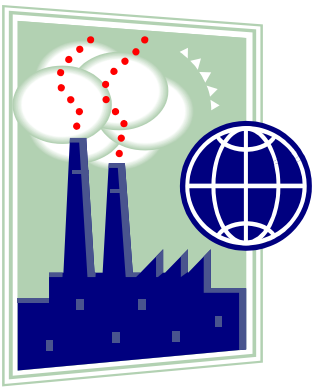

Human Impact on the Environment

An Interdisciplinary Thematic Unit

By
The Harrier Team

Kellian Adams
Lisa Bayen
Annie Behrens
Missy Lincoln

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Professor Paul Jablon
Lesley University

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Unit Overview

As we are becoming increasingly aware of the acute impact that humans have on our environment, it is imperative that we allow our children to explore these relationships, as they are the ones who must ultimately live with the consequences of society's decisions as well as imagine new ways of sustainably existing in our environment. The idea of the cause and effect relationship of humans and their environment is by no means a new subject. This topic has surfaced since ancient times in many civilizations having an impact on their survival, is a recurrent theme in literature, has implications that must be measured and assessed, as well as requires immediate attention and creative solutions. Thus, our theme of human impact on the environment is relevant, interdisciplinary, and important. Over the next four weeks, our team will explore this issue from many angles and lenses, finally converging on final projects that raise awareness and promote meaningful change.

The theme for our unit is "Human Impact on the Environment". We will study English, Social Studies, Science and Math through the lens of how man impacts the world he inhabits, what constitutes a sustainable manner of living and what happens to a civilization which is unable to live sustainably. We will individually teach our subject matter to our team of 80 seventh grade students three days a week using materials like "Silent Spring" by Rachel Carson and "Collapse" by Jared Diamond, examining population growth, carbon footprints and resource use. The remaining two days each week will be dedicated to the students' culminating projects. Teachers have planned subject crossover days where they will collaborate on lessons on which they are both working. Math and History will collaborate on energy use. English and History will collaborate on a debate on sustainable practices and so on. Each teacher has tailored her lessons

so that each subject is reflecting a different aspect of the same topic. For instance, during week two, all subjects will focus on water. Science and Math will discuss bioaccumulation and its affect on animals. In English, students will write about their findings and in History, students will discover if the Mayans caused a “man-made drought” through poor farming practices.

Our unit will be launched with a combination of the film "An Inconvenient Truth" and student investigation of what a carbon / ecological footprint is. This will occur during the first task force day. On the second task force day, the students will start the day with an all team activity, Food for Thought, http://www.populationeducation.org/media/upload/FoodThought06.pdf that will heighten students' global perspective. The game will jumpstart the brainstorming for each individual project as well as creating community. The game compares and contrasts population, land use patterns and energy consumption in five regions of the world. The game requires at least 26 students to play and is most effective when 70 or more students are involved. The classroom is divided into five regions: North America, Latin America, Europe, Africa and Asia. The regions are made up of a piece of yarn enclosing an area that is in proportion to the actual land area of the region. Each of these regions is populated with students in proportion to the actual population of the region. Each region is given a number of toothpicks that is in proportion to the area's energy consumption. The "ambassador" for each region is responsible for reading out population statistics such as birth rate, death rate and doubling rate, as well as land use statistics such as arable land per person and number of people living in urban areas. Since the land area, population, wealth and energy consumption are to scale, it gives the students a concrete representation of resource distribution over the world's population.

There are four different projects, and, on Mondays and Fridays, students will only meet in their project groups. The last two periods of Fridays will be dedicated to the students sharing

their group's progress with the other three groups. The first project is a media-based project where students will build a website to inform the community about local environmental issues, school and town energy use and environmental updates. The second project will be an "energy gallery", an artistic representation of energy use in the town and school, which will be displayed in the town hall. The third project will be a documentary film about the school's use of resources. And, the last project will be a presentation of the first three projects to the school board in order to give them recommendations for saving energy and making the school's consumption practices more environmental.

Students will choose which project to be a part of and then will concentrate on finishing this project by the end of the four-week period. We believe that the subject matter study along with the collaboration will give students a strong framework to create projects to reach out to the community. Each of our projects has a teacher advisor and is designed to help students share their research with others and encourage the community to have a positive effect on the environment.

In addition to empowering students to work together, this type of interdisciplinary unit encourages students to become life-long learners as well as citizens in a community of learners. The benefits of doing such an ITU are myriad. First, there is the content that students will be learning about the environment and the impact of Man on Nature. This broad theme spans beyond any one discipline as it has implications for how we live, and so there is no better way for students to explore this problem than in a real and meaningful way that transcends typically structured middle school classes. By learning about a larger theme, students are able to make connections to broader issues and become more critical and analytical thinkers and doers. By

specifically studying the interaction of humans and the environment, they are investing themselves in a cause that urgently requires our attention.

