

9-12 Physical Science Lesson Plan



“Ancient Pockets of Sunlight”

SD High School Science Standards

9-12.L.3.1. Students are able to identify factors that can cause changes in stability of populations, communities, and ecosystems.

9-12.E.1.3. Students are able to assess how human activity has changed the land, ocean, and atmosphere of Earth.

Examples: forest cover, chemical usage, farming, urban sprawl, grazing

9-12.S.2.1. Students are able to describe immediate and long-term consequences of potential solutions for technological issues.

9-12.S.2.3. Students are able to analyze and describe the benefits, limitations, cost, and consequences involved in using, conserving, or recycling resources.

Common Core

Speaking and Listening:

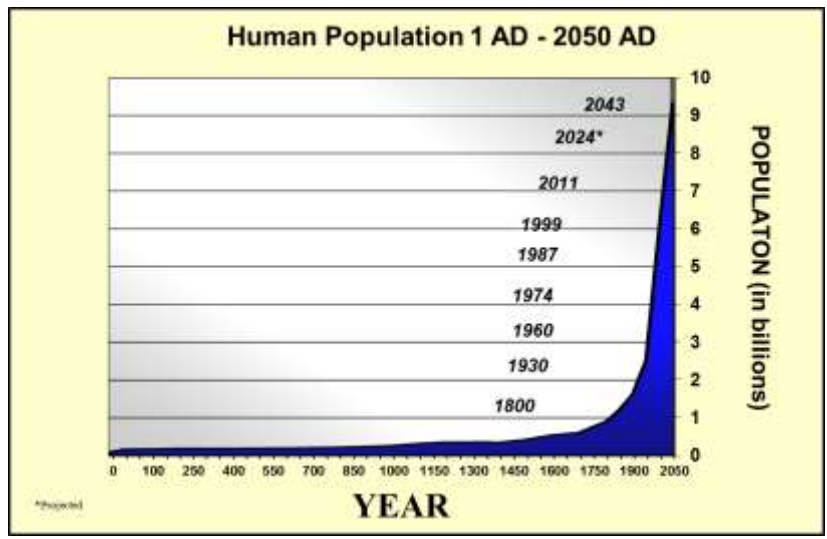
SL.9.1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.

OSEU

ESSENTIAL UNDERSTANDING 1: The original land base and natural resources of the Oceti Sakowin were under communal stewardship prior to immigrant settlement. The Oceti Sakowin tribes have a distinct and unique interrelationship with the environment that contributes to South Dakota.

Lesson:

- Create 2 circles of students: one small circle in the center (4 to 5 students) and one large circle around them with the rest of the students (ideally 18- 25 students). Have 2 bags of small candy prepared, both with about 20 pieces. Give the first bag to one person in the center circle without telling them what’s inside, giving this instruction: “Take what you need and then pass the bag on to the next person.” Observe the activity of the smaller circle. Now give the second bag to the first person in the large circle saying: “Don’t worry! We didn’t forget about you guys... take what you need and then pass the bag on to the next person.” Observe the activity of the large circle. Return everyone to the large circle to begin the discussion.
 - Questions for discussion
 - What happens when there is a limited amount of candy?
 - Who gets the most?
 - What happens when someone decide they need more?
 - What happens when you have the same amount of candy, but MORE people in the circle?
 - What is necessary for everyone to get something?
 - How do we define “what I need”?
- View clip from **The 11th Hour** (clip: <http://youtu.be/squPheFzFBo> full video: <http://vimeo.com/107108296>)
 - Questions for discussion
 - How did the Industrial Age change our view of the environment?
 - What might be the danger in aiming for “limitless growth”?
 - From what we can gather from our history, how many people could a year’s worth of sunlight naturally sustain on this planet?
 - Why does he call deposits of coal and oil “ancient pockets of sunlight”?
 - In 1800, global population was approximately 1 Billion; in 1930 (130 years later) we hit 2 Billion globally; in 1960 (30 years later) we hit 3 Billion globally; (show global population graph for remainder) What’s the explanation? What are the implications?



What’s the explanation? What are the implications?

- View Gladys Hawk interview (http://www.wolakotaproject.org/?page_id=274)
 - Depending upon time, engage with some of the “Learn About” and / or “Learn From” questions connected with this interview:

Learn ABOUT
(deep listening, information)

1. What is reciprocity?
2. How can we give back to the earth for the coal we take?
3. What is the right place of technology?
4. What role should scientists play in setting limits on oil and coal use?



Learn FROM
(deep sharing, transformation)

1. What do I think should be done to ensure that there are plenty of resources for everyone for all time?
2. How good am I at conserving resources like electricity, gas or even food?
3. What role does technology play in my life? What technologies are helpful to me? Are there any that might be not so helpful? What are they?
4. Who do I turn to to seek wisdom about difficult decisions? Are they trustworthy?

OSEU 7: INTERVIEW WITH GLADYS HAWK
WoLakota Project

- View video, **A World of Solutions**: <http://youtu.be/rm5DxojGAEI>
 - Place students in small groups (4 or 5) to brainstorm ideas for addressing this problem that THEY would like to pursue. Have each group come up with an immediate action (what can I do right now in my community) and a long-term action (what goal might I aim for as a future solution... one that might combine my work as a scientist AND as a future Wise Elder).

Possible Follow-Up Activities:

- Additional work with video: 300 Years of Fossil Fuels: <http://youtu.be/cJ-J91SwP8w>
- Further research into scientific areas of interest for possible career choices
- Further research into Elder wisdom having to do with relationship with *Unci Maka*
- Interview a scientist in person about related issues
- Interview an Elder in person about related issues

A World of Solutions



Students in my group:

What I (we) can do ***right now in our community*** to help solve the problem of environmental destruction and over consumption:

Long-term goals that I (we) have for solving this problem through science, education, Elder wisdom or some other related means: