

My Land, Our Land: Exploring the Ethics of Energy Policy, Consumption, and Sustainability Using Aldo Leopold's "The Land Ethic"

Sezai Armagan and Jennifer Kawecki, Omaha Public Schools

Teaching Statement

This instructional plan contributes to our teaching goals because we wish to offer students an opportunity to think and work across disciplines. We want to help students move beyond viewing their education in terms of compartmentalized subjects toward gaining a broader, synthesized knowledge base. In addition, the collaborative annotation component allows for deep conversations about the central text using technology. We see the interactive tool, NowComment as a way to bridge students' knowledge in a personalized way. Furthermore, by actively teaching critical thinking skills and strategies, students become better thinkers in both disciplines.

My Land, Our Land: Exploring the Ethics of Energy Policy, Consumption, and Sustainability Using Aldo Leopold's "The Land Ethic"

Duration, Grade Level, Number of Students

Duration: 4-weeks

Grade Level: 10-12

Number of students: 20-30 (flexible)

Class Topic: English

Enduring Understanding: Students will understand their own complex relationship with the environment by examining the history of energy policy, current perspectives, film, and literature.

Essential Questions:

1. Do we have a moral responsibility to protect the land?
2. How is our ecological footprint related to happiness? Consider what makes us happy and why.
3. What values are associated with material consumption?
4. What perspectives related to environmental sustainability and energy policy exist today?
5. What is the connection between us (human beings living on this planet) and the environment?
6. How are the relationships between people and each other and people and the land connected?
7. What does it take to make things *such as our homes, our cars, our gadgets such as phones, our foods, etc.* happen?
8. Where does all this stuff that we rely on daily such as our phones, cars come from?
9. What are the impacts of taking and using these resources on our environment and on ourselves?
10. What happens to our surroundings, environment as we make these happen? Do we change our environment when we take from it to make stuff?
11. Why is it important to have a dialogue in a democracy with people other than "your own classmates" about energy and environmental issues, and why is it important in order to make a better world for everyone?

Instructional Materials:

Critical Thinking Terms Handout (See below)

Imgur Media Outlet Bias Chart and Resource

<https://imgur.com/gallery/offfF>

<http://www.makeuseof.com/tag/check-political-bias-media-site/>

The full text of Aldo Leopold's "The Land Ethic"

Leopold, Aldo, "The Land Ethic." *A Sand County Almanac*. Oxford UP, 1977

[Aldo Leopold "The Land Ethic"](#)

<http://oregonstate.edu/instruct/phl201/modules/texts/text3/leopold.html>

Access to a computer for the collaborate annotation assignment using NowComment

<https://nowcomment.com/> See my screencast for information on NowComment <http://screencast-o-matic.com/watch/cb1tY0ljVZ>

Access to a computer for the final storyboard assignment. Storyboard That!

<http://www.storyboardthat.com/> StoryBoard Pro <https://www.atomiclearning.com/k12/en/storyboardpro>

Key Vocabulary and Concepts—Science

Energy
Energy resources
Fossil Fuels
Renewable energy resources
Non-renewable energy
Renewable energy
Environment
Sustainability
Environmental impacts

Learning Objectives—English

- Students will learn and apply critical reading strategies to current ideas related to the environment and to a seminal environmental text.
- Students will synthesize and build upon information about the environment using research.
- Students will understand that one’s perspective and academic lens shape meaning.
- Students will gather and analyze information to create a well-informed, academic argument
- Students will collaborate across disciplines to deepen their understanding of environmental and sustainability issues and by telling the story of a place.
- Students will internalize and gather information related to place by considering energy policies, values and beliefs that underlie arguments, and information from Aldo Leopold’s “The Land Ethic.” Using what they have learned over the course of the unit, students will articulate their own arguments related to their selected essential question.

Standards Covered—English

Common Core Reading Standards for informational texts

Key concepts and details

1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
2. Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.

Integration of knowledge and ideas

1. Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.

Key Vocabulary and Concepts—English

Belief
Prejudice
Assumption
Inference
Fact
Evidence
Opinion
Media Literacy
Ethics
Ethical Sequence
Social Evolution

RELEVANT QUOTES

Big companies are reliant on institutional investors on a punishing schedule which leads to ruthless behaviour. This form of capitalism with this structure and incentives will never deliver sustainability. -Tim Jackson

Men have become the tools of their tools. -Henry David Thoreau

The machine does not isolate man from the great problems of nature but plunges him more deeply into them. -Antoine de Saint-Exupery

Technology is the knack of so arranging the world that we don't have to experience it. -Max Frisch

Mechanization best serves mediocrity. --Frank Lloyd Wright

If we continue to develop our technology without wisdom or prudence, our servant may prove to be our executioner. - Omar N. Bradley

