

Our Radioactive Backyard: Discovering the History and Culture of the Santa Susana Field Lab

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Grade Level	High School
Duration	3 class periods

National Standards

GEOGRAPHY

Element 1: The World in Spatial Terms

1. How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information.

Element 2: Places and Regions

4. The physical and human characteristics of places.

Element 6: The Uses of Geography

17. How to apply geography to interpret the past

AZ Standards

ELA

Reading

Key Ideas and Details

11-12.RI.1 Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

11-12.RI.3 Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.

Writing

Production and Distribution of Writing

11-12.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Research to Build and Present Knowledge

11-12.W.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

Language

Vocabulary Acquisition and Use

11-12.L.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness

Arizona Social Science Standards

GEOGRAPHY

Human-environment interactions are essential aspects of human life in all societies.

HS.G2.1 Analyze interactions within and between human and physical systems.

HS.G2.4 Evaluate the use and sustainability of natural resources. Examining human population and movement helps individuals understand past, present, and future conditions on Earth's surface.

HS.G3.5 Evaluate the impact of social, political, and economic decisions that have caused conflict or promoted cooperation throughout time.

Global interconnections and spatial patterns are a necessary part of geographic reasoning.

HS.G4.1 Take an active stance on a geographic issue reflecting its scale (local, regional, state, national, or global)

HISTORY

The development of civilizations, societies, cultures, and innovations have influenced history and continue to impact the modern world.

HS.H1.7 Analyze how technological innovation and trade has affected economic development and transformed societies.

Cycles of conflict and cooperation have shaped relations among people, places, and environments.

HS.H2.1 Explain multiple causes of conflict.

SCIENCE**Earth Science**

Essential HS.E1U3.14 Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other.

HS.H2.3 Evaluate the short- and long- term impacts of conflicts and their resolutions.

SIOP Elements		
Preparation Adapting content Linking to background Linking to past learning Strategies used	Scaffolding Modeling Guided practice Independent practice Comprehensible input	Grouping Option Whole class Small groups Partners Independent
Integrating Processes Reading Writing Speaking Listening	Application Hands on Meaningful Linked to objectives Promotes engagement	Assessment Individual Group Written Oral

Arizona English Language Proficiency Standards**Grade 9-12****Basic****Listening and Reading**

Standard 1 By the end of each language proficiency level, an English learner can construct meaning from oral presentations and literary and informational text through grade appropriate listening, reading, and viewing.

B-1: determine the central idea or theme and explain how they are supported by using some text evidence.

B-2: recount specific details and information in a variety of texts.

Standard 2 By the end of each language proficiency level, an English learner can determine the meaning of words and phrases in oral presentations and literary and informational text.

B-3: apply context clues, information from visual aids, reference materials, and a developing knowledge of grade-appropriate English morphology to determine meaning of unknown words.

Speaking and Writing

Standard 4 By the end of each language proficiency level, an English learner can construct grade appropriate oral and written claims and support them with reasoning and evidence.

B-1: construct a claim about a topic or text.

B-2: supply a reason that supports the opinion and is based on some textual evidence.

B-3 use grade appropriate words and phrases.

B-4: provide a concluding statement to an opinion.

Overview

Human actions and inactions can affect the history and geography of an area. Nuclear energy is one of the issues that tends to create conflict, and people differ in their opinions on how to handle this source

of energy. To learn the different layers of government and how to advocate for one's stance on local or national issues is a civic right. When one combines their knowledge of the history and geography of an area with their power to advocate, one has a tool for action.

Purpose

In this lesson, students will learn about the history of the Santa Susana Field Lab and the nuclear meltdown that occurred there. They will also learn about the history of the Chumash caves in the area. Students will then take a stance on the relevant issues and create a persuasive letter.

Key Vocabulary

nuclear meltdown: occurs when the middle portion of the nuclear reactor containing the fuel rods (its "core") is not properly cooled

advocacy: to speak or act in favor of

environment: all the things together that surround animals and humans in the natural world, including the air, the water, and the soil

cultural site: of or relating to a culture or civilization

contamination: waste, chemicals, or other harmful substances

Indigenous: originating or occurring naturally in a particular place; native

Materials

- Access to Internet, Computers, Projection Device
- Vocabulary Cards
- KWLH Chart (Topic: Nuclear Disasters)
- PowerPoint slideshow on the Santa Susana Field Lab (SSFL)
- Timeline worksheet and Answer Key
- The Cold War and the Santa Susana Field Laboratory YouTube Video (10.30 min)
<https://www.youtube.com/watch?v=JDceOZIUz9w>
- TV segment with videos and reading: LA's Nuclear Secret: Part 1 (9.32 min) and (7.16 min)
<https://www.nbclosangeles.com/investigations/la-nuclear-secret/54503/>
- Native Narratives: Conversation with the Chumash YouTube Video (6.20 min)
<https://www.youtube.com/watch?v=2V9CvwdTc9Y>
- Santa Susana Field Lab could become a cultural site YouTube Video (2.56min)
<https://www.youtube.com/watch?v=EDnISBXSwdE>
- Vocabulary Test and Answer Key
- Optional: Persuasive Letter Template
- Scoring Guide for Persuasive Letter

Objectives

The student will be able to:

1. Identify the chronological events in the area known as the Santa Susana Field Lab.
2. Analyze the impact of human actions on the environment.
3. Identify the cultural significance of the land.
4. Determine the appropriate government agency to write a letter to.
5. Write a persuasive letter.

