

Waste Management Should Be About More Than Trash

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INTRODUCTION

Students today have a lot of experience working on computers and are much more comfortable with technology than their teachers. However, if you look below the surface, many of them are comfortable using the technology for games and social networking but lack the basic research skills that apply whether we are using technology or not. Many students rarely use technology for educational purposes. Of course, students think they know all they need to know about computers, so using a topic they are interested in to help teach the skills they are lacking helps keep their focus. Students become more engaged when they can find different points of view, and in the case of recycling, consumption, and the environment, there are no easy answers, opening the door for debate and disagreements. Students love the opportunity to debate their peers.

This curriculum unit will be taught in a large inner-city middle school in Houston, Texas. There is a diverse student population in terms of race and economic status. The racial breakdown is approximately 30/30/30/10 with the 10% being the Asian population. It is a Title I school with a large number of English Language Learners from many countries among the school's 1800 students. The school has a strong fine arts magnet program and is a neighborhood vanguard. This unit will be taught in a Research Skills elective in a computer lab but can easily be modified to be a cross curricular unit to be used with a cluster of students with common core curriculum teachers. It will be taught over a three-week period in a modified block schedule with two block periods and one short period a week.

OBJECTIVES

This unit addresses the Texas Essential Knowledge and Skills (TEKS) objectives for middle school Technology Applications, Social Studies, Science and Language Arts. (See Appendix A for specific numeration).

Computer Literacy

Students are expected to be able to acquire information from print, Internet resources and databases provided by school districts. They should also be skilled in evaluating the information they find as well as be able to ethically use the information giving credit to the owners of the information.

Problem Solving

There are many objectives that address critical thinking and problem solving skills across all disciplines of the curriculum. Students are expected to be able to handle different points of view and to realize that all information is not completely reliable. They will also be expected to research and find enough information to form a conclusion.

Communication

Also across the curriculum there are objectives concerning a student's ability to communicate effectively. Students are expected to be able to present their ideas and the findings of their research using multimedia.

RATIONALE

Middle school students are very interested in the world as it affects them. At the beginning of each semester I survey my students about topics that they are interested in studying, and topics involving the environment – recycling, alternative energy, the oceans, global warming, etc. – are always near the top of their lists. Each year someone attempts to initiate a recycling program and at times the efforts last for a while, but it is usually the work of a few individuals and does not have widespread support. In a school with 1800 middle school students, it will take more education than setting out a few recycling bins to gain the cooperation of a significant percentage of the staff and students. Recycling bins in the cafeteria inevitably end up with trash in them, and recycling bins in the classrooms are often emptied into the trash by the custodial staff.

Meanwhile, students throw away a lot of new items that have been mishandled and no longer look new.

When I take recyclables that the city of Houston will not pick up during curbside recycling to a recycling center, there is a constant flow of traffic, but I suspect from my conversations with people and from the number of recycling bins out on trash day that those are only the diehards, and that there are many more who don't recycle anything. While traveling on the East Coast last summer, I noticed that recycling was much more prevalent than in Houston. Their recycling bins were even twice as large as ours. Shortly after I returned from my trip, a report was issued by the trade journal, *Waste News*, which ranked the thirty most populated cities in the U.S. according to the percent of total waste recycled. San Francisco led the list with 70% recycled and Houston was at the bottom with a dismal 2 ½ % (DeFore).

Of course, I also think that it is unfortunate that recycling is mostly what we focus on (even if with little success) when it is the third component of reduce, reuse, and recycle. Many people don't seem to realize that there is an order to the three Rs. Recently at the Houston auto show an auto manufacturer had bags printed with Recycle, Reduce, Reuse. This struck a nerve with me because it seems many people think that recycling should be the main focus. I think that Hurricane Ike and the recent increases in gas prices both gave us unique opportunities to reduce our excess energy usage. It will be interesting to see if any of these changes are adapted into our lifestyle long term. I feel that it is important to allow students to discover the issues associated with a topic that they are interested in and willing to get involved in. It is especially interesting with middle school students because they are often unaware that there is more to solving our problems than recycling some of our waste. They are just starting to engage in abstract thinking and often underestimate the complexity of problems.

Whole Foods stores stopped using plastic bags and have focused on "reduce" by using fewer paper and plastic bags and "reuse" by selling reusable bags made of recycled plastic bottles and cloth. They also have available paper bags made of recycled paper. In 2002, Ireland placed a hefty tax on plastic bags (Plas Tax) and usage has dropped over 90% (Rosenthal). Other countries have since started to tax and ban plastic bags (Roach). These examples show that big changes are possible and can happen quickly. Companies have sprung up to sell reusable bags so the economy continues in different directions when we change our habits. My students will be required to look at the economic and environmental impacts of changes. Young people are some of the largest consumers of electronic gadgets. I want them to become more aware of their ecological footprints and think about their actions in terms of economic and environmental costs.

