section 2- **Place** with definition (picture or drawing)

Section 3-**Location** with definition (picture or drawing)

Section 4- **Regions** with definition (picture or drawing)

Section 5- **Movement** with definition (picture or drawing)

Section 6- **Human/Environment Interaction** with definition (picture or drawing)

Grading out of 100 points

Category	(25pts) Excellent	(22 pts) Good	(20 pts) Almost	(17 pts) Not yet
Attractiveness and Organization (Counted one time for title section)				
Content- Accuracy (Counted for Theme 1, 2, 3, 4, and 5)				
Writing-Mechanics (Counted for Theme 1, 2, 3, 4, and 5)				

Graphics/Pictures (Counted for Theme 1, 2, 3, 4, and 5)				
--	--	--	--	--

Eight Factors of Civilization – Brochure

CATEGORY	4	3	2	1
Attractiveness & Organization	The brochure has exceptionally attractive formatting and well-organized information.	The brochure has attractive formatting and well-organized information.	The brochure has well-organized information.	The brochure's formatting and organization of material are confusing to the reader.
Writing - Organization	Each section in the brochure has a clear beginning, middle, and end.	Almost all sections of the brochure have a clear beginning, middle and end.	Most sections of the brochure have a clear beginning, middle and end.	Less than half of the sections of the brochure have a clear beginning, middle and end.
Graphics/Pictures	Graphics go well with the text and there is a good mix of text and graphics.	Graphics go well with the text, but there are so many that they distract from the text.	Graphics go well with the text, but there are too few and the brochure seems "text-heavy".	Graphics do not go with the accompanying text or appear to be randomly chosen.
Content - Accuracy	All facts in the brochure are accurate.	99-90% of the facts in the brochure are accurate.	89-80% of the facts in the brochure are accurate.	Fewer than 80% of the facts in the brochure are accurate.
Knowledge Gained	All students in the group can accurately answer all questions related to facts in the brochure and to technical processes used to create the brochure.	All students in the group can accurately answer most questions related to facts in the brochure and to technical processes used to create the brochure.	Most students in the group can accurately answer most questions related to facts in the brochure and to technical processes used to create the brochure.	Several students in the group appear to have little knowledge about the facts or technical processes used in the brochure

Ethical Energy Use Project

Name/Block #: _____



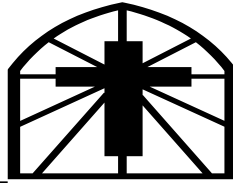
Date Assigned: _____



Progress Check Point I: _____



Progress Check Point II: _____



Due Date: _____



Project: The Children's Guide to Ethical Energy Usage

Directions:

Each class will be divided into 4 groups. Three groups will be researching specific countries. One group will be researching energy and ethics. Each job assignment is negotiable within the team. However, all jobs must be assigned or the teacher will make the final decision on job placement. All research must be done in Google Docs/Slides so information can be shared and edited jointly.

Available positions: the religion professor, the scientist, the accountant, the politician/lawyer, the engineer, or the independent journalist.

Job Descriptions for teams working on China, India or The United States:

Religion scholars: Meet with other religious scholars to research prevalent religions and belief systems in your assigned country. Compile data for the assigned country. Each religion professor will create 3-5 Google slides representing his/her findings. These slides will be added to each country's final presentation.

Scientists: meet with other scientists to research energy consumption needs and energy resources available to each country. These will vary. Scientist must create 3-5 Google slides on available energy sources to be added to each country's final presentation.

Accountants: meet with other accountants to find population data, number of households, and median income for each country. Accountants will create 3-5 Google slides on available energy sources to be added to each country's final presentation.

Politicians: meet with other politicians and decide what the technology/basic income needs will be for the citizens of the country you represent. For example: Does every family need a computer or would a centralized computer station be better (like a library)? Does every family member need an iPhone? Or is one phone per family enough? How much money should people earn? Can they afford to purchase electricity and technology? What is a fair living wage in your country? How much do computers cost? What percentage of income would that computer cost a family. Politicians will create 3-5 slides on the above questions.

Researchers: Will work with politicians to answer questions. Politicians will create the final power point for the country they are working on and present at the seminar. Each team of experts will fill out graphic organizers with the information gathered and then share their slide with the countries they represent to compile the data into one report. (a Google slide show)

Job descriptions for those working on independent research

Independent Engineers will research worldwide available energy sources. Engineers will research the scalability of those resources. They will provide answers to the big questions: How much energy would be needed to provide iPhones to 7 billion people? How much energy would need to be produced if every person in the world had a computer or electricity? Where would that energy have to come from?

Independent journalists will investigate ethical codes and belief systems, for example, *The Golden Rule*. The journalists will help answer questions on acceptable

worldwide standards of living. They will help determine the answers to the following questions: Should there be universal living wage laws? Based on research should everyone in the world have access to the same standard of living? If so, how is that done? Should the United States limit their usage in order to provide resources to less developed nations? How do we best distribute the available resources equitably?

The Engineers will create 4-5 Google slides with their findings to present to the class

The Independent Journalists will create 4-5 slides with their findings to present to the class.

Final Product

There will be four Google Slide presentations per class; three that represent the energy needs of specific countries and one that represents the energy needs of the world. After listening to the final presentations the class will create an energy code of ethics. The students will then decide on an acceptable energy usage policy. They will decide the level of pollution that is acceptable. They will decide the level of resource reduction that is acceptable. Finally, they will design an energy code of ethics based on the research presented. The code must be agreed upon by the class. The Independent Journalists will guide the class based on research gathered on ethics and codes to complete the project. The final product will be typed, signed by the members of the class, and posted at Randolph Middle school. The students may elect to send copies to The United Nations, Duke Power and President Obama.

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