U.S. Involvement in World War II Through the Lens of the Manhattan Project National Historic Park in Oak Ridge, TN

Grades: 9-12

Stage 1: Desired Results:

Understandings:

Students will understand that…

- Students will understand that the Manhattan Project in Oak Ridge was a secret city that help enrich uranium used in the bomb on Hiroshima.
- Students will understand that the story of Oak Ridge and the work people did there during the war impacted the course of the war, world history, and US history.

Essential Questions:

- What impacts did the Manhattan Project in Oak Ridge have locally?
- How did the development of nuclear weapons influence history after WWII?
- What was the role of the Manhattan project in the U.S. and the world?
- What were the experiences of women in the Manhattan Project? How does this relate to experiences of women all over the US?
- What where the experiences of African-Americans in the Manhattan Project? How does this relate to experiences of African-Americans all over the US? How were the experiences of African-American's influenced by the location of the Manhattan Project in Oak Ridge within the context of the south at that time?

Stage 2 – Assessment Evidence:

Performance tasks:

Pre-Assessment:

Teachers may want to use their own pre-assessment based on their students' abilities and needs.

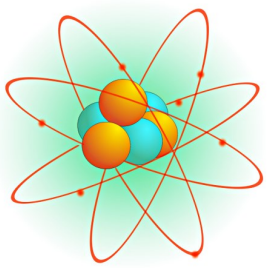
Stage 3—Learning Plan:

Learning Activities:

Preparation:

Materials: This learning unit consists of 7 learning activities and is organized around different aspects of the Manhattan Project based on primary documents, photos, excerpts, war posters, and other sources. Learning goals for each activity as well as suggested activities and suggested sources will be provided at the beginning of each section.

Activity 1:	Entering the War
Activity 2:	Choosing Oak Ridge
Activity 3:	Displacement from Communities
Activity 4:	Women in the Manhattan Project at Oak Ridge
Activity 5:	African-Americans in the Manhattan Project in Oak Ridge
Activity 6:	Sacrifice in the Secret City
Activity 7:	Dropping the Bombs



Activity 1—Entering the War:

Objectives:

Students will understand motivation for starting the Manhattan Project was spurred by fears that Germany was developed atomic weapons.

Directions:

Have students read the background information about possible reasons that lead to the implementation of the Manhattan Project. Have students also reach the primary document, a letter from Albert Einstein to US President Franklin D. Roosevelt.

Suggested Activity:

Think-pair-share. Give students think time to read and annotate the letter and start to answer questions. The letter can be also read together as a class. Have students pair and answer questions. Share out answers in a whole group discussion.

Sources:

Foundation Document: Manhattan Project National Historical Park, Tennessee, New Mexico, Washington, January 2017 (pages 8-9). Access online: https://www.nps.gov/mapr/foundation-document.htm

Other Suggested Sources:

- The Manhattan Project, Part 1, Department of Energy podcast, Direct Current.

  https://energy.gov/podcasts/direct-current-energygov-podcast/s2-e2-manhattan-project-part-1
- Kelly's, The Manhattan Project is organized into sections and within the sections shorter experts that relate to specific topics. Each part is around 1-4 pages and could be used in a high school classroom setting. For background on scientists pushing for the project see "Thinking No Pedestrian Thoughts" on p. 19, "Enlisting Einstein" on p. 38, and "Albert Einstein to F.D. Roosevelt" on p. 42.
- Kelley, Cynthia C., The Manhattan Project: The Birth of the Atomic Bomb in the Words of Its Creators, Eyewitnesses, and Historians. Black Dog & Leventhal Publishers. 2009.

Read This: *Background Information*

Science Background Leading to the Manhattan Project (excerpts from The Foundation Document, p. 8-9)

"The road to the atomic bomb began with revolutionary discoveries in physics. In the early 20th century, physicists conceived of the atom as a miniature solar system, with extremely light negatively charged subatomic particles, called electrons, in orbit around a much heavier positively charged nucleus.

In 1919, Ernest Rutherford, working in the Cavendish Laboratory at Cambridge University, detected a high-energy particle with a positive charge being ejected from the nucleus of an atom. He named this subatomic particle the proton. The number of protons in the nucleus of the atom defines the element. Hydrogen, with one proton and an atomic number of one, came first on the periodic table and uranium, with ninety-two protons, last. However, many elements existed at different weights even while displaying identical chemical properties. This discovery would have important implications for nuclear physics, as these isotopes of the same element could have markedly different nuclear properties.

A third subatomic particle, first identified in 1932 by James Chadwick at Cambridge University, explained this difference in mass. Named the neutron because it has no charge, the number of neutrons could vary among nuclei of atoms of the same element. Atoms of the same element but with varying numbers of neutrons are called isotopes. For instance, all uranium atoms have 92 protons in their nuclei and 92 electrons in orbit. Uranium–238, which accounts for more than 99% of natural uranium, has 146 neutrons in its nucleus. Uranium–235 has 143 neutrons in its nucleus, and this isotope makes up less than 1% of naturally occurring uranium.

An unexpected discovery by researchers in Nazi Germany in late 1938 radically changed the direction of both theoretical and practical nuclear research. The radiochemists Otto Hahn and Fritz Strassmann found that when they bombarded uranium with neutrons emitted from a mixed radium-beryllium source, the products of the experiment weighed less than that of the original uranium atom. Albert Einstein's formula, E=mc2, which states that mass and energy are equivalent, suggested the loss of mass resulting from this process must have been converted into energy. Hahn communicated these findings to Lise Meitner, a former colleague who fled to Sweden to escape the Nazis. Meitner and her nephew, Otto Frisch, calculated that the nucleus of the uranium atom had been split, creating two lighter elements. They concluded that so much energy had been released that a previously undiscovered process must be at work. Borrowing the term for cell division in biology, Frisch named the process fission.

Fission of the uranium atom had another important characteristic besides the immediate release of energy. This was the emission of neutrons. When fission occurred in uranium, splitting the atom, several neutrons were also emitted. Physicists speculated that these secondary neutrons might collide with other uranium atoms and cause additional fission, creating a self-sustaining "chain reaction" if the mass of uranium was of appropriate size, shape, and density, which would emit a continuously increasing amount of energy. Such a reaction could generate a large amount of energy, and if uncontrolled could create an explosion of huge force.

The possible military uses for uranium fission were apparent to the world's leading physicists. In August 1939, Albert Einstein and physicist Leo Szilard wrote a letter to President Franklin D. Roosevelt to warn him that recent uranium fission research suggesting a chain reaction in a sufficiently large mass of uranium could conceivably lead to the construction of "extremely powerful bombs." A single bomb, Einstein warned, could potentially destroy an entire seaport. Einstein called for government support of uranium research, noting ominously that German physicists were engaged in uranium research and that Germany had stopped the export of uranium."