I can envision them challenging and pushing each other to new levels in their critical thinking skills as they look at their actions in a new way.

Students are our future engineers, inventors, managers, politicians, and other professionals and hopefully will start challenging why we have to throw away electronics instead of updating them (*The Story of Stuff*). Or debate the cost to society of using corn as fuel and think about energy and water and how sometimes our efforts to reduce consumption of one of these resources leads to increased use of the other resource. It will be to society's advantage to educate our youth to challenge the idea of doing things the way they have been done in the past and to look at the new models that are appearing daily.

The main focus will be what can students, teachers, families, and our local communities do to reduce, reuse, and recycle to manage how many resources we waste or consume in a wasteful manner? This would allow students to investigate what organizations currently in place at school could be recruited to help in the effort. What can teachers do to reduce energy usage? What can we encourage our "community" to do? What "low cost" changes can be made to reduce energy consumption and efficiency? What will make recycling easier and more widespread? Are there possibilities for community gardens in Houston such as exist in other cities? What will work for us locally that might not work in other communities?

Students will have to locate information, evaluate the source of the information, look for different points of view and give credit to others for their ideas. The topic is of the quality that will allow students to find information on websites and through the online databases that the district pays for annually. There will also be opportunities to practice surveying and interview skills. And foremost, they will be required to challenge each other and engage in dialog orally and in writing about what the costs of the alternatives might be and which alternative they would recommend. I am most interested in my students learning skills and information that will benefit their future and I think that this is a perfect opportunity for them to use the skills that we study to make a contribution to the school and the community. It will help them understand the need for learning research skills and will leave them more informed and better prepared to have a positive influence on their future.

UNIT BACKGROUND

Ecology

The Kids Do Ecology website defines ecology as "the relationship of living things to each other and to what's around them." A discussion of what students and school personnel use on a daily basis at home and at school will allow students to see how much potential there is for change because they have a relationship with lots of things around them. Websites such as the Washington State Department of Ecology have facts, such as a one-liter milk carton can be recycled into five sheets of high quality paper. It also has information on the different types of plastics by recycle number, properties of the plastic, and examples of what products come in that type of plastic. Hopefully, if students start acting in small ways when they are young adolescents, then they will be politically active and effect more change as they reach voting age.

Ecological Footprint

According to the PBS glossary, ecological footprint is defined as a calculation that estimates the area of Earth's productive land and water required to supply the resources that an individual or group demands, as well as to absorb the wastes that the individual or group produces (National Geographic's *Strange Days*). The ecological footprint calculators look at things such as what food we eat, where our food is grown, how much we carpool, what types of cars we drive, what size houses we live in, how much we use public transportation, how much trash we generate, and other information that calculates how much of our land and water resources we use. In my

experience, students are always amazed to see how many earths it would take if everyone lived in the manner that they live. In the United States student lifestyles usually end up requiring anywhere from three to seven earths. There are many different versions available online and some are more student friendly than others. The *Earth Day Network* has a fancy flash version, is very interactive and seems to keep students' attention. One of the benefits of using an online version is that students can make changes to their footprint and the results are recalculated immediately, so they can play around with what changes in lifestyle will make a difference in their ecological footprint.

The next step is looking beyond the individual and doing a school ecological footprint. Those are also available online and would start discussions that hopefully would lead to school projects to reduce waste. There are also trash audits online that students can do at their school. They involve doing audits of the trash from the cafeteria as well as paper and other trash from classrooms. At websites like The Green Schools Initiative, information is available about what schools have done and can do to reduce their waste. Making students aware of the problem is the first step. The recent move of the First Daughters, Sasha and Malia Obama, to Sidwell Friends is a good opportunity to discuss what a "green" school looks like. Sidwell was the first school in the United States to receive a LEED (Leadership in Energy and Environmental Design) platinum certification for its middle school, and there is a video on the school's website with students discussing their building, grounds and other initiatives. The U.S. Green Building Council websites list LEED certified buildings in each chapter's area of the country. According to the Houston chapter website schools in the Houston area with the certification include Thompson and Walnut Bend Elementary schools in HISD. This information would allow students and teachers to see additional examples close to home of "green" schools.