The system of nature, of which man is a part, tends to be self-balancing, self-adjusting, self-cleansing. Not so with technology. -E. F. Schumacher

Technological progress has merely provided us with more efficient means for going backwards. - Aldous Huxley

The thing that I champion is sustainability. My terror is that suddenly we see it as a luxury, not an essential. That's a danger. --Kevin McCloud

We won't have a society if we destroy the environment. -Margaret Mead

Common Core Production and distribution of writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

College and Career readiness anchor Standards for Writing

Text types and Purposes*

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

ISTE Standards 6: Creative Communicator Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Background

The teachers should be familiar with Leopold's text and the arguments he includes. Teachers should also familiarize themselves with the NowComment tool. It is user-friendly with many tutorials. (Many digital tools can be used for this activity, and I know that the technology will be available in more formats in the future.) Students should also have prior experience reading complex texts, and some familiarity with examining a text's rhetorical situation: its audience or audiences, its purpose, and its exigence—the reason the text was written i.e its context.

	Rationale and Learning Goals	Procedures and Assignments
Collaborative Lesson 1: Place, happiness, and energy policy	<p>This image and/or journal is the starting point for our lessons. Students will later connect their learning to the place they selected.</p>	<p>Assignment: Draw a picture of your favorite location, a place that makes you feel comfortable, happy and safe, and briefly explain why that is. In short, what makes this particular place a unique or special one for you? Why is it the most important place? You may sketch our your place or write about it.</p> <p>Procedures: Students will be informed of what is ahead and the main outcome of this project, which is; students will understand their own complex relationship with the environment by examining environmental history, current events, energy policy and literature. Students are given a chance to share and reflect with their classmates and with the class. Science teacher explains the connections between energy resources and our stuff. English teacher pairs students to discuss 2-3 of the essential questions. Students can then write related questions or comments on a post-it to place on the wall or write on a large sheet of paper in the back of the classroom.</p>
Lesson 2: Critical Thinking Terms	<p>Rationale: Students need the appropriate language to analyze and evaluate editorial pages. Students must be prepared to consider not only what the critical thinking terms mean but also how they are connected.</p> <p>Learning Goals: Students will</p> <ul style="list-style-type: none"> • learn or review terminology related to critical thinking • examine how the critical thinking terms are connected in order to identify examples of them in editorials and present connections to the class 	<p>After the teacher presents critical thinking terms and provides examples, each student is given the list of definitions (See Critical Thinking Terms) . First, ask students to work with a partner to organize the terms into three categories and name the categories i.e terms related to the individual, terms that can lead to faulty reasoning. Students are then asked to switch partners and create new categories. After students work with the terms and examine the variety of ways the terms are connected, they should complete the following task:</p> <p>Think about how the critical thinking terms are connected. Create a visual representation that demonstrates the connections among them and be prepared to explain the connections and your reasoning for them in a two-minute presentation (See examples)</p>

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Lesson 3: Annotated Editorials</p>	<p>Rationale: Students should learn and hone skills that help them question a writer’s motives, identify bias, consider the validity of evidence and support, and examine logic. Furthermore, students need to explore a variety of perspectives in order to create informed opinions.</p> <p>Learning Goals: Students will apply critical reading strategies to opinion pieces related to the environment and the essential questions.</p>	<p>Assignment:</p> <ul style="list-style-type: none"> ○ Locate and <u>annotate</u> three editorials or persuasive pieces related to <u>an essential question, one must be from an untrustworthy source..</u> ○ To locate editorials/opinion pieces consider arguments related to THE ENVIRONMENT and COMSUMPTION, and CORPORATIONS and THE EPA, TECHNOLOGY and SUSTAINABILITY, POLITICS and ENVIRONMENTAL REGULATION, ETC. You must tie in an essential question to your editorial. ○ Use the Imgur bias charts to locate one editorial from an untrustworthy source ○ Cite the source using MLA Style. <p>Procedures: After the teacher reviews the directions, annotate a brief editorial as a class to model the procedure.</p> <p>Rubric is included under supplemental materials.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Collaborative Lesson 2: Collaborative Annotation using NowComment “The Land Ethic”</p>	<p>Collaborative Annotation—“The Land Ethic” NowComment digital tool</p> <p>Rationale: Leopold’s text is an important one in terms of the environment, and his text is a logical choice for this collaboration because The Aldo Leopold Leadership Program at Stanford “trains academic environmental scientists to communicate effectively with non-scientists” (Schwartz).</p> <p>Learning Goals: The collaborative annotation activity will allow students to read and examine the text closely and critically. This assignment may take two or three class periods, as the text is challenging and NowComment allows for deep analysis and exploration.</p> <p>See my screencast for information on NowComment http://screencast-o-matic.com/watch/cb1tY0ljVZ</p>	<p>Procedures Introduce students to Leopold using the following story: NPR Remembering Aldo Leopold, Visionary Conservationist And Writer http://www.npr.org/2013/03/10/173949498/remembering-aldo-leopold-visionary-conservationist-and-writer</p> <p>Assignment: Students will work in groups of four—two English students and two science students—to collaboratively annotate Leopold’s text. Student comments/annotations must include</p> <ul style="list-style-type: none"> ● Two entries that involve questions and clarification. (Look up words, examine concepts, analyze details, etc.) ● English Students--Two connections to editorials (i.e. the author of the editorial would agree, disagree, or qualify this statement and a link to the editorial) ● Science Students—Four connections to what you have learned in class. Explain for an audience of English students please. ● A link to another text (an online encyclopedia, an article, a video clip) and an explanation of its relevance. ● A conversation with a student from the other discipline science/English about what you believe to be the most important part of the text. <p>Closing activity: English teacher pairs students to discuss 2-3 of the essential questions. Students should add connections to and quotations from “The Land Ethic”</p>