Read This: *Letter from Albert Einstein* Below is copy of the Einstein-Szilard letter to President Franklin Delano Roosevelt. Annotate the letter for important information. Then answer the questions that follow.

Albert Einstein
Old Grove Rd.
Nassau Point
Peconic, Long Island

August 2nd, 1939

F.D. Roosevelt,
President of the United States,
White House
Washington, D.C.

Sir:

Some recent work by E.Fermi and L. Szilard, which has been communicated to me in manuscript, leads me to expect that the element uranium may be turned into a new and important source of energy in the immediate future. Certain aspects of the situation which has arisen seem to call for watchfulness and, if necessary, quick action on the part of the Administration. I believe therefore that it is my duty to bring to your attention the following facts and recommendations:

In the course of the last four months it has been made probable - through the work of Joliot in France as well as Fermi and Szilard in America - that it may become possible to set up a nuclear chain reaction in a large mass of uranium,by which vast amounts of power and large quantities of new radium-like elements would be generated. Now it appears almost certain that this could be achieved in the immediate future.

This new phenomenon would also lead to the construction of bombs, and it is conceivable - though much less certain - that extremely powerful bombs of a new type may thus be constructed. A single bomb of this type, carried by boat and exploded in a port, might very well destroy the whole port together with some of the surrounding territory. However, such bombs might very well prove to be too heavy for transportation by air.

The United States has only very poor ores of uranium in moderate quantities. There is some good ore in Canada and the former Czechoslovakia, while the most important source of uranium is Belgian Congo.

In view of this situation you may think it desirable to have some permanent contact maintained between the Administration and the group of physicists working on chain reactions in America. One possible way of achieving this might be for you to entrust with this task a person who has your confidence and who could perhaps serve in an inofficial capacity. His task might comprise the following:

a) to approach Government Departments, keep them informed of the further development, and put forward recommendations for Government action, giving particular attention to the problem of securing a supply of uranium ore for the United States;

b) to speed up the experimental work,which is at present being carried on within the limits of the budgets of University laboratories, by providing funds, if such funds be required, through his contacts with private persons who are willing to make contributions for this cause, and perhaps also by obtaining the co-operation of industrial laboratories which have the necessary equipment.

I understand that Germany has actually stopped the sale of uranium from the Czechoslovakian mines which she has taken over. That she should have taken such early action might perhaps be understood on the ground that the son of the German Under-Secretary of State, von Weizsäcker, is attached to the Kaiser-Wilhelm-Institut in Berlin where some of the American work on uranium is now being repeated.

Yours very truly,

A. Einstein

(Albert Einstein)

Answer it: ***Einstein-Szilard letter to President FDR Questions.***

Answer the questions below.

1. Einstein mentions the work of (E.) Fermi, (L.) Szilard and (Frederic Joliot-Curie) Joliot. State who each of these people are and why they might be notable or important within the context of this letter.

2. Einstein was not the sole writer of this this letter. The idea to send a letter came from multiple. It was also composed by Leo Szilard. Why did you suppose they did not write their own letters and sign them? Why ask Albert Einstein to sign and send the letter?

3. What does the letter warn of?

4. How does Einstein imagine such a weapon will be used? Why?

5. Why does he mention where to find uranium sources?

6. What is the significance of uranium in the former Czechoslovakia?

7. Who does he suggest getting in contact with?

8. What actions does he recommend taking? Name at least two actions.

9. What does he mention that Germans have done with the Czechoslovakian uranium mines?

10. What do you think the letter implies about possible German intentions and actions? Explain.

11. Speculate to how President Roosevelt might have felt upon receiving and reading the letter.

Activity 2—Choosing Oak Ridge:

Objectives:

Students will be able to state reasons why the Oak Ridge location was chosen as the site for one of the Manhattan Project secret cities.

Directions:

Have students read the excerpt from the NPS website, analyze map, and read primary document, a letter from the War Department to the TVA. Then students will fill out a Venn diagram and answer questions.

Suggested Activity:

Have students read the documents individually or whole group. Give student time to annotate the texts. Have students work in groups of 2-4 to fill in the Venn diagram and answer the questions.

Sources:

Map and selected text about the Oak Ridge tract of land was taken from the NPS website.

Oak Ridge site – Manhattan Project National Historic Park webpage, Accessed September 2, 2017. www.nps.gov/mapr/oakridge.htm

Historic document from the War Department to the TVA was accessed thought the Atlanta National Archives.

Selection of the Oak Ridge Site, National Archives Atlanta, Accessed September 2, 2017.

https://www.archives.gov/atlanta/exhibits/item91_exh.html

Other Suggested Sources:

- "City Behind a Fence" is about Oak Ridge from 1942-1946. For short excerpts about choosing the Oak Ridge location and early city planning see chapter 1 and pages 3-10.

- Johnson, Charles W. and Jackson, Charles O.. City Behind a Fence. The University of Tennessee Press. 1981.