Next, there is the way that students are learning content – by investigating and doing. Inquiry is the natural way that we gather information about the world around us, creating meaningful schema, and acting on them by developing and testing possible solutions. The unit is open-ended enough for students to find multiple inroads in and contribute their strengths while strengthening real-world problem-solving skills. Because they have the potential to make a difference, students are invested in the process. Ultimately, it is this process of thinking, applying, creating, and evaluating that is the highest goal of thinking and using these habits of mind in any situations. ITUs teach students how to learn, a process they will use for the rest of their lives.

Finally, an ITU such as this requires an immense amount of teamwork. From completing inquiry projects to writing poetry, having debates about ancient civilizations, computing the school's carbon footprint, and making a presentation to the School Board, these tasks not only require a great deal of skills (which will be scaffolded throughout the unit), but also peer collaboration and trust. Through working on these projects as well as more active team-building and assigned roles, students will learn what it means to be an active and important member of a group. Each student will contribute his or her own skills to the table, and together, with cooperation, the students will complete a truly awesome project. Learning how to work together requires the skills that it ultimately gives students in life – a sense of citizenship, belonging, empathy, sensitivity, perseverance, and importance.

Subject Overview

Science

This theme so handily leads itself to Science as the goal of this entire unit is to investigate problems and engineer solutions. In terms of scientific habits of mind, this unit will encourage students to design and implement their own scientific method as they define a problem, do research on the problem and possible solutions, propose solutions, evaluate, test, and engineer possibilities. This is students learning Science through doing Science.

In addition to the scientific process and skills this unit scaffolds, the content of the unit also addresses and crosses over many of the aspects of the fields of Science. First, we learn Earth Science as we explore the evolution of the planet over time and current trends in global climate. We will look at the natural resources of the Earth and how they are changing. One of the main topics of this unit is sustainability – how can we make responsible choices will preserving our Earth for the future. Next we will address Life Science (Biology) as we look at communities and ecosystems and the dynamics of populations and interrelations of roles. We will take a day to look at the effect of bioaccumulation in whales as well as to explore the problem of over fishing. We will examine Physical Science as we embark on our energy exploration, and we will finish with Engineering as we design eco-friendly products that meet current needs in a way that does not have a detrimental impact on the environment. In Science class, task force, and every other class, students will use and develop scientific habits of mind as well as explore content that is integral to understanding the scientific world around us.

Social Studies

Seventh grade Social Studies focuses on ancient civilizations of Mesopotamia, Africa and the Mediterranean where students study the rise and fall of classic civilizations like Rome, Greece and Egypt. In this interdisciplinary unit, students will continue their study of ancient civilizations through a mystery: what was it that caused the fall of Mayan civilization? Mayan civilization was in decline well before the Spanish Conquistadores reached Mexico. There are three prevailing theories as to why the Mayan culture slid into decline. The first theory is that the Mayans overextended themselves through war and were crippled by an invasion from a neighboring nation. The second theory is that climate change and drought outside of the Mayans' control stunted their capability to farm and feed their people. The third theory is that the Mayans misused their resources and were the cause of their own decline.

In this unit, students will study Mayan civilization and examine evidence for different theories to explain its decline. Each theory is related to environment and man's effect on his environment so as students learn about environmentalism, resource use and abuse, farming, water conservation and population control, they will apply this knowledge to what they're learning about Mayan civilization. They will also make connections between the Mayans' use of their resources and America's use of its resources.

The unit will crossover with Math through a week on examining resource use, and with English as we prepare for our debate. Science is a common theme throughout the unit and intersects through all of the lessons on drought, resource use and sustainability.

Mathematics

Seventh grade mathematics deals with the interpretation and representation of data and changes to those sets of data. The study of population and its growth provides students with a set of data that is ready for interpretation. During the four weeks, students will work on four main topics. The first week introduces what population is and how it has grown over time and what factors influence its growth. The second week explores the impact of population on water and the animals that live in it. During the third week, the students will compare fuel consumption and CO_2 production between the United States and China, as well as look at how trees and the biodiversity of tropical rainforests are affected by population growth. For the last week, students will discover how population trends developed in the past, and how they might continue to develop in the future. The students will look at family size trends, compare population demographics, and age and gender distributions.

English / Language Arts

With “being green” more present in 2008 than ever, there are endless written pieces available for a middle school classroom. Through out the four weeks of the unit students will be learning about the earth's precious resources while working with multiple genres.