Collaborative Lesson 3: Storyboard Assignment	<p>Rationale: This assignment will allow students to collaborate in a creative and meaningful way.</p> <p>Learning Outcomes: Students will synthesize what they have learned and incorporate their own informed opinions into the text.</p> <p>Tools</p> <p>Storyboard That! http://www.storyboardthat.com/</p> <p>Storyboard Pro https://www.atomiclearning.com/k12/en/storyboardpro</p>	<p>Procedures:</p> <p>Pair one English student and one science student to complete the following culminating activity.</p> <p>Assignment:</p> <p>Storyboard: What is the story of your place?</p> <p>Directions: Select one or both of the places you wrote about in the first activity (or select a different place). Using a tool such as <i>Storyboard That!</i> or <i>Storyboard Pro</i>, you and your partner must create a storyboard. Each of you should become characters in your storyboard and each of you should articulate your position or opinion on any essential question.</p> <p>For example you might consider the energy history of an item(s) in your place. What does it take to make things <i>such as our homes, our cars, our gadgets such as phones, our foods, etc.</i> happen?</p> <p>Your storyboard must also include</p> <ul style="list-style-type: none"> • Narration • External Dialogue • Internal Dialogue • Drawings or Images • Another character (your character does not need to be human) • One direct quotation from “The Land Ethic.” • Pictures or drawings of the place one or both of you wrote about for the first collaborative assignment, or another place. • An explanation of how energy policy has shaped the place. • At least one different value-driven point of view about energy policy, sustainability, and or consumption.
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Extension Activities

Students can enter the Wisconsin Aldo Leopold Writing Contest

<https://www.aldoleopold.org/teach-learn/partner-programs/leopold-writing-contest/>

Students can conduct primary source research using the Leopold Archives

<https://www.aldoleopold.org/about/the-leopold-archives/>

Students can create their own editorial piece using the information they have learned.

Critical Thinking Terms

Disciplined, self-directed thinking which exemplifies the perfections of thinking appropriate to a particular mode or domain of thinking; 2) Thinking that displays mastery of intellectual skills and abilities; 3) The art of thinking about your thinking while you are thinking in order to make your thinking better: more clear, more accurate, or more defensible. In thinking critically we use our command of the elements of thinking to adjust our thinking successfully to the logical demands of a type or mode of thinking

BELIEF Unlike an opinion, a **belief is a conviction based on cultural or personal faith, morality, or values.** Statements such as "Capital punishment is legalized murder" are often called "opinions" because they express viewpoints, but they are not based on facts or other evidence. They cannot be disproved or even contested in a rational or logical manner. Since beliefs are inarguable, they cannot serve as the thesis of a formal argument. (Emotional appeals can, of course, be useful if you happen to know that your audience shares those beliefs.) A **belief** is an idea or conviction that someone accepts as true or real. Some people, for example, believe that walking under a ladder is bad luck. Can this be proven? Probably not. But the person may still believe it true.

FACT A **fact is verifiable.** We can determine whether it is true by researching the evidence. This may involve numbers, dates, testimony, etc. (Ex.: "World War II ended in 1945.") The truth of the fact is beyond argument if one can assume that measuring devices or records or memories are correct. Facts provide crucial support for the assertion of an argument. However, facts by themselves are worthless unless we put them in context, draw conclusions, and, thus, give them meaning. A **fact** can be proven true. For example, it is a fact that Mars is the fourth planet from the sun. A fact can be proved either by actually observing something or by consulting a reliable source such as an encyclopedia.

PREJUDICE Another kind of assertion that has no place in serious argumentation is **prejudice, an ill-considered opinion based on insufficient or unexamined evidence.** (Ex.: "Women are bad drivers.") Unlike a belief, a prejudice is testable; it can be contested and disproved on the basis of facts. We often form prejudices or accept them from others--family, friends, the media, etc.--without questioning their meaning or testing their truth. At best, prejudices are careless oversimplifications. At worst, they reflect a narrow-minded view of the world. Most of all, they are not likely to win the confidence or agreement of your readers.