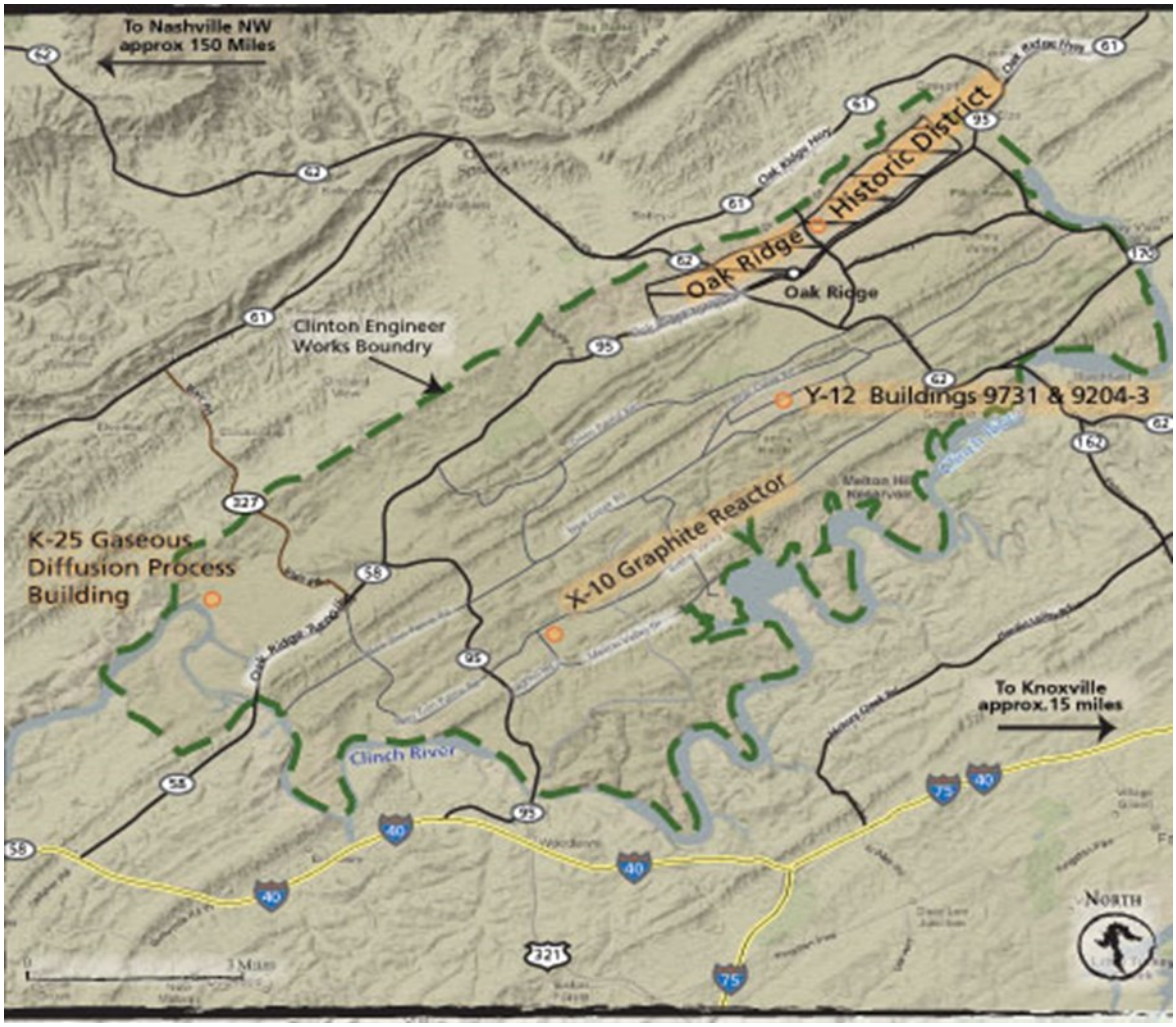
Read This: ***excerpt from the Manhattan Project National Historical Park website*** www.nps.gov/mapr/oakridge.htm Read the information, analyze the map, read the letter after, then answer the questions.

The Clinton Engineer Works, which became the Oak Ridge Reservation, was the administrative and military headquarters for the Manhattan Project and home to more than 75,000 people who built and operated the city and industrial complex in the hills of East Tennessee.

The Oak Ridge Reservation included three parallel industrial processes for uranium enrichment and experimental plutonium production.

The Oak Ridge site includes

- X-10 Graphite Reactor National Historic Landmark, a pilot nuclear reactor which produced small quantities of plutonium;
- Buildings 9731 and 9204-3 at the Y-12 complex, home to the electromagnetic separation process for uranium enrichment;
- K-25 Building site, where gaseous diffusion uranium enrichment technology was pioneered. Buildings 9731, 9204-3 and K-25 together enriched a portion of the material for the uranium bomb.



Read This: ***War Department—TVA Letter Choosing Clinch River Site***

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ADDRESS REPLY TO
CHIEF OF ENGINEERS, U. S. ARMY
WASHINGTON, D. C.

REFER TO FILE NO. _____

WAR DEPARTMENT
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON

August 12, 1942.

Mr. Gordon R. Clapp,
General Manager,
Tennessee Valley Authority,
Knoxville, Tenn.

My dear Mr. Clapp:

Your letter of July 22 and supplemental teletype message of July 28 concerning the availability of power in the Clinch River area have been received.

Since receipt of these communications, a representative of this office contacted Mr. Herbert S. Marks, Acting Chief, Power Branch, War Production Board. He stated the conclusions of the Power Branch concerning the Clinch River site as follows: " - - It will be practicable for the TVA System to supply at this site the entire amount of power required. During the late summer and fall of 1943, should 1943 be a dry year, it is probable that supply of your requirements would cause or would increase, curtailment of other uses of power, but the interconnected power network is so extensive that such curtailment would not be likely to result in interference with war production or to occasion serious civilian hardship. From the transmission standpoint the site is feasible, although a site adjacent to Watts Bar or a site further down on the Tennessee River would be somewhat better. At your proposed site an additional transmission circuit (not over 40 miles) might be required if the load reaches 100,000 kw." This statement by Mr. Marks is in reply to an inquiry for information as to availability of power supply for a load approximately as follows:

1st half 1943	7,000 kw increasing to	12,000 kw
2nd half 1943	30,000 kw increasing to	60,000 kw
1st half 1944	100,000 kw possibly increasing to	150,000 kw

In selecting the Clinch River site this office considered sites in the vicinity of Watts Bar and also sites on the lower part of the Tennessee River. However, climate and other considerations rule out sites in Alabama, Mississippi, and Western Tennessee and no other suitable site was found north of Chattanooga.

ADMINISTRATIVE FILES

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The site selected will not displace the large number of people indicated in your letter since practically all the small towns located in the vicinity will be excluded in the taking.

In regard to water requirements, the larger portion of our requirements can be taken from the Watts Bar pool thereby resulting in no detrimental effects to your power service for the heavy war loads. However, in this regard information is requested as to what arrangements can be made for a minimum daily average flow of 150 c.f.s. of water in the Clinch River below Clinton. If this is too serious a drain on your power service requirements, it is requested that you state the minimum flow that could be maintained.

The selection of the site now being considered was made after considerable study was given to the TVA area and other areas. Colonel T. B. Parker and Mr. John P. Ferris of your organization gave us significant assistance and information upon which to base a decision. The site tentatively selected appears to comply most fully with the following requirements:

1. The land area of the project should preferably be all in one tract and yet should be in rugged enough terrain to provide isolation for certain portions of the project. A minimum of 100 square miles is required. The Clinch River site with its series of valleys and ridges provides almost ideal possibilities for isolation of the several portions of the project.

2. The site should be isolated from any large center of population and yet must be near enough to a source of labor supply to provide for operation and construction. The twenty or twenty-five miles distance separating the site from Knoxville meets this requirement.

3. A labor pool of from 2,000 to 5,000 men will be needed for construction and operation. Except for certain technicians the type of labor available in Knoxville and vicinity will be suitable.

4. The exact amount of water required has not been definitely determined, but large quantities as cool as possible should be available.

5. The transportation requirements for the project are small. The requirements for construction are greater than for operation. The site should be easily accessible from all parts of the country by rail and by air.

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6. There is no particular waste disposal problem that cannot be solved by normal methods.

7. From the standpoint of research, the type of personnel involved, and certain phases of operation, a mild climate throughout the year is desirable. The Clinch River site does not have an ideal climate but is much more suitable than other sites considered.

Consideration has been given to the effect of the project upon the proposed Melton Hill Power and Navigation Dam. Except for a few small levees required the dam will not interfere with the project and data now available indicate that there is no hazard which will endanger the dam or its foundations.