Consumption, Waste, and Point of View

Victor Lebow, in his article in the 1955 spring edition of the *Journal of Retailing*, made the following statement: "Our enormously productive economy... demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfaction, our ego satisfaction, in consumption... We need things consumed, burned up, worn out, replaced, and discarded at an ever increasing rate." This is a statement quoted by Annie Leonard in her video *The Story of Stuff*. Additionally, she gives a quote from President Eisenhower's council of economic advisors chairman. "The American economy's ultimate purpose is to produce more consumer goods. Not better health care, education, housing, transportation, or recreation, or less poverty and hunger, but providing more stuff to consumers." She goes on to talk about the problem with our model of consumption and how continuing to extract resources and run them through a system that ends up with disposing of them cannot work indefinitely. This short video is eye-opening and represents good information for teachers to decide what part of the video or what other resource to use with students. There are lots of movies and videos available now on Amazon.com, PBS, and other sources. Care should be taken to think about whether your students are ready for *The Story of Stuff*. On one hand, it could be a good starting point for students to look closer at their patterns of consumption. Students today have lots of electronic devices, clothes, shoes, and other "stuff" that often ends up being disposed of relatively quickly. According to *The Story of Stuff*, only one percent of what we consume is still in use six months later. Since I am concerned with teaching students research skills, we would challenge the facts in *The Story of Stuff* and determine what we really believe. On the other hand, teachers might consider whether or not the tone of *The Story of Stuff* is too negative overall. I experienced mixed reactions from middle school students who accept the basic premise, but don't always appreciate the tone. At any rate, information from the video is available on a fact sheet on the website and Annie Leonard tries to be more upbeat at the end of

the video so it is a very useful tool however it is used. A recent *NY Times* article relates some student and parent reactions to the film (Kaufman).

As far as Victor Lebow is concerned, when I looked at blogs about him on Wordpress and Blogspot, one blogger in particular challenged the use of the quote as being out of context and wondered if Lebow actually was commenting on the state of things or was really suggesting that we should embrace consumption as our way of life (Steve). This is useful in discussing point of view and how the Internet lets all of us have an informed voice. However, there is no doubt that our society did embrace consumption. But then I have always heard that wars are good for our economy and since the quotes from Lebow and Eisenhower were after World War II, was there a need to pump up the economy since there was no longer a war to employ people.

At this point in our recession, there is a greater opportunity to get people to listen to a message of change than there has been in the recent past. There is information about the Plas Tax in Ireland but that information is disputed by some organizations. According to the American Chemical Plastics Division, the positive effects of the tax on plastics are a myth. On their website, they dispute the claims item by item and tell how more plastic bags are being used, the landfill and litter problems have not been solved, and shop lifting has increased. This would be a great website for students to look at and investigate for point of view. It would be true that landfill problems would not improve since plastic bags are so thin. That however, is not usually the problem with plastic bags. The site doesn't point out that plastic bags are not biodegradable. The website also points out something that I have read on other websites and in the *Waste Management* book by Wilcox. A shipment of paper bags takes seven times as many trucks as a shipment of plastic bags. However, the plastics industry does not mention that the ultimate solution is not a shift to paper bags but to reusable bags, which is what happened in Ireland. On the other hand, websites such as reusablebags.com that point out the negatives of plastic bags fail to mention the higher cost to the environment of producing paper bags. They also don't point out any costs of reusable bags. This information along with a more balanced point of view can be found on websites such as National Geographic News. But then when students search further, they may find information about biodegradable plastic bags made of corn and other products. At first this sounds like a great solution, but I will challenge my students to find out how much energy is used to make biodegradable bags, if there are even better solutions, and what problems may result from switching to biodegradable bags. Students will also be encouraged to see how much waste actually biodegrades in a landfill since there are archaeologists now who examine the trash in landfills to learn about people and cultures today. From what I have read, a landfill is about as far from a compost bin as you can get. In many cases, new "products" improve a situation by eliminating one problem but do not always look at other problems that may be created. One example would be a total shift from plastic to paper bags, which would cost the environment in other ways. Students must learn to investigate and not just accept information. They must weigh the costs of each alternative and evaluate them. Plastic has a cost but so does paper. Is recycled paper the answer or perhaps tree farms or reusing or recycling plastic bags? Perhaps they will discover that solutions may vary depending on the location.

Change

In September 2008, Hurricane Ike struck the Houston area and many of us were without power for three weeks or more. There was no school, and for a few days we were all involved in cleanup. Our lives changed with the gasoline shortage, lack of electricity (many traffic lights not working), damaged office buildings and schools, and thousands of downed trees. We learned to live without televisions, computers, and other electronics. It was a different life, but most of us adapted fairly easily. Teamwork became the norm, families worked together, and neighbors helped neighbors. Children went out and played with friends. Everyone pitched in, and with the help of professionals from across the country to repair power lines and help with picking up

debris, our lives slowly returned to "normal" for most of us, even though months later businesses are still closed and some people are still not back in their homes. But even when the electricity came back on for most of us, my family was more conscious of our use of electricity and water. Our utility bills now show a significant reduction in consumption over the same time periods last year. When we become conscious of our habits, that awareness can contribute to helping us change those habits.

LESSON PLANS

Lesson Plan One: Exactly What is This New Science?

Objectives

Students will be expected to meet the objectives Technology Applications 4b, 6a; and Language Arts 2a.

