

**Jamie Kruse | Methods for ESL | SPRING 2015**

Integrated Skills Lesson Plan for Language Supported Sustainable Systems course, Parsons

**TOPIC:** The Anthropocene: geologic scales of change

**LEVEL:** Lower Advanced

**LEARNERS:** Parsons, First-year, Sustainable Systems (required course)

**TIME:** 160 minutes

**SKILLS:** Read, Speak, Listen + MAKING (emphasizing vocabulary and cultural differences)

**OBJECTIVE/TOPIC:** Introduce the concept of the Anthropocene through a reading, art/design/scientific examples, drawing, audio, video and a field experience. Students will begin to develop an awareness of the geologic scale of impact humans are exerting on the planet (and its systems) and a (verbal + visual) vocabulary for expressing the effects of geologic change to audiences/clients through their creative work.

This content is a targeted study and project for the MATERIALS and CLIMATE CHANGE themes of Sustainable Systems and the course overview statement, *“By engaging in a creative practice that takes into account known “externalities” (systems thinking) we will begin to build a creative agency that supports diversity, adaptability and resilience in the face of ever changing conditions.”*

**KEY VOCABULARY:** Anthropocene, geologic time

**PRONUNCIATION:** Anthropocene, Pleistocene

SEQUENCE	WHAT/HOW	MATERIAL	TIME
<b>WARM UP (ENGAGE)</b>	Our topic for today is a new, proposed geologic epoch called the <b>Anthropocene</b> .		
	Here’s picture of a standard geologic timescale. Has anyone see an image of this before? (Discuss geologic scales/history).	Image of geologic time scale (basic)	
	Can anyone guess what this new geologic epoch is named after or what ANTHROPO might stand for?	Project the word ANTHROPOCENE	15 minutes
<b>PROJECT INTRO</b>	Anthropocene is being proposed by scientists as new geologic epoch named for human impact on the planet. Anthrope is Greek for HUMAN.  What kind of impact might this mean? What actions or materials might compose the Anthropocene?  <b>TASK:</b> Talk with your neighbor and come up with 5-6 things that might be part of the Anthropocene) based on experiences/observations from your home country AND since moving to New York.  Discuss ideas generated.		

<p><b>VOCABULARY PRESENTATION (STUDY)</b></p>	<p><b>Listening activity:</b> Watch video “Welcome to the Anthropocene”</p> <p><b>VOCABULARY TASK: LISTEN</b> for materials and events that are shared in this video as composing the Anthropocene. Make a list of 10-15 words that you hear.</p> <p><b>Discuss what was heard</b> Group brainstorm/map vocabulary list on board/projector of words mentioned in the video. Rotate around the room inviting students to contribute further explanation to vocabulary and to provide real world examples.</p> <p>Jamie offers further explanation as needed models back corrections in vocabulary and pronunciation. <b>List could include:</b> Coal, Plastic Industrial revolution, Nuclear materials Railroads, Cars, Highways, Fertilizers Population growth, Great acceleration (1950), Marketing, Tourism, Rise of cities Extraction, Erosion, Green house gases Temperature increases, Ozone hole Damming, Mining, Sea level rise, Melting glaciers, Extinction, Ocean acidification)</p> <p><b>Project image of USGS geologic time scale encompassing 4.6+ billion years of history (visualized as spiral through time).</b> We exist today at the edge of this timescale and humans evolved only within the Pleistocene. Show how geologic epochs/periods are divided and illustrated as events. Explain vocabulary of geologic classification. The Anthropocene would be an additional epoch added to this timescale due to its <b>lasting impact upon the geologic record of the planet into the deep future.</b> That there will be long-term material, lines carved into the earth (called strata) marking our place and the materials we use (i.e. plastic etc.) in the rock record. These lines are called <b>strata</b>.</p> <p>The planet has always undergone massive changes and is a dynamic system of change. In the Earth’s history, geologic epochs and eras have been marked by events such as meteors colliding with the planet or mass extinction (think dinosaurs). Geologic events can move faster (earthquakes for example) or slower (across thousands of years) that we can’t see/sense with our own bodies, but shape our daily life realities. Due to their relatively slow unfolding (according to human sensing capacities) over millions of years, we can’t always directly see/feel its geologic changes, but we can measure them in their material accumulations (smog etc.).</p>	<p><a href="https://www.youtube.com/watch?v=PGtCkv7_nIs">https://www.youtube.com/watch?v=PGtCkv7_nIs</a></p> <p>spiral timescale from USGS</p>	<p>30 minutes</p>
---	---	--	-------------------