I appreciate the assistance and cooperation on this project extended by you and others of your organization, particularly Col. T. B. Parker, Mr. John P. Ferris, and Mr. W. R. Chambers who supplied valuable information and help when my representatives were in Tennessee for the purpose of inspecting available sites. Unless you advise to the contrary my representatives will continue to consult with these individuals as problems concerning the TVA and the project arise.

Sincerely yours,

Thomas M. Robins,
Major General,
Assistant Chief of Engineers.

8/19/42-MGO
CC: Mr. D. E. Lilienthal
Dr. H. A. Morgan
Mr. J. P. Pope
Mr. J. P. Ferris -to prep. rep. for GM's sign., coord. with Messrs. Parker and Wessenauer
Col. T. B. Parker
Mr. G. O. Wessenauer
Miss Marguerite Owen

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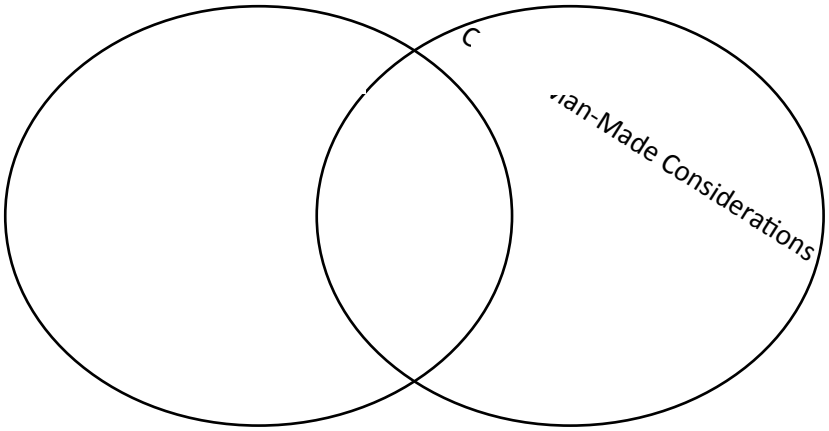
Fill in the Venn diagram with reasons why the Oak Ridge location was chosen. Then answer the questions.

1.



2. What two types of natural land features create the boarders of secret city?

3. In the letter refers to the "Clinch River site," what would this site become?

4. Why do you think it would be important to choose a semi-secluded area?

5. What is the Tennessee Valley Authority? How does this tie to earlier U.S. history? Explain.

6. What is unique about the Clinch River area relative to the following areas

Power water, land requirement?

7. What city is far enough away for some seclusion but close enough to recruit labor?

Secret City

Activity 3—Displacement from Communities:

Objectives:

Students will understand that the Manhattan Project site at Oak Ridge was composed of several small rural communities. Students will understand that the people living there were displaced and sacrificed a great deal for the war effort.

Directions:

Have students read the excerpt from the Foundation Document. Students may work in groups of 2-4. Students will answer the questions and write captions for each of the photos. Show students the photos with the actual captions after they have shared their captions with the whole group. Have students choose 2+ photos to make more inferences from. Then read the displacement letter.

Suggested Activity:

Read expert about the communities in class. Have students use the crop method for analyzing photos. And share out to the whole group. Have students read the displacement letter and compose a letter to a relative or friend about what is happening and how the feel.

Sources:

- Text excerpts from the Foundation Document on the NPS Manhattan Project website.
- Foundation Document: Manhattan Project National Historic Park, Tennessee, New Mexico, Washington, January 2017. (page 5) Access online: https://www.nps.gov/mapr/foundation-document.htm
- Photos are from the Department of Energy in Oak Ridge Flicker webpage and it appropriate for students to explore.
- Before Oak Ridge, Department of Energy Flicker page. Accessed September 2, 2017. www.flickr.com/photos/doe-oakridge/albums/72157669441168194

Other Suggested Sources:

- "City Behind a Fence" is about Oak Ridge from 1942-1946. For writing about displacement of communities that is appropriate for classroom use see pages 39-43.
- Johnson, Charles W. and Jackson, Charles O.. *City Behind a Fence*. The University of Tennessee Press. 1981.
- Reba Holmberg's Interview with the Voices of the Manhattan Project. Reba grew up the in community of Robertsville her family was displaced by the Manhattan Project. She later worked at the Y-12 analytical labs.

  http://manhattanprojectvoices.org/oral-histories/reba-holmbergs-interview

Caption Key

Photo 1: 6-25-1938 McKinney Cross-roads Store in the Wheat Community, Tennessee

Photo 2: Uncle Charlie McKinney with mules 1938, Wheat

Photo 3: Ina Lee Gallaher, Wheat Tennessee

Photo 4: Edmonds Home 1939 Wheat Tennessee

Photo 5: Woman canning in Wheat 1939

Read This: ***Excerpt from the Manhattan Project National Historical Park Foundation document.***

Analyze the pictures of Wheat residents taken by Ed Westcott, then read the displacement letter and answer the questions.

"The area making up the Oak Ridge Reservation includes evidence of human settlement dating back at least 14,000 years, long prior to the creation of the Clinton Engineer Works. Various American Indian tribes settled the area. European settlement began in what is now East Tennessee when the Long Hunters arrived in the second half of the 1700s. Subsequently, waves of settlers followed, including many Scots-Irish. By 1942, the nearly 60,000 acres along the north bank of the Clinch River taken for the Manhattan Project were occupied by a few sparsely populated farming communities in three valleys only a few tens of miles west of Knoxville. These communities included Scarborough (known as Scarboro by 1942), the Wheat community, Robertsville, New Bethel, New Hope, and Elza.

The Tennessee Valley Authority completed the Norris Dam in 1936 on the Clinch River, providing electricity and flood control to the area and the project. In November 1942, approximately 3,000 people were required to be displaced in very short order to make way for construction of the Clinton Engineer Works. For a variety of reasons the location of the Clinton Engineer Works was considered at the time ideal, and when General Leslie Groves was put in charge of the Manhattan Project he selected the site as the location of the project's first plant. Interesting to note, Tennessee Governor Prentice Cooper initially declined to cede sovereignty over the land to the federal government, which gained the Clinton Engineer District a military restricted area designation rather than a military reservation."

Analyze the photos taken of the Wheat community. Answer the questions and write detailed captions for each

Photo 1

Who is in the photo?

