

Teacher Resource Set

Title	Rocky Flats Nuclear Facility
Developed by	Josephine Wade, Social Studies Teacher, Bell Middle School
Grade Level	4-8
Essential Question	<p>How do human activity and the environment affect each other?</p> <p>How have different people impacted the state of Colorado and beyond?</p> <p>What happens when people interact with the environment?</p> <p>Whose story is it and why does it matter?</p>
Contextual Paragraph	<p>Rocky Flats, located between Golden and Boulder, was a nuclear weapons factory complex. Its purpose was to process plutonium into metal and to manufacture plutonium bomb cores. Rocky Flats produced 70,000 bomb cores over the span of four decades.</p> <p>After the dismantling of the Berlin Wall and the collapse of Communism, George H.W. Bush declared the so-called arms race over and production at Rocky Flats was halted in 1989. Since clean-up of the contaminated property was successful, ownership of the land was transferred from the U.S. Department of Energy to the United States Fish and Wildlife Service as a national wildlife refuge in 2007.</p> <p>However, the planned biking and hiking trails have not been open to the public for, according to the U.S. Fish and Wildlife Service, financial reasons. Due to the poisonous materials, workers from Rocky Flats have suffered maladies including a high percentage of people suffering from cancer and even death.</p> <p>Rocky Flats was listed in the National Register of Historic Places May 19, 1997.</p>

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Overall View of Rocky Flats Plant	Plutonium “pit” (i.e., trigger for nuclear bomb)	Building 771	1957 Fire in Building 771	Building 371	National Register of Historic Places Registration Form
This photo shows scope of the Rocky Flats Plant in 1995 just before dismantling began.	This photo shows a typical plutonium “pit.”	View looking south at Building 771 under construction. Building 771 was one of the first four major buildings at the Rocky Flats Plant. Building 771 was originally the primary facility for plutonium operations. (5/29/52)	A worker in a radiation suit points to where a fire occurred in Building 771 at Rocky Flats c. 1957.	Aerial view looking north of Building 371 after construction completion. (11/7/78)	Registration form dated May 19, 1997. The Rocky Flats Plant Property is significant for its association with events that have made a significant contribution to the broad patterns of our 20 th century history.

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<p>The Rocky Flats Plant (6,240 acres) was part of the nationwide nuclear weapons complex. It manufactured radioactive and non-radioactive metal parts, primarily for nuclear weapons, from 1951 to 1989.</p>	<p>Nuclear bomb plutonium triggers (called "pits") were produced at Rocky Flats between 1954 and 1989.</p>	<p>Building 771, also known as Plant C, was one of the first four major buildings to be constructed and placed into operation at the plant. For the first few years of the plant, Building 771 was the primary facility for plutonium operations. These operations included the production of plutonium weapons components and recovery of plutonium from recycled materials and residues.</p>	<p>The picture shows the first large conflagration at the Rocky Flats plant. This fire resulted in the largest single release of plutonium to the external environment.</p>	<p>This building is a primary contributor of the Rocky Flats Plant historic district, and is associated with the U.S. strategy of nuclear military deterrence during the Cold War, considered of major importance in preventing Soviet nuclear attack. Building 371 was originally built to replace plutonium recovery operations in Buildings 771 and 776, using advanced technology for plutonium handling, recovery and safety.</p>	<p>This source contains a wealth of information regarding the significance of Rocky Flats, both as a military/industrial complex and the clean-up of the site for environmental purposes. A complete history of the site and its change over time is included as well.</p> <p>Three to-scale maps illustrate the enormity of the complex and 8 photos complete with building identification numbers show the enormity of the site.</p>
					
<p>https://www.colorado.gov/pacific/sites/default/files/HM_sf-rocky-flats-1995.jpg</p>	<p>https://www.colorado.gov/pacific/sites/default/files/HM_sf-rocky-flats-exposures-study-history-of-site.pdf</p>	<p>https://www.lm.doe.gov/land/sites/co/rocky_flats/haer/base/low_res/B771_N_1.jpg</p>	<p>https://coloradoencyclopedia.org/image/1957-fire</p>	<p>http://cdn.loc.gov/service/pnp/habshaer/co/co0800/co0852/photos/316851pr.jpg</p>	<p>https://npgallery.nps.gov/NRHP/AssetDetail?assetID=7f5212c2-dc2b-4014-a9d8-5b3730e0290c</p>