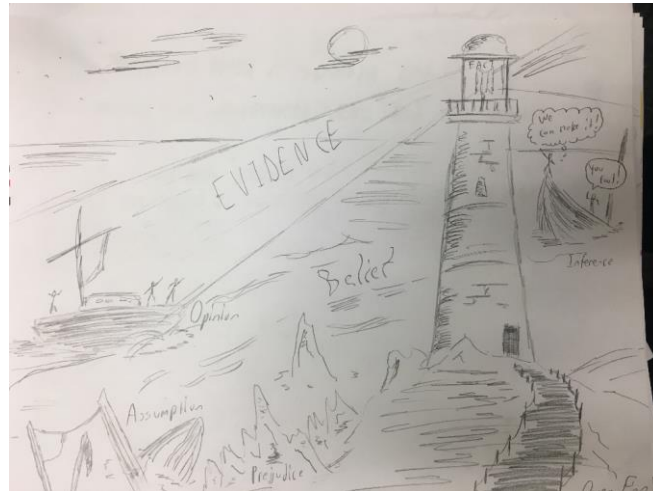
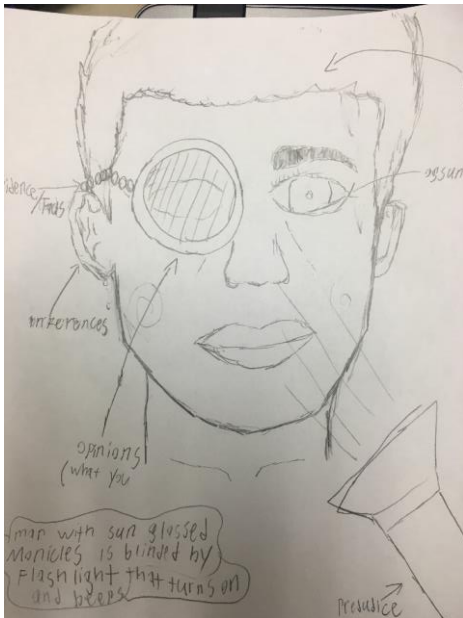
OPINION An **opinion is a judgment based on facts,** an honest attempt to draw a reasonable conclusion from factual evidence. (For example, we know that millions of people go without proper medical care, and so you form the opinion that the country should institute national health insurance even though it would cost billions of dollars.) An opinion is potentially changeable--depending on how the evidence is interpreted. By themselves, opinions have little power to convince. You must always let your reader know what your evidence is and how it led you to arrive at your opinion.

EVIDENCE The data on which a judgment or conclusion might be based or by which proof or probability might be established. Critical thinkers distinguish the evidence or raw data upon which they base their interpretations or conclusions from the inferences and assumptions that connect data to conclusions. Uncritical thinkers treat their conclusions as something given to them in experience, as something they directly observe in the world. As a result, they find it difficult to see why anyone might disagree with their conclusions. After all, the truth of their views is, they believe, right there for everyone to see! Such people find it difficult or even impossible to describe the evidence or experience without coloring that description with their interpretation.

ASSUMPTION A statement accepted or supposed as true without proof or demonstration; an unstated premise or belief. All human thought and experience is based on assumptions. Our thought must begin with something we take to be true in a particular context. We are typically unaware of what we assume and therefore rarely question our assumptions. Much of what is wrong with human thought can be found in the uncritical or unexamined assumptions that underlie it. For example, we often experience the world in such a way as to assume that we are observing things just as they are, as though we were seeing the world without the filter of a point of view. People we disagree with, of course, we recognize as having a point of view. One of the key dispositions of critical thinking is the on-going sense that as humans we always think within a perspective, that we virtually never experience things totally and absolutistically. There is a connection, therefore, between thinking so as to be aware of our assumptions and being intellectually humble.

INFERENCE An inference is a step of the mind, an intellectual act by which one concludes that something is true in light of something else's being true, or seeming to be true. If you come at me with a knife in your hand, I probably would infer that you mean to do me harm. Inferences can be accurate or inaccurate, logical or illogical, justified or unjustified.

Lesson 2: Examples of student work. I selected these examples because they demonstrate very different points of view. In the first image, the student identified prejudice as a light shining in a subject's face; in the third image a student identified evidence as a light, serving as a lighthouse beacon. Another student created a scene that included figures representing belief and inference battling. These brief presentations allowed students to examine nuanced similarities and differences among the terms and provide a foundation for further analysis.