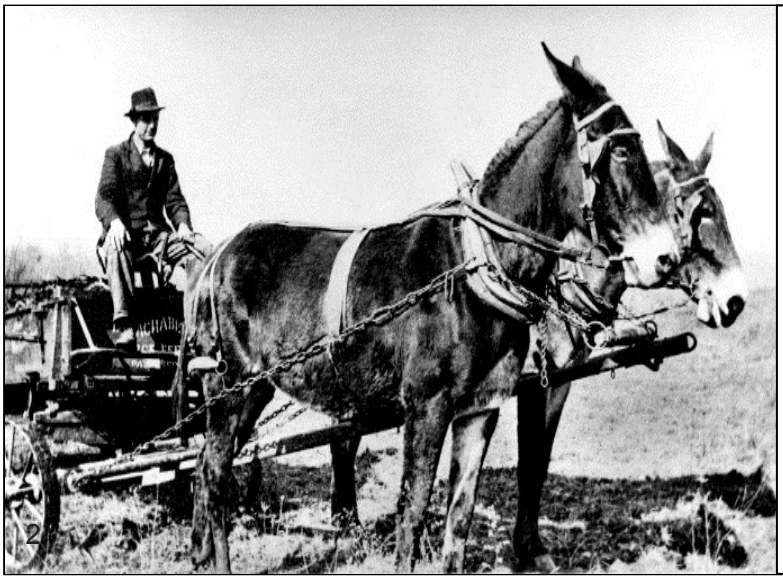
What is the setting?

What activities are happening?

Caption:

1

Analyze These: *Historic Photos*



2

Photo 2

Who is in the photo?

What is the setting?

Caption:

Photo 3

Who is in the photo?

What is the setting, what is happening?

Caption:

3

Analyze These: ***Historic Photos***

Photo 4

Who is in the photo?

What is the setting?

Caption:

Photo 5

Who is in the photo?

What is the setting?

What happen earlier that day?

Caption:

Read This: ***Displacement Letter***

Roane

IN THE DISTRICT COURT OF THE UNITED STATES

FOR THE EASTERN DISTRICT OF TENNESSEE

NORTHERN DIVISION

18-57-6692

13

UNITED STATES OF AMERICA	)	
	)	
vs.	)	Civil Action No. 429
	)	
56,200 Acres of land, more or less, situate in Roane and Anderson Counties, Tennessee, and Ed C. Browder, et al.	)	Notice as to Declaration of Taking No. 4

TO THE UNITED STATES MARSHAL FOR THE EASTERN DISTRICT OF TENNESSEE -- GREETING:

You are hereby commanded to notify Brad Wells and wife of Oliver Springs, Tennessee Route #1 or his tenants and/or agents that heretofore on the 20 day of November 1942, a judgment on the Declaration of Taking No. 4, filed in the above entitled proceeding, gave the United States of America possession of Tract No. C-204, containing 77.8 acres in Anderson County, Tennessee, in connection with the establishment of the Kingston Demolition Range, as of FIRST day of DECEMBER, 1942, (which tract of land is fully described in the Declaration of Taking No. 4 on file in my office), and to forthwith vacate said premises IMMEDIATELY.

You are further commanded that if none of the parties are found in actual possession of said premises to post a copy of this notice at a conspicious place upon the premises and forthwith made due return of said service to this Court.

Witness my hand and the seal of this court on this the 21 day of November, 1942.

LEE A. BEELER, Clerk
United States District Court
By Naomi Matthews
Deputy Clerk

(SEAL)

FILED
U.S. DISTRICT COURT EASTERN DIST. OF TENN.
LEE A. BEELER, CLERK
DEC 17 1942 PM
BY

38

Write about it: ***Personal Letter***

Imagine you are the head of household receiving this letter. You provide for your family from running your farm. You have been told that the government needs the land for a project that will help end the war. Everyone wants to end the war and bring their boys back home. Everyone in the community has been affected by the war and many people have husbands, sons, brothers, and fathers that are away fighting. Your entire town is displaced.

Imagine that you will have to find a place to stay for you and your family while you look for a new residence. Compose a letter to a relative explaining what is happening to you and your family. What plans will have to make? Where will you live? How will you move? What emotions is your family experiencing?

Activity 4—Women in the Manhattan Project at Oak Ridge:

Objectives:

Students will understand that there was a shortage of manpower during the war and that women moved into jobs that men typically held. There were many government and industry supported messages encouraging women to get jobs and serve in roles that also supported the military.

Directions:

Have students analyze the war message, and the photo of women working the Calutons at the Y-12 plant. Then have students answer the questions in groups of two, and then share out whole group.

Suggested Activity:

Have students use the crop technique to analyze the image of the war poster. Students can answer questions in pairs. There are also video interviews from the Voices of the Manhattan Project to watch in class and discuss. The interview with Colleen Black is under 40 minutes and she give details about living in Oak Ridge. She worked as a leak detector in the K-25 gaseous diffusion plant.

Sources:

- Poster 44-PA-389; Get A War Job!; 1941 - 1945; World War II Posters, 1942 - 1945; Records of the Office of Government Reports, Record Group 44; National Archives at College Park, College Park, MD. www.docsteach.org/documents/document/get-a-war-job, July 5, 2017

- Photos are from the Department of Energy in Oak Ridge Flicker webpage. Y-12 Oak Ridge 1940's. Department of Energy in Oak Ridge Flicker webpage www.flickr.com/photos/doe-oakridge/albums/72157669169100644/with/9067043071/

Other Suggested Sources:

- Colleen Black's Interview with the Voices of the Manhattan Project Video in 2013. http://manhattanprojectvoices.org/oral-histories/colleen-black-interview-0
- Evelyn Ellingson's Interview. Voices of the Manhattan Project. http://manhattanprojectvoices.org/oral-histories/evelyn-ellingsons-interview
- *The Girls of Atomic City* explores what it was like for women working in Oak Ridge during the Manhattan Project. Kiernan, Denise. *The Girls of Atomic City*. Touchstone. 2013.
- Female Scientists of the Manhattan Project, Manhattan Project National Historic Park webpage accessed September 2, 2017. www.nps.gov/mapr/learn/historyculture/female-involvement-in-the-manhattan-project.htm
- American Army Women Serving on All Fronts, a news real that is (not specifically about Oak Ridge, but) about women working for the war effort. American Army Women Serving on All Fronts, United News, news reel that is 9 min 17 sec. www.docsteach.org/documents/document/american-army-women
- You're Going to Employ Women, a government pamphlet to help employers learn how to employ and train women. You're Going to Employ Women, The War Department. 1943. www.docsteach.org/documents/document/youre-going-to-employ-women

Analyze This: ***Wartime message***

1. Who is the advertisement targeting?

2. Who is putting out this message?

3. What is the significance of the flag with the blue star?

4. What can we infer about the woman in the advertisement? Give evidence for each statement. (Provide at least 3 things).

5. What do you think the poster is trying to accomplish?

6.Do you think this is an effective message? Explain why or why not.

Analyze This: ***Historic Photo***

1. Who is in the photo?

2. What is the setting?

3. What activities are happening?

4. What else can you infer from the photo?

Activity 5—African-Americans in the Manhattan Project:

Objectives:

Students will understand that African Americans came to work at Oak Ridge for better paying jobs. However, African Americans were restricted in the kinds of jobs they could get. They also lived under segregated conditions.