Materials and Resources

Students will need access to library reference books and/or Internet access through computers, smart phones, iPod touches, or other devices.

Procedures and Activities

This lesson will take one long – 85 minute – class period. For the introduction, I will tell the students that we are going to discuss waste management. Students will be asked to brainstorm what things come to mind when they hear waste management. I will have either a poster or a clip art picture with pictures that represent waste management. Some of the things included will be a garbage truck, garbage can, trash compacter, landfill, and garbage disposal.

Next the students will be told that over the next three weeks we will be exploring a new science that relates to waste management. I would want students to speculate about why I referred to ecology as a new science. Hopefully, they will come to the conclusion that the term is used relative to other sciences. We will come up with a working definition of ecology as a class before they break into small groups to brainstorm what terms are associated with ecology. We will then put together a class list which I can add to. One student can type in the terms to be projected onto a screen, or if that is not available, the terms can be written on the board.

Some terms which I would hope students would include would be acid rain, environment, biodegradable, ecosystem, deforestation, sustainable, food chain, ecosystem, genetic engineering, greenhouse effect, global warming, hazardous waste, human capital, natural resources, conservation, nonrenewable resources, hybrid, nutrient, biodiversity, organic, consumption, pollutant, extinction, poverty, fossil fuel, and ecological footprint.

Teachers can search for ecological terms to determine which terms would be appropriate for your level of students.

After developing a list, students will work in small groups to find definitions they can understand and will write examples and draw pictures that can be used to explain what each term means. If time is limited, the terms can be divided up to be searched so not every student is searching every term. Hopefully after this lesson students will be ready to learn and understand the topics we are studying in the remaining lessons of the unit.

Assessment

Students will collaborate on examples and will compile their examples in a collaborative tool such as Google Docs where several students can update a document simultaneously. This can also be done easily without technology using a large presentation pad. Students will volunteer to share their examples with the group as we go through the terms. At least one example for each

term should be posted on the walls to ensure all students understand the vocabulary for the unit and to refer to in future lessons.

In addition, the class will reflect on the terms and what they have to do with middle school students. It will be shared with students at this point that their job at the conclusion of this unit will be to develop a plan of action for home and for school and to create multimedia presentations to inform the student body of ways students impact the environment at home and at school, positive changes that can be made and why changes are needed.

Lesson Plan Two: What is Your Ecological Footprint?

Objectives

Students are expected to meet the objectives Social Studies 29a, 29b, 29c, 32a, 32b; Science 1b; and Language Arts 10a.

Materials and Resources

Students will need Internet access to take the ecological footprint quiz and to shop at the interactive market.

Procedures and Activities

This lesson will take one long class period. A review of the definition of ecological footprint from last class should begin this lesson. Next let students know that they will be calculating their ecological footprint to see how many earths we would need if everyone on the planet lived like us. Some calculators like the Earth Day Network Footprint Calculator give choices when students take the test. I encourage students to give as many details as they know because it does make a difference in the results. If they don't know how much their parents pay for monthly electricity, then they may be able to look up the square footage on their house by searching the county appraisal district website for their address or they can look at the website for a nearby apartment complex to see approximately how large apartments are based on the number of bedrooms. Inevitably there will be some guessing but in the end it doesn't matter because the important thing is learning what changes to lifestyle improve and worsen the footprint.

Once students have calculated their footprint have them think about what might change their footprint. They can then go back in and make changes to see the impact of their change and discuss with their neighbor what and why changes occur. If students are curious there are explanations on the footprint calculator websites that help explain how the thought processes that go into the calculations.

For the second part of this lesson students can use an online resource such as the Interactive Market on the PBS website for the National Geographic series *Strange Days on Planet Earth*. Students have a grocery list and must make decisions on which products to purchase. It exposes the hidden costs of foods.

Assessment

After students have experimented to see how many and how few worlds they can manipulate the data to reflect and the hidden costs of different foods, they should do some reflection on what changes had an impact and why. The reflection should be individual since they have had an opportunity to discuss what they found with their neighbors. The reflection can include a list showing activity/ change/ impact. Each student should list several changes that they observed and form a conclusion.

Homework

Students will keep a journal of all of their activities in a typical day.

Lesson Plan Three: What Can We Do?

Objectives

Students are expected to meet the objectives Technology Applications 4b, 6a, 6b, 6c, 9b; Science 1b.

Materials and Resources

Students will need access to the Internet or library books.

Procedures and Activities

In this lesson, students will brainstorm and research what individuals and small groups can do to effect change. This lesson will cover one short and two long class periods, so we will examine what students can do at home and at school. The ecological footprint was a starting point for understanding what helps. The ecology terms should also be in sight in the classroom.

For the short class have a couple of students share their lists of daily activities they engage in on a regular basis that affect the environment both positively and negatively. Have other students help fill in the little things that were missed – kind of like all the steps in making a peanut butter sandwich. Students should then go back and do a more thorough job on their own lists.