Media Literacy Resources

News and Media Literacy: Building Critical Consumers and Creators

Recorded on Wednesday, March 29, 2017 <https://www.common sense.org/education/webinars/news-and-media-literacy-building-critical-consumers-and-creators>

Evaluating Sources in a 'Post-Truth' World: Ideas for Teaching and Learning About Fake News

<https://www.nytimes.com/2017/01/19/learning/lesson-plans/evaluating-sources-in-a-post-truth-world-ideas-for-teaching-and-learning-about-fake-news.html>

PBS Decoding Media Bias – Lesson Plan

http://www.pbs.org/newshour/extra/lessons_plans/decoding-media-bias-lesson-plan/

Rubrics

Article Annotation Rubric

A Annotation reveals insightful and thorough interaction with the text with accurate and significant information	B Annotation reveals interaction with the text with accurate information	C Annotation reveals some interaction with the text with accurate information	D Annotation reveals little interaction with the text with some accurate information	F Incomplete
<p><i>Made relevant inferences</i> related to critical thinking terms (i.e. bias, logical reasoning, syntax, use of evidence, types of evidence, etc.) and developed insightful observations about the writing situation (audience, purpose, and author). The student commented on ways the author used evidence and reasoning to support ideas. It is clear the student furthered his/her understanding of the text. The student correctly identified and examined any fallacies.</p> <p>Followed guidelines, wrote questions, made insightful connections and highlighted key ideas.</p>	<p>Identified critical thinking terms (i.e. bias, logical reasoning, inferences, use of evidence etc.). Commented on the writing situation and the effectiveness of evidence and reasoning. The student correctly identified any fallacies.</p> <p>Followed guidelines, wrote questions, made some connections, highlighted key ideas.</p>	<p>Identified critical thinking terms and the writing situation. The student somewhat correctly identified any fallacies.</p> <p>Wrote a few questions, made some connections— annotations aren't clear.</p>	<p>Identified a few critical thinking terms. It is difficult to gage student understanding based on notes.</p> <p>Wrote 1-2 general questions.</p> <p>Entries are intermittent</p>	<p>May have completed haphazardly with little thought or effort</p>

Storyboard Rubric

A	B	C	D	F
<p>Written responses and images address the complexity of the task and include specific and relevant information from the texts. They adeptly use all the required elements.</p>	<p>Written responses and images address the task and demonstrate an understanding of the components. They refer to specific information from the texts. They use all the required elements.</p>		<p>Written responses and images are general and ambiguous—it is difficult to discern whether the student understood the assignment. They do not contain appropriate detail or contain inaccurate details. Written responses may contain distracting grammar and syntax errors. They use some of the required elements.</p>	

**Western Literature Association and Charles Redd Center
Teaching Western American Literature K-12 Teaching Prize
Instructional Plan Format**

Note: This instructional plan format is very flexible and just a guideline. You are welcome to develop a format and structure that applies to your teaching and classroom context and grade level.

Instructional plan title: My Land, Our Land: Exploring the Ethics of Energy Policy, Consumption, and Sustainability Using Aldo Leopold’s “The Land Ethic”

Energy Course

S. H. Armağan

Duration, Grade Level, Number of Students	<p>Classroom instruction time needed and additional time for student project completion. Class topic/title, grade level, and number of students. Duration: 4-weeks (but it can easily be extended to a semester) Grade Level: 10-12 Number of students: 20-30 (flexible) Class Topic: Science (physical sciences such as earth science and environmental science), literature and social studies.</p>
Instructional Materials	<p>A list of learning materials needed for instruction.</p> <p>Internet Resources:</p> <ul style="list-style-type: none"> - storyofstuff.org: https://www.youtube.com/watch?v=9GorqroigqM - Lifecycle of plastic bottle and the environment, https://www.youtube.com/watch?v=_6xINyWPpB8 - Living in a zero-waste environment; https://www.youtube.com/watch?v=pF72px2R3Hg - <p>Books and Articles:</p> <ul style="list-style-type: none"> - Leonard, Annie, <i>The Story of Stuff</i>, How Our Obsession with Stuff is Trashing the Planet, Our Communities, and Our Health – and a Vision for Change, Free Press, 2010. - Diamond, Jared, <i>Collapse</i>, How Societies Choose to Fail or Succeed, Penguin Books, 2005. - Leopard, Aldo, <i>The Land Ethic</i>, A Sand County Almanac, 1977, Oxford University Press. - McNeill, J.R., <i>An Environmental History of the Twentieth-Century World</i>, Something New Under the Sun, W.W. Norton & Company, Inc., 2000.