Directions:

Have students complete the photo analysis. Then have students read the excerpt from the National Park website.

Suggested Activity:

Students can use the crop technique to analyze photos.

Sources:

Photos are from the Department of Energy in Oak Ridge Flicker webpage. African American History Oak Ridge. www.flickr.com/photos/doe-oakridge/albums/72157674674051596/with/7128930793/

African-American Involvement in the Manhattan Project webpage www.nps.gov/mapr/learn/historyculture/african-american-involvement-in-manhattan-project.htm

Other Suggested Sources:

- Kelly's, *The Manhattan Project* is organized into sections and within the sections shorter experts that relate to specific topics. Each part is around 1-4 pages and could be used in a high school classroom setting. For reading about the experience of African Americans see "An answer to their prayers" on p. 210, and "All-black crews with white foreman" on p. 214.

- Kelley, Cynthia C., *The Manhattan Project: The Birth of the Atomic Bomb in the Words of Its Creators, Eyewitnesses, and Historians*. Black Dog & Leventhal Publishers. 2009.

- "City Behind a Fence" is about Oak Ridge from 1942-1946. For writing about African Americans look for references to Scarboro, also see an excerpt on pages 210-215

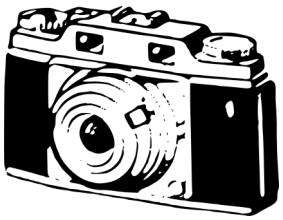
- Johnson, Charles W. and Jackson, Charles O.. *City Behind a Fence*. The University of Tennessee Press. 1981.

Photo 1: Men working garbage collection at Oak Ridge. Driving jobs were reserved for whites.

Photo 2: Women outside Hutments in Oak Ridge

Photo 3: X10-14 DOE photo by Ed Westcott Outdoor Privies Oak Ridge Tennessee 1943

Photo 4: Teen Dance Oak Ridge Tennessee 1945



Analyze These: *Historic Photos*

Photo 1:

Who is in the photo?

What jobs do they have?

Write a caption:

Photo 2:

Who is in the photo?

What is the setting?

Write a caption:

Analyze These: *Historic Photos*

Photo 3:

What is the setting?

Write your observations?

What can you infer?

Write a caption:

Photo 4:

What is the setting?

Write your observations?

What can you infer?

Write a caption:

Read This: Excerpt from NPS website

“President Franklin D. Roosevelt's Executive Order 8802 stated: “I do hereby reaffirm the policy of the United States that there shall be no discrimination in the employment of workers in defense industries of government because of race, creed, color or national origin, and I do hereby declare that it is the duty of employers and of labor organizations, to provide for the full and equitable participation of all workers in defense industries, without discrimination...” Even though the president had written this executive order, things did not always go as planned.

African-American workers within Oak Ridge lived in a community located near today’s Illinois Avenue. Residents within that community lived in small wooden shacks called hutments, unlike housing in other communities. At 14 feet by 14 feet, hutments were roughly the size of a storage shed and were shared by 5-6 people.

Amenities were sparse, with a coal-burning stove, dirt floor, one door and no bathroom. Married couples were not allowed to live together. Instead, women lived in their own guarded, and fenced-off community called the “pen,” enclosed by a 5-foot fence with barbed wire lining the top. Their children were not permitted to live in Oak Ridge until 1946. Original plans for a “Negro Village” on the east end of town, with housing and a shopping center, were abandoned as Oak Ridge grew.

For many people the wages and living conditions were better than back home, and transportation was provided; nevertheless, discriminatory practices and Jim Crow laws were an ever-present barrier to prosperity in day-to-day life.

Despite the many challenges that African-Americans faced during this point in time in American history, many went on to become prominent citizens; doctors, teachers, principals, city counsel members, leaders within their communities, and some became scientists within the Manhattan Project.

African-Americans also faced much of the same discrimination at the Hanford, Washington site. There are no records of African-American workers in Los Alamos, New Mexico, during the Manhattan Project.”

Activity 6—Sacrifice in the Secret City :

Objectives:

Students will understand that the war effort meant shortages of many material and consumable goods. Students will be able to state ways these shortages affected people's daily lives and ways they coped. Students will also understand that workers were not allowed to talk about their jobs and mainly did not know exactly what they were working on much of the time. Students will understand that maintaining secrecy and security was important to the success of the Manhattan Project

Directions:

Read the excerpt about rationing. Then have students analyze the photos.

Suggested Activity:

Use the crop technique to analyze photos and discuss in groups of 2-4. Then have students create a war poster about rationing or conservation in small groups.

Sources:

- Sacrificing for the Common Good: Rationing in WWII article about the WWII Memorial www.nps.gov/articles/rationing-in-wwii.htm
- Photos are from the Department of Energy in Oak Ridge Flicker webpage. People Oak Ridge 1940's. www.flickr.com/photos/doe-oakridge/albums/72157671325827802/page1
- Photos are from the Department of Energy in Oak Ridge Flicker webpage. Billboards Oak Ridge 1940's. www.flickr.com/photos/doe-oakridge/sets/72157672128427296
- Poster 44-PA-368; Plant A Victory Garden. Our Food Is Fighting.; 1941-1945; World War II Posters, 1942 - 1945; Records of the Office of Government Reports, Record Group 44; National Archives at College Park, College Park, MD. www.docsteach.org/documents/document/plant-a-victory-garden-our-food-is-fighting, September 3, 2017

Other Suggested Sources:

- Dickson, Peggy. Memories of Oak Ridge During World War II. www.atomicheritage.org/sites/default/files/resources/Memories%20of%20Oak%20Ridge%20During%20WWII%20by%20Peggy%20Dickson.pdf

Read This: ***Excerpt from Sacrificing for the Common Good, NPS Website***

During the Second World War, Americans were asked to make sacrifices in many ways. Rationing was not only one of those ways, but it was a way Americans contributed to the war effort.