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Rocky Flats Plant, Plutonium Recovery Facility, Northwest portion of Rocky Flats Plant, Golden, Jefferson County, CO	Rocky Flats Plant, Plutonium Recovery Facility, Northwest portion of Rocky Flats Plant, Golden, Jefferson County, CO	Rocky Flats Plant, Plutonium Recovery Facility, Northwest portion of Rocky Flats Plant, Golden, Jefferson County, CO	Former Worker at Rocky Flats	Rocky Flats Plant, Plutonium Recovery Facility, Northwest portion of Rocky Flats Plant, Golden, Jefferson County, CO	Wife of a Former Worker at Rocky Flats
<p>Aerial view of building 371 under construction. It was originally intended to replace plutonium recovery operations in Buildings 771 and 776 using advanced technology for plutonium handling and safety.</p>	<p>View of building 371 exterior wall construction.</p>	<p>Pictures of lines that move contaminated materials.</p>	<p>George Barrie, a former worker at Rocky Flats, is being fitted with a breathing mask.</p>	<p>View of the first plutonium button.</p>	<p>Picture of a wife of a former worker weeping due to a decision of a board.</p>
<p>This building is a major part of the Rocky Flats Plant historic district. It is associated with the U.S. strategy of nuclear military deterrence during the Cold War, a strategy considered of major importance in preventing Soviet nuclear attack.</p>	<p>The walls in building 371 were constructed to withstand an earthquake and tornado because of the potential radioactive breach that could occur otherwise.</p>	<p>Picture shows how lines were installed to move contaminated filters and move solid and liquid material samples. Another example of how dangerous Rocky Flats was because of the hazardous material used on a daily basis.</p>	<p>The picture shows a man with an ailment that he has suffered as a result of working at the plant. Most workers from Rocky Flats continue to be denied compensation for their ailments incurred at their workplace.</p>	<p>This is a picture of the first trigger meant to ignite a nuclear bomb built at Rocky Flats building 371. This trigger was made using plutonium materials. Building 371 was the last dismantled building at Rocky Flats and contained radioactive materials.</p>	<p>Mary Ann Rupp, whose husband, a former employee at Rocky Flats, died of lung cancer at the age of 45 is pictured weeping after a board decided that former employees would not receive any type of aid for their injuries and various illnesses despite overwhelming evidence that they suffered the maladies due to their work at the plant.</p>

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<p>https://www.loc.gov/resource/hhh.co0852.photos/?sp=1</p>	<p>https://www.loc.gov/resource/hhh.co0852.photos/?sp=6</p>	<p>https://www.loc.gov/resource/hhh.co0852.photos/?sp=9</p>	<p>http://digital.denverlibrary.org/cdm/singleitem/collection/p16079coll32/id/353751/rec/22</p>	<p>https://www.loc.gov/resource/hhh.co0852.photos/?sp=17</p>	<p>http://digital.denverlibrary.org/cdm/singleitem/collection/p16079coll32/id/159984/rec/5</p>

Foundations Annotations

Curriculum Connections

History

Geography

Civics

Curriculum Standards

CO State History Standard 2: The historical eras, individuals, groups, ideas and themes in Colorado history and their relationships to key events in the United States. (Fourth Grade)

d. Describe the impact of various technological developments.

CO State Geography Standard 2: Connections within and across human and physical systems are developed. (Fourth Grade)

d. Describe how places in Colorado are connected by movement of goods and services and technology.

CO State Civics Standard 4: Analyze and debate multiple perspectives on an issue. (Fourth Grade)

b. Provide supportive arguments for both sides of a current public policy debate.

Content and Thinking Objectives

Students will be able to:

- analyze and gather evidence from primary and secondary sources.
- identify cause and effect relationships (when describing the history, interactions, and contributions of the diverse people/cultures in Colorado's history).
- define technology and explain the impact of various technological developments in Colorado's past.
- describe how the physical environment of Colorado's regions provided opportunities for and placed constraints on people/groups over time.

Inquiry Questions, Activities and Strategies**Inquiry Questions**

How have various individuals, groups, industries, and ideas affected the development of Colorado?

How does human activity affect the environment?

How does an individual's experiences and background influence perception of an issue?

Inquiry Questions, Activities and Strategies (continued)**Inquiry Activities**

Ask students to analyze how the landscape in and around Rocky Flats has changed due to the plant and materials used in the facility in a Socratic Seminar forum.