During the first long class, we will view a segment of the *Story of Stuff* or another video and look at a fact sheet showing information about consumption. Students can then add to their brainstorm lists of activities they engage in that impact the environment. We will brainstorm keywords that might help them find information about what they can do to reduce, reuse, or recycle in their daily lives.

Next students will engage in research to get additional ideas listed on websites such as the Earth Day Network, or in our case, Green Houston, or one of the other local websites dedicated to green living and awareness. Students will list positive things they can do as they find information.

As students research, they should find information that challenges the ideas presented by ecology networks. If not, the teacher will challenge them to find alternative points of view. For example, who would promote the use of plastic bags? Someone would figure out that the manufacturers of plastic bags would not want people to stop using them. There would also be those who believe that the small things don't make a difference. Student thinking needs to be challenged so they can figure out what they really believe.

During the second long class, students will conduct an activity similar to their home activities, but listing the activities that happen at school and looking at activities of students, teachers, office staff, kitchen staff and others and exploring their ecological impact. This is a good point at which to explore how we can measure progress. Students can use one of the online school ecological footprint tools. They should figure out how they will measure progress once they have identified what activities can be changed and suggested improvements.

Assessment

Groups of students will create word maps, such as Wordless, with terms reflecting things they can do to reduce, reuse, or recycle.

Students will be responsible for individually creating a plan of action based on what they have learned. They should have three sections – what they can do as individuals, what their family can do, and what our school can do. Once these lists are completed, we will work as a class to come up with a real plan of action for school projects. We will revisit the individual and family lists in a few weeks to see if any change has taken place that has lasted.

Lesson Plan Four: From the Good Old Days to the Future

Objectives

Students are expected to meet the objectives Technology Applications 4b, 6a, 6b, 6c, 9b, 11b; Science 1b; Social Studies 29a, 29b, 29c, 32a, 32b, Language Arts 13a, 13b, 13c, 13d, 22a, 22b, 23a, 23b, 23c, 23d, 24a, 24b, 25a, 25b, 25c, 25d.

Materials and Resources

Teacher will need "old school" items for Show and Tell. Students can also be asked ahead of time to bring an old item from home for Show and Tell. During the previous lesson, one of the activities at school that negatively impacts the environment might have been throwing away lots of ball point pens. An old item could be a refillable pen or a bottle of ink. Some households still have collector's items that show how things were done in the past. Some new ideas will reflect a return to the past, such as resurgence in the consumption of glass bottles of soda such as cokes from Mexico.

Procedures and Activities

This lesson will take two long and two short class periods. Thinking about the waste we generate, have students make a list of activities and products that generate a lot of waste. They will then attempt to find what happened to those items in the "good old days," if it is a new item, what it replaced, and in either case, what are possibilities for reducing or eliminating the waste in the future. Tell students that there are lots of "green heroes" among us working individually, as part of a small group, or as part of a company finding solutions that are making a difference or that have potential to make significant changes in the future.

While looking for how things were done differently in the past or changes possible for the future, have them note who is changing. Many companies now have a section on their website that outlines what they are doing to lessen their negative impact on the environment and promote sustainability. Have students look at some of their favorite companies, see what the companies are writing, and think about possible reasons these changes are taking place on the websites.

Assessment

Students should complete their chart listing products and activities that generate waste, how they were handled in the past and possibilities for the future.

Students will record what they found on "green heroes."

The information from all of the lessons will then be used to make multimedia presentations that can be shared with the larger student population. They must be informative yet creative enough to keep their peers' attention and effective enough to convince their peers to make a change. The classes will vote on the presentations that will be broadcast during Advocacy.

APPENDIX A

Unit Objectives

From the Texas Essential Knowledge and Skills for Grades 6 through 8 -- **Technology Applications (Computer Literacy):**

Information Acquisition

The student is expected to:

- 4b - apply appropriate electronic search strategies in the acquisition of information including keyword and Boolean search strategies.

6a - determine and employ methods to evaluate the electronic information for accuracy and validity;

6b - resolve information conflicts and validate information through accessing, researching, and comparing data; and

6c - demonstrate the ability to identify the source, location, media type, relevancy, and content validity of available information.

Solving Problems

The student is expected to:

9b - resolve information conflicts and validate information through research and comparison of data.

Communication

The student is expected to:

11b - design and create interdisciplinary multimedia presentations for defined audiences, including audio, video, text, and graphics.

From the Texas Essential Knowledge and Skills for 8th Grade **Social Studies**:

Science, Technology, and Society

The student is expected to:

29a - compare the effects of scientific discoveries and technological innovations that have influenced daily life in different periods in U.S. history,

29b - describe how scientific ideas influenced technological developments during different periods in U.S. history, and

29c - identify examples of how industrialization changed life in the United States.