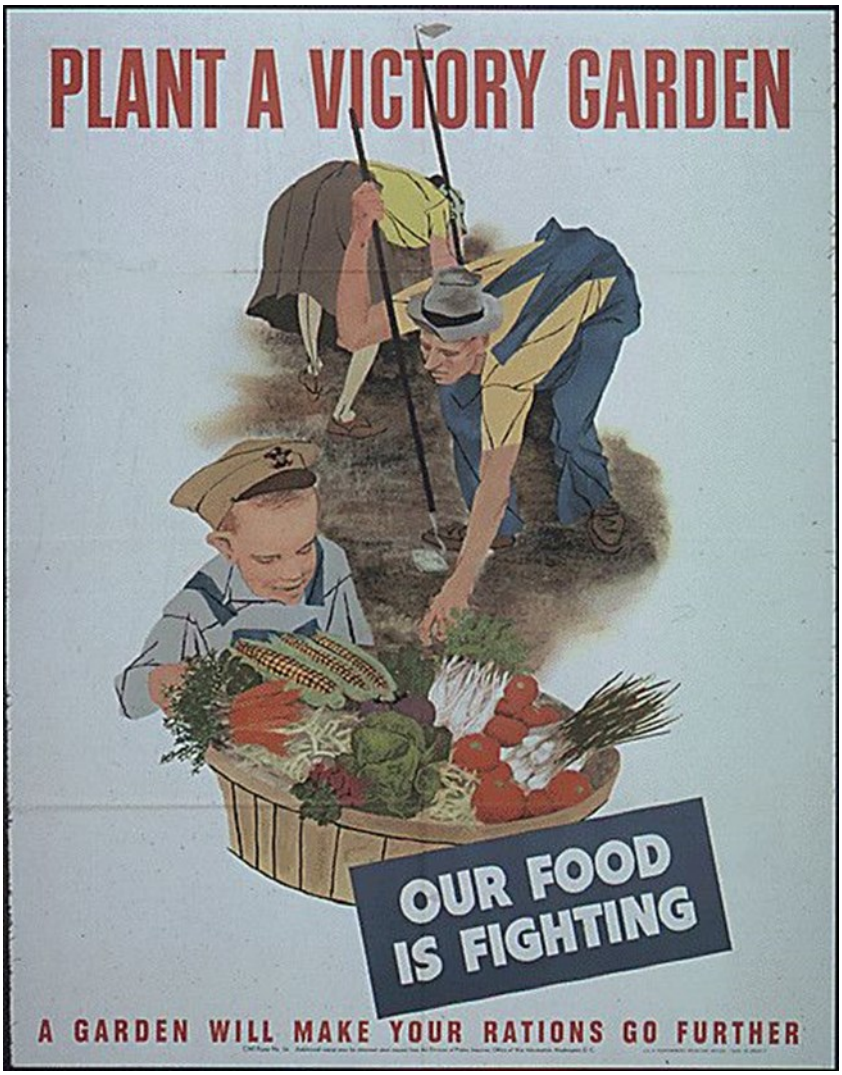
When the United States declared war after the attack on Pearl Harbor, the United States government created a system of rationing, limiting the amount of certain goods that a person could purchase. Supplies such as gasoline, butter, sugar and canned milk were rationed because they needed to be diverted to the war effort. War also disrupted trade, limiting the availability of some goods. For example, the Japanese Imperial Army controlled the Dutch East Indies (today's Indonesia) from March 1942 to September 1945, creating a shortage of rubber that affected American production.

On August 28, 1941, President Roosevelt's Executive Order 8875 created the Office of Price Administration (OPA). The OPA's main responsibility was to place a ceiling on prices of most goods, and to limit consumption by rationing.

Americans received their first ration cards in May 1942. The first card, War Ration Card Number One, became known as the "Sugar Book," for one of the commodities Americans could purchase with their ration card. Other ration cards developed as the war progressed. Ration cards included stamps with drawings of airplanes, guns, tanks, aircraft, ears of wheat and fruit, which were used to purchase rationed items.

The OPA rationed automobiles, tires, gasoline, fuel oil, coal, firewood, nylon, silk, and shoes. Americans used their ration cards and stamps to take their meager share of household staples including meat, dairy, coffee, dried fruits, jams, jellies, lard, shortening, and oils.

Americans learned, as they did during the Great Depression, to do without. Sacrificing certain items during the war became the norm for most Americans. It was considered a common good for the war effort, and it affected every American household.



Analyze the photos and answer the questions.

What does the ad communicate?

What is the objective of the ad?

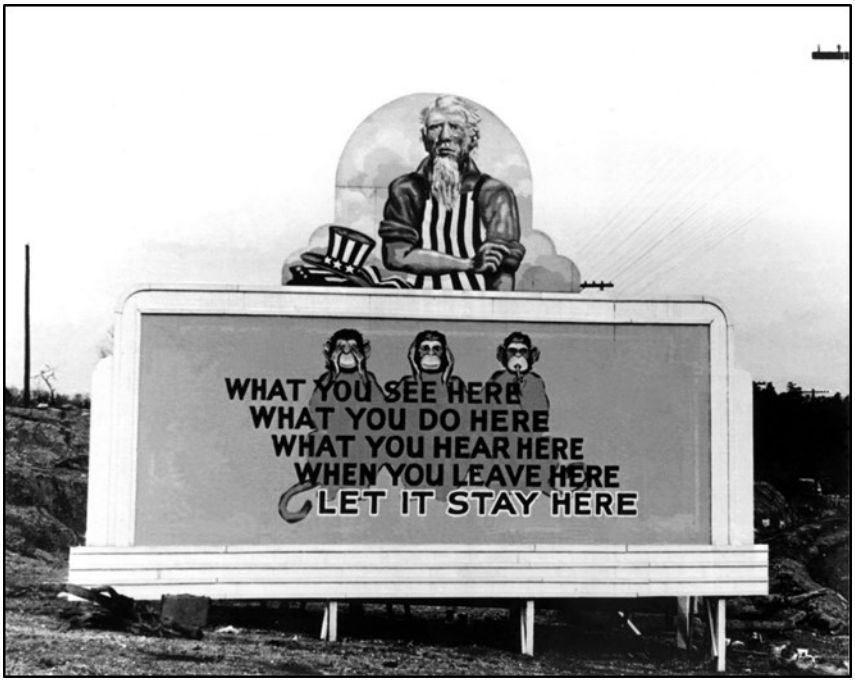
Who is in the photo?

What is the setting?

What is the activity?

What is in the photo?

What is the object for?



Describe the billboard?

Is the message effective?

Activity 7—Dropping the Bombs :

Objectives:

Students will be able to think critically about the reasons for using the bomb and reasons against using the bomb. Students can identify ways in which using the bomb impacted the nations involved and world history to follow.

Directions:

Have students read the excerpt from the Foundation Document. Give students background assign research into reason for and against using the bomb.

Suggested Activity:

Students will write an essay articulating reasons the U.S. decided to use the bomb. Students will examine the human cost of this decision through independent research. It is suggested to organize a debate between students, for or against the bomb.