Ask students to research the current status on Rocky Flats. What is it now? How is it used? What surrounds it? Why, or why not, is it important to preserve a site that at one point had radioactive contamination?

Ask students to research other Superfund sites in Colorado. To what purpose have those sites been put? How have those sites impacted their surrounding area? Compare the findings to Rocky Flats.

Using the resource set as a museum walk, ask students to note things they observe in the images and questions that arise from the conversation during the museum walk.

Students may research why people sought compensation if they chose to work at Rocky Flats and why the board denied the workers' claims.

Assessment Strategies

Depending upon how one uses the resources and which standards are chosen, assessment can take many forms. For example:

CO History Standard 2 (d) (Fourth Grade) Students may choose one of the images from the resource set to analyze and describe how technological advances have changed Colorado's physical landscape.

CO Geography Standard 2 (d) (Fourth Grade) Create a project (Google slides, Prezi, Podcast, poster, tri-fold, board game, etc.) that explains how the builders used the available resources to build Rocky Flats.

CO Civics Standard 4 (b) (Fourth Grade) Students may research and form a debate about whether the National Wildlife Refuge should ever be opened due to the health risks.

Other Resources**Web Resources**

National Register of Historic Places Database: <https://npgallery.nps.gov/NRHP/AssetDetail?assetID=9dda949e-217a-4ab0-a21e-2b914e8d8814>

Colorado Encyclopedia: www.coloradoencyclopedia.org

Library of Congress: www.loc.gov

Denver Public Library: www.denverlibrary.org

Secondary Sources

Len Ackland, *Making a Real Killing: Rocky Flats and the Nuclear West* (Albuquerque: University of New Mexico Press, 1999; paperback, 2002).

Len Ackland, "Open Wound from a Tough Nuclear History," in *Remedies for a New West: Healing Landscapes, Histories and Cultures*, ed. Patricia Limerick, Andrew Cowell, Sharon K. Collinge (Tucson: University of Arizona Press, 2009).

"RockyFlatsFacts.com" <http://rockyflats.com> This site has links intended for teachers who may want to research specific aspects of the clean-up of Rocky Flats, housing availability near the site, environmental waste disposal, etc.

"The Nuclear Information Project" Federation of American Scientists: The Nuclear Information Project. <https://fas.org/programs/ssp/nukes/> .

Preservation Connection

The Rocky Flats Plant historic district consists of 61 structures dating from 1951 to 1989 within the industrial area of the nuclear weapons production plant. The industrial buildings housed equipment to manufacture triggers for use in nuclear weapons. The buildings intended to purify plutonium recovered from retired weapons, were largely constructed of concrete or corrugated metal. Although surrounded by numerous recent temporary facilities, the core of the Plant containing the district retains integrity of location, setting, materials, and association.

The Plant is a self-contained, concentration of industrial buildings surrounded by ranch land, preserved open space, mining areas, and low-density residential area. The original site was 1900 acres. In 1972, an additional 4600 acres were purchased. In 1995, 234 acres, the wind site in the northwest corner, were released to the Department of Energy (DOE) Golden Field Office. Due to restricted access and use of the site over the past 20 to 40 years, the buffer zone contains what are now believed to be rare or declining habitats of the Colorado Piedmont. All undisturbed areas within the Buffer Zone, totaling about 5,900 acres, have been surveyed for archaeological resources. Very few resources have been identified, none of which have been determined eligible for listing in the National Register by the Colorado State Historic Preservation Office. The US Fish and Wildlife Service anticipates opening the Rocky Flats National Wildlife Refuge to the public in 2018.

Its period of significance dates from its inception in 1951 to its closure in 1989 as the Cold War ended. It was particularly significant as it was the sole producer of triggers for nuclear weapons from 1964 to 1989. The plant is related, as well, to the 12 other plants comprising the Nuclear Weapons Complex located in other states. The property is significantly associated with the U.S. strategy of military deterrence against the Soviets, producing and maintaining a sufficient arsenal of weapons, to be launched by air, land, or sea, to prevent a preemptive strike by the Soviets. This strategy was considered of major importance in preventing nuclear war during the Cold War period. (Excerpts taken from the National Register Registration Form.)

Why is Rocky Flats listed in the National Register of Historic Places?

What work has been/is being done to make the site safe for people of Colorado to enjoy?

Why might it be important to preserve such a site as this even though it created radioactive contamination?

Working together to tell the story of our state!

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