Social Studies Skills

The student is expected to:

32a - use a problem-solving process to identify a problem, gather information, list and consider options, consider advantages and disadvantages, choose and implement a solution, and evaluate the effectiveness of the solution; and

32b - use a decision-making process to identify a situation that requires a decision, gather information, identify options, predict consequences, and take action to implement a decision.

From the Texas Essential Knowledge and Skills for 8th Grade **Science**

Scientific Processes

The student is expected to:

1b - make wise choices in the use and conservation of resources and the disposal or recycling of materials.

From the Texas Essential Knowledge and Skills for 8th Grade **Language Arts**

Reading/Vocabulary Development

Students are expected to:

- 2a - determine the meaning of grade-level academic English words derived from Latin, Greek, or other linguistic roots and affixes.

Comprehension of Informational Text/ Expository Text

Students are expected to:

- 10a - summarize the main ideas, supporting details, and relationships among ideas in text succinctly in ways that maintain meaning and logical order;
- 10b - distinguish factual claims from commonplace assertions and opinions and evaluate inferences from their logic in text;
- 10c - make subtle inferences and draw complex conclusions about the ideas in text and their organizational patterns; and
- 10d - synthesize and make logical connections between ideas within a text and across two or three texts representing similar or different genres and support those findings with textual evidence.

Reading/Media Literacy

Students are expected to:

- 13a - evaluate the role of media in focusing attention on events and informing opinion on issues;
- 13b - interpret how visual and sound techniques (e.g., special effects, camera angles, lighting, music) influence the message;
- 13c - evaluate various techniques used to create a point of view in media and the impact on audience; and
- 13d - assess the correct level of formality and tone for successful participation in various digital media.

Research/Research Plan

Students are expected to:

- 22a - brainstorm, consult with others, decide upon a topic, and formulate a major research question to address the major research topic; and
- 22b - apply steps for obtaining and evaluating information from a wide variety of sources and create a written plan after preliminary research in reference works and additional text searches.

Research/Gathering Sources

Students are expected to:

- 23a - follow the research plan to gather information from a range of relevant print and electronic sources using advanced search strategies;
- 23b - categorize information thematically in order to see the larger constructs inherent in the information;
- 23c - record bibliographic information (e.g., author, title, page number) for all notes and sources according to a standard format; and
- 23d - differentiate between paraphrasing and plagiarism and identify the importance of using valid and reliable sources.

Research/Synthesizing Information

Students are expected to:

- 24a - narrow or broaden the major research question, if necessary, based on further research and investigation; and
- 24b - utilize elements that demonstrate the reliability and validity of the sources used (e.g., publication date, coverage, language, point of view) and explain why one source is more useful and relevant than another.

Research/Organizing and Presenting Ideas

Students are expected to synthesize the research into a written or an oral presentation that:

- 25a - draws conclusions and summarizes or paraphrases the findings in a systematic way;
- 25b - marshals evidence to explain the topic and gives relevant reasons for conclusions;
- 25c - presents the findings in a meaningful format; and
- 25d - follows accepted formats for integrating quotations and citations into the written text to maintain a flow of ideas.

ANNOTATED BIBLIOGRAPHY

Works Cited

DeFore, John. "Houston Listed as Last in Recycling Among Big Cities." 7 Online. 01 Aug 2008. WABC TV New York. 9 Feb 2009 <<http://www.greenrightnow.com/wabc/2008/08/01/houston-drags-its-feet-on-recycling/>>.

This article explores possible reasons for Houston's low rate of recycling.

"Earth Day Network Footprint Calculator." *Earth Day Network*. 2009. Earth Day Network. 21 Apr 2009 <<http://www.earthday.net/footprint/>>.

One of the interactive footprint calculators that measures our footprints in how many earths would we need if everyone lived like us.

"Ecology for Educators & Students." *Department of Ecology: State of Washington*. 2009. Washington State Department of Ecology. 21 Apr 2009 <<http://www.ecy.wa.gov/services/ee/index.html>>.

This site has references, tips, facts, a kids section, and tools and curriculum guides for teachers.

"Green Houston." *Green Houston*. 2009. Mayor's Office of Environmental Programming. 21 Apr 2009 <<http://www.greenhoustontx.gov/index.html>>.

This is one of the websites that informs citizens about sustainability projects and shares information about Green Houston programs.

Kaufman, Leslie. "A Cautionary Video about America's 'Stuff.'" *The New York Times* 10 May 2009 Web. 3 Jun 2009. <<http://www.nytimes.com/2009/05/11/education/11stuff.html>>.

This article talk about how some teachers are using the video *The Story of Stuff* to supplement textbooks that have very little up-to-date information about the environment and how one district voted against its use.

Kids Do Ecology. 2008. National Center for Ecological Analysis and Synthesis. 21 Apr 2009 <<http://kids.nceas.ucsb.edu/>>.