Sources:

- Foundation Document: Manhattan Project National Historic Park, Tennessee, New Mexico, Washington, January 2017. (page 12) Access online: https://www.nps.gov/mapr/foundation-document.htm

Other Suggested Sources:

- The Manhattan Project, Part 2, Department of Energy podcast, Direct Current.

  https://energy.gov/podcasts/direct-current-energygov-podcast/s2-e3-manhattan-project-part-2

- Tennessee Virtual Achieve, Knoxville News Sentinel newspaper dated August 6, 1945. http://teva.contentdm.oclc.org/cdm/ref/collection/p15138coll18/id/439

Read This: *Excerpt from the Foundation Document*

"The Manhattan Project owed its existence to fear that Nazi Germany was developing an atomic weapon, but the surrender of Germany in spring 1945 turned the focus of the program to perfecting a device that could be used against Japan in the ongoing war in the Pacific. American strategists thought that an invasion of the Japanese Home Islands might be required to end the conflict, and planning and preparation for the invasion, codenamed Operation Downfall, began more than a year before the Trinity test. Estimates of casualties resulting from an invasion and defeat of Japan varied widely, with the upper range numbering in the millions for the United States, its allies, and the Japanese military and civilians.

President Harry S Truman and his advisors were well aware that successful development and deployment of an atomic weapon could alter strategic calculations for ending the war. Plans were made for launching an attack with these weapons from recently captured Tinian Island (now part of the Commonwealth of the Northern Mariana Islands) in the Pacific, within striking distance of Japan by B-29 bombers. Truman formed an Interim Committee of top officials charged with recommending the proper use of atomic weapons. The group considered whether a demonstration of the bomb might possibly convince the Japanese to surrender. This was rejected, however, out of fear that the bomb could malfunction, the Japanese might put U.S. prisoners of war in the area, or they might manage to shoot down the plane. In addition, the shock value of the new weapon could be lost. These reasons and others convinced the group that the bomb should be dropped without warning on a "dual target"—a war plant surrounded by workers' homes.

On August 6, 1945, just three weeks after the Trinity test, the United States dropped the "Little Boy" uranium bomb on Hiroshima, Japan. A B-29 bomber named Enola Gay lifted off in the predawn hours from Tinian Island and released the first atomic weapon in history over Hiroshima. "Little Boy" detonated with a yield of 13 kilotons at nearly 2,000 feet above the city, to maximize its destructive effects.

The effects of the explosion were both devastating and indiscriminate, a lethal combination of blast overpressure, extreme heat, and radiation effects that killed between 90,000 and 166,000 people. Half of the fatalities came from the initial blast and firestorm, and those who did not perish immediately in the blast suffered for days or weeks before finally succumbing to gruesome burn injuries or acute radiation sickness. More than one-third of Hiroshima's people died, and two-thirds of its buildings were completely destroyed.

Three days later, on August 9, 1945, another B-29 bomber named Bock's Car lifted off from Tinian Island carrying the "Fat Man" plutonium implosion-type bomb. Unable to attack its primary target of Kokura due to poor visibility, the crew released "Fat Man" over its secondary target, the city of Nagasaki. "Fat Man" detonated 1,700 feet above the city with a yield of 22 kilotons. The explosion was contained by the steep hills that surrounded ground zero; still, between 60,000 and 80,000 people were killed by the combined effects of the bomb. Those who survived the bombings faced the loss of family members, destroyed livelihoods, and a lifetime of significantly increased risk of leukemia and other cancers due to radiation exposure.

The destructive effects of the two atomic bombs, combined with the Soviet invasion of Japanese-occupied Manchuria on August 9, led Japan to surrender on August 14. The United States and its allies began their occupation of Japan on August 28, the first foreign occupation in the history of the Japanese nation."

Organizing Bomb Research and Questions to Consider

1. Why did Truman decide to use the bomb?

2. How did this benefit civilians? Armed service personnel?

3. What other options where available to the U.S.? What was the outlook?

4. What was the estimated death toll in Hiroshima? Nagasaki?

5. How does the death and destruction compare other bombings in Japan, for instance, the fire-bombing of Tokyo?

6. What where the lasting effects of dropping a nuclear weapon on Japan in the cities?

7. What are the environmental impacts of dropping the bomb as well as keeping supplies of nuclear weapons?

8. How did the development of atomic weapons influence the course of history after the war?

Objectives/Standards: These are just some of the standards that may be used for this lesson. Please add to, or delete, as you the teacher need for your students with this lesson. These are chosen for use with *high school* students with emphasis on standards in English/Language Arts & US History.

ENGLA

11-12.RI.KID.1 Analyze what a text says explicitly and draw inferences; support an interpretation of a text by citing and synthesizing relevant textual evidence from multiple sources.

9-10.RI.KID.1 Analyze what a text says explicitly and draw inferences; cite the strongest, most compelling textual evidence to support conclusions.

11-12.RI.KID.2 Determine multiple central ideas of a text or texts and analyze their development; provide a critical summary. 9-**10.RI.KID.2** Determine a central idea of a text and analyze its development; provide an objective or critical summary.
11-12.RI.IKI.7 Evaluate the topic or subject in multiple diverse formats and media.
9-10.RI.IKI.7 Evaluate the topic or subject in two diverse formats or media.
11-12.W.TTP.3 Write narrative fiction or literary nonfiction to convey experiences and/or events using effective techniques, well-chosen details, and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing point of view, and introducing a narrator/speaker and/or characters. b. Sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome. c. Create a smooth progression of experiences or events. d. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines to convey experiences, events, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative. f. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. g. Use appropriate language and techniques, such as metaphor, simile, and analogy. h. Establish and maintain an appropriate style and tone.
9-10.W.TTP.3 Write narrative fiction or literary nonfiction to convey experiences and/or events using effective techniques, well-chosen details, and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation, establishing point of view, and introducing a narrator/speaker and/or characters. b. Sequence events so that they build on one another to create a coherent whole.

US History

US.48 Explain the reasons for American entry into World War II, including the attack on Pearl Harbor. G, H, P

US.49 Identify the roles and the significant actions of the following individuals in World War II: H, P · Winston Churchill · Dwight Eisenhower · Adolph Hitler · Douglas MacArthur · George C. Marshall · Benito Mussolini · Franklin D. Roosevelt · Joseph Stalin · Hideki Tojo · Harry Truman

US.52 Examine and explain the entry of large numbers of women into the workforce and armed forces during World War II and the subsequent impact on American society. C, E, H

US.53 Examine the impact of World War II on economic and social conditions for African Americans, including the Fair Employment Practices Committee and the eventual integration of the armed forces by President Harry Truman. (T.C.A. § 49-6-1006) C, E, H, P, TCA

US.55 Describe the war's impact on the home front, including: rationing, bond drives, propaganda, movement to cities and industrial centers, the Bracero program, conversion of factories for wartime production, and the location of prisoner of war camps in Tennessee. C, E, G, H, P, T

US.56 Describe the Manhattan Project, and explain the rationale for using the atomic bomb to end the war. H, P, T

US.64 Explain the fears of Americans surrounding nuclear holocaust and debates over stockpiling and the use of nuclear weapons, including: · Atomic testing C, H, P · Civil defense · Fallout shelters · Impact of Sputnik · Mutual assured destruction