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Teaching Geosciences in Context
Abridged version, Spring 2019
Syllabus adapted from Geo 101 from Dr. Amy Larson Rhodes, Smith College

Teaching Geosciences in Context: The Great Unconformities of Earth Science

The Great Unconformity in The Grand Canyon represents missing time in the rock record between the older Mesoproterozoic rocks and the younger Cambrian rocks.

Description

This syllabus is meant to accompany an introductory geology course to teach the missing social contexts from earth sciences and create a classroom that holds many pathways through the material. As the title suggests, this syllabus doesn't stray from the geologic concepts, but aims to engage with them to refocus and challenge. Unconformities denote missing time and information in the rock record. Sediment, information, erodes away from powers stronger than the rock—winds and water—and is reburied by new deposits. But, we can fill in the gaps with the larger context, the missing stories and perspectives.

Science classrooms, as a whole, often forgo the historical and social contexts in which the science is rooted. Western science finds these roots in colonialism and imperialism, and still taints our interactions and observations of the world. Scientific objectivity, of course, has shielded us as learners from letting truly critical thought into our work. We will use a framework of strong objectivity, which aims to create a more balanced science, one that invites more voices to the table and listens to their theories. This is the framework that allows us to keep our science accountable.

In earth sciences we will focus on the geo- in geopolitics and the nuances of energy, labor practices in resource extraction, and how to use an environmental justice lens. We will enter those new layers of analysis through historical context, and also art, literature, and social movements.

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Course Topics

A geologist's perspective of the world

How did you get here? // Personal pathways into geosciences

Connection concepts: students will explore their own connections to geology and be welcomed to the classroom with excitement for the vast pathways we take to get to earth science. Students will be introduced to this topic by reading and interacting with geologic concepts and wonders through literature and art.

- Reading: Silko, Leslie Marmon (1994). An Essay on Rocks, *Yellow Woman and a Beauty of Spirit.*
- Assignment: Guiding Questions & Thoughts on *An Essay on Rocks.*
- Optional: Field-trip to art gallery exhibit on volcanoes

Coastlines and Hurricanes

Science of storms & environmental justice // Natural disasters & disaster capitalism // The topography of environmental racism

Connection concepts: students will engage with the intersections of storms and society to see the principles of environmental justice in action. This lesson will begin to unpack the ways in which systems of power, specifically racism, colonialism, capitalism, are linked and use the environment and its associated science and technology to their advantage.

Geology concepts: readings from section 15.1 through 15.6 will cover Coriolis effect, ocean temperatures, hurricane formation, storm surge

- Solnit, Rebecca (2013). Of Levees and Prisons, *Unfathomable City: A New Orleans Atlas,* (pages 55-61).
    - Pair with this: *Hurricane Florence Blows Open Harsh Realities of American Inequality* https://www.democracynow.org/2018/9/20/hurricane_florence_blows_open_harsh_realities
- Solnit, Rebecca (2013). Snakes and Ladders, *Unfathomable City: A New Orleans Atlas,* (pages 127-132).
- Solnit, Rebecca (2013). Waterland, *Unfathomable City: A New Orleans Atlas,* (pages 152-158).
- Solnit, Rebecca (2013). Ebb and Flow, *Unfathomable City: A New Orleans Atlas,* (pages 19-25)

- Think about this: Environmental Justice Principles from the People of Color Environmental Leadership Summit: http://www.ejnet.org/ej/principles.html

- Look at this: *Lower Ninth Ward* by Thornton Dial (NOLA Museum of Art, https://noma.org/wp-content/uploads/2015/08/New-Installation-Modern-Art-Entergy-Gallery-Autosaved.pdf)

- Assignment: guiding questions through Solnit's essays and maps.

Energy Resources: Fossil Fuels

Extraction & exploitation // Labor rights in energy production through time

Connection concepts: students will explore the working-class struggle for better labor conditions in the coal industry, as well as the history of oil as a continuing settler colonial force in the United States. An emphasis on historical context will be used to also make aware the intricacies of politics and fossil fuels. Students will think critically about green technology and geoengineering.

Geology concepts: readings from section 12.1 through 12.6 will cover fossil fuel deposit formation and locations of fossil fuel resources around the world, as well as ways we extract these fuels.

- Solnit, Rebecca (2013). *Oil and Water* in Unfathomable City: A New Orleans Atlas (pages 48-54)
- Selections from *Mean Spirit* (1990) by Linda Hogan, (pages 50-59, 146-150, 185-186, 228-229, 287).

- Listen to this: Miner's rights and union songs of the 1950s
  - Pete Seeger, Banks of Marble https://www.youtube.com/watch?v=x-o3CJytIPE
  - Pete Seeger, Miners Lifeguard https://www.youtube.com/watch?v=x-o3CJytIPE
  - Pete Seeger, Come All You Hardy Miners https://www.youtube.com/watch?v=-dZ2RR2bgNk
  - Victor Jara, Canción del Minero https://www.youtube.com/watch?v=u50YP7VVdr8

- Watch this: Documentary on organizing/labor rights in mining industry: Harlan County, USA https://www.youtube.com/watch?v=fLT16LP4ACQ

- Look at this: *The True Cost of Coal* by The Beehive Collective http://beehivecollective.blogspot.com/

- Think about the future: Geoengineering and Environmental Capitalism https://magazine.scienceforthepeople.org/geoengineering/geoengineering-environmental-capitalism/

Energy and Mineral Resources

Extraction & exploitation // Outsourcing U.S. control of energy // Health implications of mining

Connection concepts: students will begin to understand the ways the U.S. outsource our energy needs to continually displace indigenous people here and abroad and create overwhelming health conditions.

Geology concepts: sections 12.7 through 12.12 will cover mineral resources as finite materials and various types of economic minerals, like metals, nonmetallic and minerals used for nuclear power.

- Organizing miners: An Interview with a Mexican Copper Miner by Science for the People (1979, v.11, n.5) http://science-for-the-people.org/wp-content/uploads/2015/07/SftPv11n5s.pdf
- People Unite for Survival: Black Hills Gathering by Science for the People (1980, v.12, n.6) http://science-for-the-people.org/wp-content/uploads/2015/07/SftPv12n6s.pdf)
- Barrios de Chungar, Domitila and Moema Viezzer (1978). Her People, *Let Me Speak! Testimony of Domitila, A Woman of the Bolivian Mines* (pages 19-44).

- Explore this: Click on 'Mineral Ores and Building Extractions' https://ejatlas.org