	<ul style="list-style-type: none"> - Miller, Tyler G., Jr, <i>Sustaining the Earth, An Integrated Approach</i>, 1994, International Thomson Publishing. - Raven, Peter H., Berg, Linda R., Hassenzahl, David M., <i>Environment</i>, 2008, John Wiley and Sons.
Key Vocabulary and Concepts	<p>Terms used to build essential understandings, establish the conceptual framework, and engage students' thought.</p> <p>Energy Energy resources Fossil Fuels Renewable energy resources Non-renewable energy Renewable energy Environment Sustainability Environmental impacts Energy portfolio</p>
Enduring Understanding	<p>A brief statement that clearly identifies the life-long understanding that students will gain as a result of this instructional plan.</p> <p>Students will understand their own complex relationship with the environment by examining environmental history, current events, energy policy and literature.</p>
Essential Question(s)	<p>The basic inquiry sequence that will direct student learning and understanding.</p> <ul style="list-style-type: none"> - What is the connection between us (human beings living on this planet) and the environment? - What does it take to make things <i>such as our homes, our cars, our gadgets such as phones, our foods, etc.</i> happen? - Where do all these stuff that rely on a daily basis such as our phones, cars come from? - Since energy resources and non-energy resources such as minerals make all of our stuff possible, where do they come from? - What are all the energy resources and minerals that we rely on to make our stuff happen? - What are the impacts of taking and using these resources on our environment and on ourselves? - What happens to our surroundings, environment as we make these happen? Do

	<p>we change our environment when we take from it to make stuff?</p> <ul style="list-style-type: none"> - What are the consequences of shaping our environment and what can we learn from science? - What factors determine the future in the context of environment, energy resources availability and the future world? - Why is it important to have a dialog in a democracy with people other than “your own classmates” about energy and environmental issues, and why is it important in order to make a better world for everyone?
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Learning Goals	Measureable Outcomes	
<p>Fossil fuels and non-renewable energy Resources:</p> <ul style="list-style-type: none"> - Understand what different types of fossil fuels are and the meaning of non-renewable energy resources. - Know how coal, natural gas and petroleum was formed - Understand fossil fuel use in our daily lives - Understand the environmental impacts of using fossil fuels <p>Extensions:</p> <ul style="list-style-type: none"> - Students can learn about non-traditional fossil fuels such as natural gas through fracturing, shale oil, tar sands - Environmental impacts of harnessing non-traditional fossil fuels 	<p>At the end of fossil fuels, students need to be able to</p> <ul style="list-style-type: none"> - List all three fossil fuels, - Explain how each one was formed, - Explain what makes fossil fuels non-renewable energy resource, - List some of the different uses of fossil fuels in daily our lives such as plastics, fertilizers, pesticides, pharmaceuticals etc. - Explain the environmental impacts of fossil fuels 	
<p>Renewable energy resources</p> <ul style="list-style-type: none"> - What is wind energy and how does it work? 	<p>At the end of renewable energy resources, students need to be able to</p> <ul style="list-style-type: none"> - List all renewable energy resources 	

<ul style="list-style-type: none"> - What is solar energy and how does it work? - What is hydro energy and how does it work? - Geothermal and how does it work? - Understand environmental impacts of renewable energy resources <p>Extensions:</p> <ul style="list-style-type: none"> - More time can be allocated to each renewable energy resource to understand more technical aspect of it. - Students can investigate what is happening in their own city and state in terms of investing in renewable energy and the future outlook for renewable energy. 	<ul style="list-style-type: none"> - explain the difference between renewable and non-renewable energy resources - Explain how wind energy can be used to harness to make electricity - Explain how solar energy works - Explain hydroelectric power - Explain how geothermal energy works - Explain the environmental impacts of renewable energy resources 	
<p>Nuclear energy [This section is dedicated to understanding of what nuclear energy is and how it is generated and the environmental impacts]</p> <ul style="list-style-type: none"> - What is nuclear energy and how does it work? - What is a nuclear reactor and how does it work? - Where does the nuclear waste come from? 	<p>At the end of nuclear energy, students need to be able to</p> <ul style="list-style-type: none"> - Explain what nuclear energy is and how it is different from other energy resources - Explain how nuclear energy in general can be generated in a nuclear reactor - Explain the environmental impacts of nuclear energy 	
<p>Energy Use in the United States [This section is dedicated to understanding the United States' energy policies in terms of the</p>	<p>At the end of Energy Use in the United States, students need to be able to</p> <ul style="list-style-type: none"> - Have an idea of percentages of fossil fuels, nuclear and renewable 	