Procedures

Prerequisite Knowledge: Students know the persuasive letter format and how to create a timeline of events.

Prior to the Lesson: The teacher should read the TV segment and watch videos about the history of the Santa Susana Field Lab.

SESSION ONE

Note: Because the information for the Timeline is coming from a PowerPoint and several videos, it might be hard for students to keep the dates in chronological order.

Explore:

1. Introduce the lesson by telling students they are going to learn about a nuclear meltdown that happened in the "backyard" of the author of this lesson.
2. Distribute the KWLH Chart worksheet. Project the first Vocabulary Card. Ask students what they know about nuclear disasters. Have students write 4 things they know about nuclear disasters anywhere in the world in the K portion of the KWLH Chart. If desired, have students share some of their responses.
3. Now have students write 4 questions they have about nuclear meltdowns but instead of anywhere in the world, what questions do they have about a specific one that occurred at the Santa Susana Field Lab (SSFL) in Southern California. The questions will be recorded in the W portion of the KWLH Chart. If desired, have students share some of their questions. (**Preparation: Linking to past learning or background; Integrating Processes: Writing, Speaking, Listening**)
4. Distribute the Timeline worksheet and instruct students to begin a timeline on the events that happened at SSFL. Instruct them to fill in the key dates and outcomes areas of the worksheet. Project the PowerPoint slideshow on the Santa Susana Field Lab (SSFL). Model the first date if needed. (**Scaffolding: Comprehensible input, Modeling**)

Explain:

5. After the PowerPoint presentation, ask students to write 2 things they learned about the Santa Susana Field Lab nuclear meltdown. Have students write their responses in the H portion of the KLWH Chart. Then have them write HOW they learned those 2 things in the H portion of their KLWH chart. (**Integrating Processes: Writing, Reading, Listening**)

SESSION TWO

Engage:

6. Continue this session with the Timeline activity and students writing down the events, dates, and outcomes. *Note: The History Guy speaks very rapidly. Be prepared to pause the video to help students write down their information.*
7. Project The Cold War and the Santa Susana Field Laboratory YouTube Video (10.30 min) <https://www.youtube.com/watch?v=JDceOZIUz9w> so students are aware of the history of the land on which the Santa Susana Field Lab is located.
8. Project and read a TV segment about LA's Nuclear Secret: Part 1 (9.32 min) and (7.16 min) <https://www.nbclosangeles.com/investigations/la-nuclear-secret/54503/> and again have students work on the Timeline worksheet.
9. To build connections to the indigenous people of the area, project Native Narratives: Conversation with the Chumash YouTube Video (6.20 min) <https://www.youtube.com/watch?v=2V9CvwdTc9Y>
10. To gain an update on the issue, project Santa Susana Field Lab Could Become a Cultural Site YouTube Video (2.56min) <https://www.youtube.com/watch?v=EDnISBXSwdE>
11. Instruct students to go back to their KWLH charts and write at least 2 more things they learned about the Santa Susana Field Lab. Remind students to complete the H part and write HOW they learned those things. (**Integrating Processes: Writing, Reading, Listening**)

SESSION THREE

Elaborate:

12. Introduce this session with: How does the government and its structure relate to the Santa Susana Field Lab? Project the **PowerPoint slide 13** about the government involvement in the Santa Susana Field Lab. Clarify which local, state, federal entities are involved with the Santa Susana Field Lab. Have students research the addresses or email contact information for each

of the entities. (**Application: Meaningful, Linked to objectives**)

13. Project the Vocabulary Cards and provide copies of the cards to students who may need additional help in language acquisition. (**Scaffolding: Comprehensible input**)

Evaluate:

14. Distribute the Persuasive Letter Scoring Guide. Direct students to write a letter to one of the government agencies concerning the Santa Susana Field Lab and whether or not they think the nuclear meltdown should be cleaned up. Explain how the letters will be scored.
15. For students who need additional help, use the persuasive letter template to draft their letters to one of the government agencies. (**Assessment: Written, Individual, Scaffolding, Preparation: Adapting content**)

Assessment

Social Science and ELA

The KWLH Charts can be graded for completeness and accuracy. Mastery will be considered a score of 85% or higher.

The Timeline worksheet can be graded for accuracy and completeness. Mastery will be considered 12 or more complete and accurate entries.

The persuasive letters can be scored with the Persuasive Letter Scoring Guide. Mastery will be considered a total score of 16 points or higher.

The Vocabulary Test can be given to measure language acquisition. Mastery will be considered a score of 80% or higher.

Extensions

Students could write an Op/Ed or Letter to the Editor to a local newspaper regarding this issue. Students could also create a video or social media post advocating for or against the clean up of the Santa Susana Field Lab and the preservation of the Chumash Painted Cave.

Sources

See Credits on the PowerPoint and Vocabulary Cards

Video on SSFL #1

<https://www.youtube.com/watch?v=JDceOZIUz9w>

Video on SSFL #2

<https://www.nbclosangeles.com/investigations/la-nuclear-secret/54503/>

YouTube Video on Chumash

<https://www.youtube.com/watch?v=2V9CvwdTc9Y>

YouTube Video on Burro Flats

<https://www.youtube.com/watch?v=EDnISBXSwdE>