General information about ecology as well as information to include ecology in the classroom and links to other useful websites.

Lebow, Victor. "Price Competition in 1955." *Journal of Retailing* XXXI (1955): 5-10;42-44.

This is an article that Victor Lebow, a retail executive, wrote for the *Journal of Retailing* in 1955. He is quoted in the video *The Story of Stuff*.

- National Geographic's Strange Days on Planet Earth*. 2009. *PBS.org*. Public Broadcasting Service. 3 Jun 2009 <<http://www.pbs.org/strangedays/index.html>>.
This site has educator information about a series developed for middle school students on our changing environment. The series is now available on DVD. It has activity guides and supporting information for educators, a glossary which defines ecological terms, and an interactive market that shows students the hidden costs of items we purchase.
- Roach, John. "Plastic-Bag Bans Gaining Momentum Around the World." *National Geographic News*. 04 April 2008. National Geographic Society. 9 Feb 2009 <<http://news.nationalgeographic.com/news/2008/04/080404-plastic-bags.html>>.
Discusses how Ireland's 2003 hefty tax on plastic bags led to almost zero usage in that country and has spurred taxes and bans on plastic bags in countries around the world and cities across the U.S. In Ireland the tax is 34 cents per plastic bag and usage dropped 95%. Some of the problems created by plastic bags are explained.
- Rosenthal, Elisabeth. "By 'Bagging It,' Ireland Rids Itself of a Plastic Nuisance." *International Herald Tribune* 31 Jan 2008 10 Mar 2009 <<http://www.ihf.com/articles/2008/01/31/europe/bags.php>>.
This article interviews Irish citizens who were opponents and proponents of the Plas tax about its effect. It also looks at the use of plastic bags worldwide and what some other countries are doing or considering. Ireland is also considering other taxes or "clean up funds" on chewing gum, ATM receipts, and will soon ban conventional light bulbs.
- Severson, Steven. "Price Competition in 1955 by Victor Lebow." *Hundred Goal\$: Achieve Your Goals While Managing Your Finances*. 14 May 2009. 3 Jun 2009 <<http://hundredgoals.files.wordpress.com/2009/05/journal-of-retailing.pdf>>.
This wordpress blog includes an pdf file of the article Victor Lebow wrote for the *Journal of Retailing* in 1955.
- Sidwell Friends School*. 2009. Sidwell Friends School. 21 Apr 2009 <<http://www.sidwell.edu/>>.
The school's website has information on their green efforts and LEED platinum certification.
- Steve. "Victor Lebow's Complete Original 1955 Article." *What Do I Know?*. 13 May 2009. 3 June 2009 <<http://whatdoino-steve.blogspot.com/2007/12/victor-lebows-complete-original-1955.html>>.
In this blog the author questions the intent of the Victor Lebow quote in *The Story of Stuff*. He also references other information about Lebow and wonders if the statement was taken out of context.
- "Texas Essential Knowledge and Skills (TEKS)." *Texas Education Agency*. 2009. Texas Education Agency. 21 Apr 2009 <<http://ritter.tea.state.tx.us/teks/>>.
This site has the current and upcoming revisions to the TEKS. I used the current TEKS for Tech Apps, Science and Social Studies but was able to use the 2009 -2010 revisions for Language Arts.
- The Green Schools Initiative*. 2009. The Green Schools Initiative. 3 Jun 2009 <<http://greenschools.net/>>.
This site was started by a group of parents who were concerned about the waste and consumption they saw in their children's schools. It has an amazing number of resources in the form of documents, links, quizzes, curriculum ideas, and steps for greening your school.
- The Story of Stuff*. Dir. Annie Leonard. Quicktime. Free Range Studios. 2005 <<http://www.storyofstuff.com/index.html>>.
Discusses the real cost of all the stuff we accumulate, when the trend started and how our economy is based on it.
- "The Truths Behind Ireland's Plastic Bag Tax." *American Chemistry Council Plastics Division*. 2006. American Chemistry Council. 3 Jun 2009 <http://www.americanchemistry.com/s_plastics/doc.asp?CID=1106&DID=8390>.
This gives the Plastics industry's rebuttal to the information presented about positive gains in Ireland as a result of the PLAS tax.
- U.S. Green Building Council*. 2009. U.S. Green Building Council. 3 Jun 2009 <<http://www.usgbc.org/>>.
The national website for the non-profit group working to encourage building green. This includes the latest reference guides for LEED certification and the location of LEED certified buildings.

U.S. Green Building Council - Greater Houston Area Chapter. 2009. U.S. Green Building Council. 21 Apr 2009 <<http://www.usgbc-houston.org/>>.

Includes requirements for LEED certification and local buildings that are LEED certified.