<p>type of energy resources is used as percentages]..</p> <ul style="list-style-type: none"> - The United States energy portfolio - Energy pie chart that shows electricity generation from various resources - Energy pie chart showing the use of petroleum <p>Extensions:</p> <ul style="list-style-type: none"> - Students can also examine other countries' energy policies by looking at their current energy portfolio. For this, www.cia.gov/factbook is a great resource. - Students might be interested in examining other developed nations' energy portfolio, and comparing these energy portfolios with the United States'. - Students can find out the energy portfolio of their own city and state in which they live. 	<p>energy use in the United States</p> <ul style="list-style-type: none"> - Students do their own a draft of their energy portfolio for the United States - Each student is clearly explains what resources and why they would like to use 	
<p>Reflections/Analysis/Energy Policy</p> <p>The hopes for this whole activity and at the end of collaboration are</p> <ul style="list-style-type: none"> • Collaborating; learning from each other including from students who are not in the same class. In other words, we should be willing to listen to others and learn from each other. • By allowing each student to create her/his own 	<p>At the end of the whole unit, it is important to keep in mind of few things when grading student's paper.</p> <ul style="list-style-type: none"> - Since an energy policy and reflections of students would vary from one student to another, to be objective/fair grader as a teacher, make sure to focus on student's learning and progress throughout the project. 	

<p>energy policy and having each student to share it with other students in the literature course allows them to be open-minded and have a dialogue in these important topics.</p> <ul style="list-style-type: none"> - That there are no simple or ‘one-size-fits-all’ solutions to energy and the environmental issues 	<ul style="list-style-type: none"> - It is more important that students are able to express their opinion through their energy policies, make sure students do these in civilized manner. - When grading these assignments, look for clarity and thoughtfulness and solid reasoning. 	
<p>Standards</p>	<p>National Standards, Common Core Standards, or state standards that your instructional plan meets. Nebraska Science Standards: Impacts on Ecosystems; SC8.3.3.g, SC12.3.3.d; Earth Structures and Processes, Use of Earth Materials: SC2.4.2.b, SC5.4.2.c, SC8.4.2.h, SC12.4.2.c, Energy in Earth’s Systems; SC12.4.3.c.</p>	
<p>Background</p>	<p>What does the teacher need to know about the topic before introducing the lesson? What do students need to know prior to this lesson being introduced?</p> <p>Important: The goal is to encourage students to understand the use of all energy resources and their pros and cons as objectively as possible. Make sure to stay objective throughout the introductions of different energy resources as in not to promote or favor one energy resource over another. The overall objective should be encouraging students to be very open-minded and critical thinkers.</p> <p>Background for teachers: Be familiar with reference books but particularly with the following sections.</p> <ul style="list-style-type: none"> - Unhappy Nation, pp. 151-153, and pp. 157-158; Time versus Stuff from Chapter 4 – Consumption, the Story of Stuff by Leonard. Also remember the videos or sections of Leonard’s book are available on the Internet. 	
<p>Suggested Procedure</p>	<p>A brief outline of active learning techniques that will promote the learning objectives.</p> <p>Assignment:</p> <ul style="list-style-type: none"> - Draw a picture of your favorite location, a place that makes you feel comfortable, 	

happy and safe, and briefly explain why that is. In short, what makes this particular place a unique or special one for you? Why is it the most important place? You may sketch our your place or write about it.

Procedures:

- Students will be informed of what is ahead and the main outcome of this project, which is; students will understand their own complex relationship with the environment by examining environmental history, current events, energy policy and literature. Students are given a chance to share and reflect with their classmates and with the class.
- Science teacher explains the connections between energy resources and our stuff.
- English teacher pairs students to discuss 2-3 of the essential questions. Students can then write related questions or comments on a post-it to place on the wall or write on a large sheet of paper in the back of the classroom.

Day 2-5: Fossil fuels and non-renewable energy

Resources:

- Understand what fossil fuels are and the definition of non-renewable energy resource
- How coal, natural gas and petroleum was formed
- Understand fossil fuel use in our daily lives
- Understand the environmental impacts of fossil fuels

Day 6-8: Renewable energy resources

- what is wind energy and how does it work?
- What is solar energy and how does it work?
- What is hydro energy and how does it work?
- Geothermal and how does it work?
- Understand environmental impacts of renewable energy resources

Day 9-11: Nuclear energy

- what is nuclear energy and how does it work?
- What is a nuclear reactor and how does it work?

Where does the nuclear waste come from?

Day 12: Energy Use in the United States

- The United States energy portfolio
- Energy pie chart that shows electricity generation from various resources

Day 13-15: Collaboration

Procedures

Introduce students to Leopold using the following story:
NPR Remembering Aldo Leopold, Visionary Conservationist And Writer

<http://www.npr.org/2013/03/10/173949498/remembering-aldo-leopold-visionary-conservationist-and-writer>

Assignment:

Students will work in groups of four—two English students and two science students—to collaboratively annotate Leopold’s text. Student comments/annotations must include

- Two entries that involve questions and clarification. (Look up words, examine concepts, analyze details, etc.)
- **English Students--Two connections to editorials (i.e. the author of the editorial would agree, disagree, or qualify this statement and a link to the editorial)**
- **Science Students—Four connections to what you have learned in class. Explain for an audience of English students please.**
- A link to another text (an online encyclopedia, an article, a video clip) and an explanation of its relevance.
- A conversation with a student from the other discipline science/English about what you believe to be the most important part of the text.