The English / Language Arts portion of this unit provides the students with the opportunity to do a lot of reflecting about what they are leaning through out the four weeks. This theme relates itself to each student on various personal levels whether it’s the recycling that takes place at their home, their interest in helping the school save energy, or their frustration when they see animals having their habitats ruined from underneath them. No matter what sparks them,

they will learn how to share their ideas and feeling through multiple genres and will also be introduced to various authors who have already taken a stand.

Integrated Arts

This Unit will integrate the arts through the final task force projects. Students are able to choose which project they would like to work on based on which kind of art they feel most comfortable working with. The visual arts will be addressed by the “Energy Gallery”. Students will use what they have learned to make visual representations of resource use and abuse including paintings, sculptures, installations or performance art. The performing arts will be addressed through a video presentation, which is to be unveiled both at the Energy Gallery opening night and during the presentation to the school board. It will also be aired on local access television. This will give students the opportunity to include music, write short plays and develop a “documentary-style” film presentation of their work. Instructional technology is represented by the website project. Students will use art, design and programming to create a website that introducing people to resources about environmentalism. Writing and public speaking will be the strengths of students who choose to work on the presentation to the school board project. This will include giving speeches and making an effective presentations and developing a set of energy-saving solutions that the board could implement in the schools. Through these many options, we hope that each student is able to find something that he or she can get excited about working on.

Timeline

Week 1

Subject	Theme	Monday	Tuesday	Wednesday	Thursday	Friday
Math	Intro to Population	What is your ecological footprint?	Introduction to Population Topics	Pop Ecology Files	Intro to Population Growth Webquest	Food for Thought Activity
Science	Intro to Systems and Sustainability	Science / Math collaborate	Fishing for the Future (Science / English collaborate)	Systems are Dynamic	Deep Space 3000	Project Teams Launch
Social Studies	Intro to ancient civilization	An Inconvenient Truth	Introduce the concept of lost civilizations: Ozymandius	The Mysteries of Lost Cities: Introduce the Maya's History, timeline	How do you think the environment made the Maya collapse?	
English	Intro to Genres	Unit Launch	Fiction / Non-fiction The Lorax / Silent Spring (Science / English collaborate)	Poetry: Embrace The Disgrace	Drama: What can we do?	

Week 2

Subject	Theme	Monday	Tuesday	Wednesday	Thursday	Friday
Math	Water	Project Teams	Bioaccumulation in Killer Whales (Math/Science co-taught in a double period)	Water, Water Everywhere (Math/English collaborate)	Field Trip: Water testing at local streams	Project Teams
Science	What's in the Water?			Every Drop Counts		
Social Studies	Water		The Maya Environment: How is this like America and our environment? How is it different?	Wars and droughts: Come up with a plan to tell the Mayans how they could better preserve their water supply. How did the Mayans create a "man-made drought"?		Work
English	Waste of Tiny, Tiny water drops.		Fiction/ Non fiction The Drop in my Drink/ Water Squeeze	Poetry: Waste of Tiny, Tiny water drops. (Math/English collaborate)		

Week 3

Subject	Theme	Monday	Tuesday	Wednesday	Thursday	Friday
Math	Energy	Project Teams	Fueling the Future (Math / Social Studies collaborate)	Global Warming Begins at Home USA	A World of Difference / Timber !	Project Team
Science	Energy and Air Exploration		Energy Exploration	Project Learning Challenge	Project Learning Challenge	
Social Studies	Energy		How does America get its energy? (Math/Social Studies collaborate)	Mining: Differences among mining companies Question: Is it possible for the US to have the same standard of living but do it environmentally?	Oil: Two oil fields Question: Is it possible for the US to have the same standard of living but do it environmentally?	Work and Present Findings
English	Can I cut back?		Begin final poem	Work on poem structures	Teacher/ peer editing poems	

Week 4

Subject	Theme	Monday	Tuesday	Wednesday	Thursday	Friday
Math	Population Trends	Project Teams	An American Family Perspective	A Hill of Beans	Mysteries of the US Pyramids	Project Teams
Science	Engineering for Change		Guest Speaker Panel on Sustainable Design	Building for Sustainability	Building for Sustainability	
Social Studies	Sustainability		The logging industry Question: Is Logging a sustainable practice? Is this anything like what happened with the Mayans and their "man-made drought"? HW: Signs of Hope	Collapse in the southern lowlands: How is the US's treatment of our environment similar to how the Mayans treated their environment?	(Social Studies/ ELA Collaborate) Energy Debate! Is it possible for the US to keep its standard of living, but do it environmentally?	Energy Gallery, Drama and School Board Presentation Finalized, Website goes live
English	Poems and Debate		Poems due Students will share	Drama: Students will prepare scripts and structures for debate	Energy debate	