<b>COMMUNICATIVE PRACTICE</b> + <b>FOCUSED PRACTICE</b> (Controlled exercise) Application/ Reinforce	<p>Some people say we (humans) have been living in an “eden” of the Holocene marked by a human-friendly, relatively “stable” climate that has lasted for millennia and now all of that is massively changing. Humans have always existed in relation to planetary changes, but we have now reached a point where humans have impacted the environment (air, soil, and planetary systems) to a degree that there will be a mark in the geologic record in the Earth that shows our presence. Climate Change is a geologic event of the Anthropocene. Some people call this the “Great Acceleration”, illustrated by the keeling curve.</p> <p>The <b>Keeling Curve</b> is a graph that plots the ongoing change in concentration of carbon dioxide in Earth's atmosphere since 1958. It is based on continuous measurements taken at the Mauna Loa Observatory in Hawaii that began under the supervision of Charles David <b>Keeling</b>.</p> <p>Show graphs with upward spikes since the industrial revolution. SPECIFIC MATERIAL IMPACTS of CHANGE (CO<sub>2</sub>, Ocean Acidification, extinction, populations increase, fossil fuels, deforestation, agriculture, nuclear materials such as Fukushima or nuclear waste (materials that require long-term thinking). When we look at smog, we're looking at geologic materials from the Carboniferous (250 million years old) being airborne in the air/atmosphere of 2015.</p>	<p>Project images: Keeling curve graphics + Mauna Loa</p>	<b>15 minutes</b>
	<p><b>TASK:</b> Read the Elizabeth Kolbert Article from National Geographic “Enter the Anthropocene” while reading, take notes about things that surprised you and unfamiliar vocabulary.</p> <p>Share key vocabulary list for reading.</p> <p>Work with your group and discuss what</p> <ul style="list-style-type: none"> <li>- surprised you most about the article</li> <li>- and if you agree we are in the Anthropocene</li> <li>- (and why) based on your previous experiences OR what you learned today?</li> </ul>	<p>Illustrate examples</p> <p>“Enter the Anthropocene” article + vocab list see end of document (#1)</p>	<b>20 minutes</b>
	<p><b>TASK:</b> Distribute copies of the USGS spiral timescale and a blank “future” oriented timescale. Students should illustrate the future timescale with events/materials that compose the Anthropocene and impact geologic futures. Students should research and place a minimum of 10 events/materials on the timescale (i.e. invention of plastic, or a specific glacier that has melted, when Ozone was compromised etc.).</p>	<p>USGS scale and blank scales</p>	<b>30 minutes</b>

	<p><b>*Culture note:</b> At least one event or material should be <b>specific to the students' home country</b> (a particular dam, building project, mine, type of agricultural practice, loss of species etc.). Students should also draw a title for their timescale and provide a definition for the Anthropocene at the bottom of their drawing.</p> <p><b>Presentation and discussion of timescales (pin-up and critique) including cultural notes.</b></p>		<b>30 minutes</b>
<b>PRESENTATION (STUDY) + COMMUNICATIVE PRACTICE</b>	<p>OPEN DISCUSSION:</p> <p><b>CULTURE:</b> Geologic thinking requires a great deal of imagination and creativity. When thinking about geologic time we have to imagine times we can't inhabit (in the past and future) yet we know affects the present. Perhaps this is why artists and people working in the humanities are very interested in the idea of the Anthropocene. In many ways, it's artist/designers and people working in the humanities that have taken up this term and organized books, exhibitions, projects, conferences and events about the topic.</p> <p>Creativity/aesthetics are about visualizing things that we can't always see or sense. Communicating the invisible.</p> <p>How might artists and designers share (visually or otherwise) stories about planetary changes that unfold at geologic scales that humans can't individually experience (thousands of years)?</p> <p>How might artists experience and express the Anthropocene differently than scientists?</p> <p>How might you express the realities that contribute to the Anthropocene to a client or audience?</p> <p><b>Think about what's most important to you about understanding this concept.</b></p> <p>How can we, as designers, creatively communicate and share stories the long-term effects humans are having on the planet to the public?</p>	<p>Examples of artists who work with the Geologic materials or the Anthropocene, conferences, books and art related events (Taipei Biennial/HWK etc.)</p> <p>Project questions</p>	15 minutes
<p>CLOSING + FREE EXERCISE HOMEWORK</p> <p>NEXT CLASS:</p>	<p><b>CENTRAL PARK FIELD OUTING IS THIS THE ANTHROPOCENE?</b></p> <p>Distribute brief. Take turns reading through specifications and requirements for submission. Discuss the climate of the Pleistocene versus today. Talk through how to conduct research and presentation of projects.</p> <p>Group critique and presentations.</p>	<p>Project images of Laurentide Ice Sheet/Pleistocene and work of Robert Smithson.</p> <p>See attached document and #2 below</p>	15 minutes

## **#1 VOCABULARY FOR KOLBERT NATIONAL GEOGRAPHIC ARTICLE:**

**Go over, read each piece, these words are underlined in the article:**

**ACIDIFICATION:** to make into an acid. In the case of ocean acidification, this is the ongoing decrease in the pH of the Earth's oceans, caused by the uptake of carbon dioxide (CO<sub>2</sub>) from the atmosphere.

**GEOLOGIC TIME SCALE:** The period of time covering the physical formation and development of Earth, especially the period prior to human history.

**SIXTH EXTINCTION:** extinction event of species mainly due to human activity. The large number of extinctions span numerous families of plants and animals including mammals, birds, amphibians, reptiles and arthropods. According to the species-area theory and based on upperbound estimating, the present rate of extinction may be up to 140,000 species per year.

**EPOCH:** a division of geologic time less than a period and greater than an age

**SEDIMENTATION:** accumulation of solid material that has been moved and deposited in a new location.

**STRATIGRAPHY:** The study of many layers of a substance (such as rock), especially the distribution, deposition, and age of sedimentary rocks.

**TRANSIENT:** the state or fact of lasting only for a short time

**PLEISTOCENE:** Epoch of geologic time spanning approximately 2.6 million to 12,000 years ago and includes twenty cycles of advancing and retreating continental glaciers. The Pleistocene was also when humans first began to adapt and design tools in response to planetary climate change.

## **#2 ROBERT SMITHSON QUOTE:**

“Imagine yourself in Central Park one million years ago. You would be standing on a vast ice sheet, a 4,000-mile glacial wall, as much as 2,000 feet thick. Alone on the glacier, you would not sense its slow crushing, scraping, ripping movement as it advanced south, leaving great masses of rock debris in its wake. Under the frozen depths, where the carousel now stands, you would not notice the effect on the bedrock as the glacier dragged itself along.” - Robert Smithson