Closing activity: English teacher pairs students to discuss 2-3 of the essential questions. Students should add connections to and quotations from “The Land Ethic”

Day 16-17 Students work on their own energy policy – a short, two-page energy policy that underlies students’ energy resource choices for the future.

Evaluations (Assessment)

A rubric directly tied to the stated lesson objectives. State evaluation methods can be used. Evaluation options should not be limited to a standard testing format and should consider various ways that students learn.

- A quiz after each energy resource taught following Learning Goals
- A unit test after all energy resources are studied following Learning Goals

- Open ended, essay type of questions are particularly useful to encourage students to reflect on what they have learned
- Students write their energy policies
- A picture booklet with students' own drawings to indicate what energy resource to choose from. Under each energy resource drawing, clearly label the resource and explain the percentage of that energy choice, and explain why that choice

(Alternative assessments: Students can get into groups of two to three depending on the class size to make an energy policy as a group rather than individual.

Students can also write a story book and draw their own pictures to tell about their vision of energy policies.

Collaborative Assessment:

Procedures:

Pair one English student and one science student to complete the following culminating activity.

Assignment:

Storyboard: What is the story of your place?

Directions: Select one or both of the places you wrote about in the first activity (or select a different place). Using a tool such as *Storyboard That!* Or *Storyboard Pro* you and your partner must create a storyboard. Each of you should become characters in your storyboard and each of you should articulate your position or opinion on any essential question.

For example you might consider the energy history of an item(s) in your place. What does it take to make things *such as our homes, our cars, our gadgets such as phones, our foods, etc.* happen?

Your storyboard must also include

- Narration
- External Dialogue
- Internal Dialogue
- Drawings or Images
- Another character (your character does not need to be human)
- One direct quotation from “The Land Ethic.”
- Pictures or drawings of the place one or both of you wrote about for the first collaborative assignment, or another place.

	<ul style="list-style-type: none"> • An explanation of how energy policy has shaped the place. • At least one different value-driven point of view about energy policy, sustainability, and or consumption.
Extension	Suggestions for further activities for teachers who wish to develop the Enduring Understanding in greater depth.
Resources	<p>A bibliography of print and electronic resources that will aid in the preparation and development of this lesson.</p> <p>Internet Resources:</p> <ul style="list-style-type: none"> - storyofstuff.org: https://www.youtube.com/watch?v=9GorqroigqM - Lifecycle of plastic bottle and the environment, https://www.youtube.com/watch?v=_6xINyWPpB8 - Living in a zero-waste environment; https://www.youtube.com/watch?v=pF72px2R3Hg - Energy Information Agency, www.iea.gov gives statistics regarding energy use in the United States - www.cia.gov/factbook gives detailed facts and statistics on energy portfolio of countries around the world <p>Additional References:</p> <ul style="list-style-type: none"> - Ehrlich, Paul R. and Ehrlich, Anne H., <i>Population, Resources, Environment</i>, 1970, W.H. Freeman and Company. - Diamond, Jared, <i>Collapse</i>, How Societies Choose to Fail or Succeed, Penguin Books, 2005. - Leonard, Annie, <i>The Story of Stuff</i>, How Our Obsession with Stuff is Trashing the Planet, Our Communities, and Our Health – and a Vision for Change, Free Press, 2010. - McNeill, J.R., <i>An Environmental History of the Twentieth-Century World</i>, Something New Under the Sun, W.W. Norton & Company, Inc., 2000. - Miller, G. Tyler, <i>Sustaining the Earth</i>, An Integrated Approach, 1994, Wadsworth Publishing Company.

You should use the evaluation rubric in conjunction with this instructional plan format as you develop your application.

Instructional plan format adapted from the Western History Association/Charles Redd Center Teaching Western History Award.

Scoring Rubric
 Understanding Energy Resources, Environmental Impacts, Sustainability and the Future

S. H. Armağan

Criteria	4 = Outstanding	3 = Very Good	2 = Good	1 = Poor	0 = Unsatisfactory
RELEVANCE CRITICAL THINKING CREATIVITY RESOURCEFULNESS Interdisciplinary Perspectives	The student understands the topic very clearly, and the concepts are explained thoroughly.	The student understands the topic clearly, and the concepts are explained well. The student sees the connections between science and social studies. Energy policy is explained clearly.	The student understands some of the topics but not all of them, and not every concept is clearly explained. The student sees the connections between science and social studies but able to express it clearly. The overall energy policy is clear but the details are missing.	The student understands one or two topics, but no clear understanding of the whole project. The student does not see the connections between science and social studies, and there is no clear energy policy.	The student shows no understanding of any of the topics and concepts, no energy policy and no effort is given for this project.