Wilcox, Charlotte. *Earth-Friendly Waste Management*. Minneapolis: Lerner Publications Company, 2009.

Great explanation of how much trash we throw away, what happens to trash, the three Rs and other waste management issues. It even has an explanation of what each of the plastics is used for.

Supplemental Sources

For Teachers

Dougherty, Joseph. "Glossary of Ecology Terms." *Biodiversity and Human Health*. 2002. Society for Environmental Education. 21 Apr 2009 <http://www.ecology.org/biod/library/glos_index.html>.

This is one of several glossaries containing ecological terms.

"Earth Day Network." 2009. *Earth Day Network*. 21 Apr 2009 <<http://www.earthday.net/>>.

Included in this website besides information on Earth Day are programs including the Green Schools Campaign and Water for Life. There are lots of educator resources including five versions of environmental jeopardy.

Ecology Global Network. 2009. ecology.com. 21 Apr 2009 <<http://ecology.com/index.php>>.

The network has Ecology TV, Ecology Radio, articles, Ecology Hero, and a kids section. It is a source of the latest news on Ecology.

EnviroLink. 2009. EnviroLink Network. 21 Apr 2009 <<http://www.envirolink.org/index.html>>.

This site contains literally hundreds of links to each of the many topics concerning the environment – Waste Management, Sustainable Living, Agriculture, Air Quality, and so on.

"Environment." *National Geographic*. 2009. National Geographic Society. 21 Apr 2009 <<http://environment.nationalgeographic.com/>>.

Environmental news, quizzes, eco tips, wallpaper, videos and all things environment.

Friedman, Thomas. *Hot, Flat and Crowded*. 1st. New York: Farrar, Straus and Giroux, 2008.

In his latest book, Friedman first outlines the problems that we are facing now including environmental problems and problems of America's position in the world since 9/11. He then spends time showing how nation-building can help us solve our problems and lead needed changes in the world even though it will not be easy.

--. "The Power of Green." *New York Times Magazine* 15 Apr 2007.

This article in the NY Times Magazine gives support for the idea that one way to fight terrorism and the spread of the radical Islam is to go green and decrease our need for oil from the Middle East. He gives evidence that when the price of oil decreases, radical ideas are not spread as easily because there is less money going to the groups that use oil money to spread their influence.

"Green Guide for Daily Living." 2009. National Geographic Society. 21 Apr 2009 <<http://www.thereenguide.com/>>.

Buying guides, videos, tips, quizzes, answers to questions and more.

Mortenson, Greg, and David Oliver Relin. *Three Cups of Tea*. 1st. New York: Penguin Books, 2006.

This is the story of one man's efforts to fight terrorism through education, specifically by building schools for girls in Pakistan and Afghanistan. He discovered that educating the girls did more for their villages because the young women were more likely to stay or return to their villages and influence future generations.

"Pocono Green." *Pocono Record*. Pocono Mountains Media Group. 19 Mar 2009

<<http://www.poconorecord.com/apps/pbcs.dll/section?category=FEATURES08>>.

There is a slide show that puts together facts about plastic bags from organizations such as *National Geographic News*, *Christian Science Monitor*, U.S. National Academy of Sciences, National Marine Debris Monitoring Program, CNN, BBC, AP and many others.

"The Green Generation." 2009. *Earth Day Network*. 21 Apr 2009.

The Green Generation section of the Earth Day Network website specifically targets what individuals and groups have done for the environment. There is a section on Generation We which is another name for the Millennial generation.

Tilford, Dave. " Why Consumption Matters." *Sustainable Consumption*. 2000. Sierra Club. 10 Mar 2009 <http://www.sierraclub.org/sustainable_consumption/tilford.asp>.

Thorough discussion of consumption even referring to it as "borrowing from the future."

For Students

Cyberschoolbus. 2009. United Nations. 21 Apr 2009 <<http://www.un.org/cyberschoolbus/>>.

Compiled information about countries, human rights, world hunger, and lots of other topics. There is a great interactive water section that teaches how much water is used for certain activities and to make some products. It ends with a quiz.

Ecology Global Network. 2009. ecology.com. 21 Apr 2009 <<http://ecology.com/index.php>>.

The network has Ecology TV, Ecology Radio, articles, Ecology Hero, and a kids section. It is a source of the latest news on Ecology.

Ganeri, Anita, and Chris Oxlade. *Down the Drain: Conserving Water*. Chicago, IL: Heinemann Library, 2005. Explains the science concepts the water cycle, why we need water, what happens when people don't have clean water, how much water we use and for what, and what happens to waste water. It also gives lots of tips on how to conserve water at home and at school and cites a couple of case studies including one school's harvesting of rainwater and has a fact file with interesting facts.

Rapp, Valerie. *Protecting Earth's Land*. Minneapolis: Lerner Publications, 2009.

Includes stories of what individuals have done to protect the land.