# MANUFACTURING VICTORY

## ELECTRONIC FIELD TRIP

THE NATIONAL WWII MUSEUM
NEW ORLEANS

# ACKNOWLEDGMENTS

## **MANUFACTURING VICTORY** Electronic Field Trip Classroom Guide


**WWII Education**

Chrissy Gregg

Isabel Mann

Melissa Tran (Program Lead)

Rob Wallace

LaToya Williams

**Marketing & Communications**

Alex Dodson

Jourdon Ferdinand

Kenn Perkins

Kelsey Scott

Meg Spilker



## ABOUT THIS GUIDE

The National WWII Museum has compiled this classroom guide to accompany the Manufacturing Victory Electronic Field Trip, presented by the **Union Pacific Foundation**, the **Dale E. and Janice Davis Johnston Family Foundation**, **DOW Chemical**, and **Stephens Inc.**

https://www.nationalww2museum.org/manufacturing-victory

THE NATIONAL WWII MUSEUM
NEW ORLEANS

# TABLE OF CONTENTS

**MANUFACTURING VICTORY** Electronic Field Trip Classroom Guide

## INTRODUCTION

The National WWII Museum offers many resources to help teachers bring to life the story of the American Home Front for their students. Within this classroom guide, you will find a collection of lesson plans, activities, essays, and primary sources drawn from the Museum's wide range of curricular materials. From women's contributions to the war effort to the engineering skills behind building ships, this guide will help build on the lessons and stories students learn during the Manufacturing Victory Electronic Field Trip.

## ACTIVITIES & LESSON PLANS


**MANUFACTURING VICTORY** Electronic Field Trip Classroom Guide

# Who's Who in WWII Production?

In order for America to wage a total war during WWII, it took an army of individuals on the Home Front to switch over factories from producing consumer goods to making war equipment for the US military. Below are a few of the men in American Industry who helped the country to achieve this goal.

**Extension Activity:** Assign each student one of the U.S. industrial men profiled on the fact sheet. Have the students conduct additional research on their individual and develop a Facebook profile page for this person. Their profiles should include the name and picture of the person, their birthday, their current job and work skills, interests (sports, books, quotes) and friends from the WWII era whom they knew and worked with, including some of the other men on the fact sheet.

U.S. Army

## William Knudsen, CEO of General Motors:

William Knudsen (1879-1948) came to the US as a poor immigrant from Denmark. He worked his way up the economic ladder by starting as a dockworker, and eventually became an assistant to Henry Ford, the automobile manufacturer. During his work at Ford, Chevrolet, and then as CEO of General Motors (GM) from 1937-1940, Knudsen revolutionized mass production by building more flexible and efficient production plants. In 1940, President Roosevelt selected Knudsen to lead the nation's National Defense Advisory Council to prepare for war, and he became the first "Dollar-a Year-Man" by leaving his $300,000 a year job at GM to volunteer to direct the government industrial production effort. Knudsen made the Arsenal of Democracy possible as US Director of Production by simplifying government contracting and repayment procedures, making it easier for corporations to produce for the war effort.

Bentley Historical Library, University of Michigan

## Albert Kahn, Industrial Architect:

Albert Kahn (1869-1942) immigrated to the US from Germany and became one of the most famous industrial architects in the world. While building factories in Detroit, MI for the Packard and Ford Motor Companies, he pioneered the use of reinforced concrete in construction. He also believed in creating a healthier environment for workers by incorporating large windows into his designs for light and air flow. He was best known for designing Ford's Highland Park plant, which mastered assembly line production; the Detroit Arsenal Tank Plant (DATP) which was the first plant ever built to mass produce tanks; and Ford's massive Willow Run Bomber Plant to make B-24 bombers. Willow Run was the largest factory ever built at the time, with an assembly line that was over a mile long under one roof.

U.S. Navy

## Henry Kaiser, Builder and Philanthropist:

Before WWII, Henry Kaiser (1882-1967) was known for constructing the Hoover Dam. During the war, Kaiser became famous for building Liberty Ships, which were needed to ship war supplies and troops around the world. Although he and his company had never produced ships before the war, Kaiser was determined to produce as many ships as the country needed by building vast shipyards in San Francisco which ran year-round, 24 hrs a day, with three eight-hour work shifts each day. Kaiser also sped up production by introducing creative, time-saving subassembly techniques, like welding sheets of metal together instead of riveting. In this way, Kaiser's factories were able to break production records, achieving the amazing feat of building and launching the Liberty Ship SS Robert E. Peary in just 4 days and 15 hours. A noted philanthropist, Kaiser also set up Kaiser Permanente first aid centers to provide health care for workers and was the National Chair for the United Clothing Collection for International War Relief.

Library of Congress

## Edsel Ford, President of Ford Motor Company:

Edsel Ford (1893-1943) was the son of famous automobile producer Henry Ford. As President of Ford Motor Company from 1919-1943, he often clashed with his father about mobilizing the company to prepare for war against Germany, since Henry was a strict isolationist. After Henry vetoed the construction of Merlin-Packard engines for the government in 1940, Edsel created his own plan to support the war effort. In 1941, he asked Albert Kahn to design and build the Willow Run plant to build B-24 Liberator Bombers, converting Ford Motor Company from car to airplane production. Although Edsel died of stomach cancer before its completion, the Willow Run plant became the largest plant in the country, breaking production records by eventually producing 350 Liberators a month, and building almost half of the 18,000 B-24s made during the entire war.

LeTourneau University

## R.G. Le Tourneau, Inventor and Founder of Le Tourneau Technologies:

R. G. Le Tourneau (1888-1969) was born in Vermont in 1888 and left school at an early age. An inventing genius, Le Tourneau founded his own company, Le Tourneau Technologies in 1929, and the company soon became the largest manufacturer of heavy earthmoving equipment and supplies in the world. During his lifetime, Le Tourneau secured nearly 300 engineering patents for his inventions, receiving 78 patents in WWII alone. He is credited with introducing heavy duty rubber tires to the earthmoving industry, as well as designing bulldozers, portable cranes, bridge spans and offshore oil drilling platforms. Le Tourneau and his company supplied 70% of all the heavy earthmoving equipment used by the Allies during WWII.

University of Cincinnati

## Fred Geier, President of Cincinnati Milling Machine Company and Machine Tool Builders Association:

Fred Geier (1983-1981) was the son of German immigrants. Born in America, Geier was a well educated and quiet man who was at the forefront of America's preparation for war. During his pre-war travels to Germany in the 1930s as president of the Cincinnati Milling Machine Company, Geier witnessed Germany's industrial mobilization for war. In 1938, he began expand his company's production capacity and Geier was one of the first industrialists that Knudsen recruited to increase America's wartime production. In 1941 alone, Geier's work helped to nearly double US machine tool production overall, and his company produced a new machine tool every 17 minutes during the war.

From the Collection of The National WWII Museum

## Andrew Higgins, Businessman and Shipbuilder:

Andrew Jackson Higgins (1886-1952) was the founder of Higgins Industries, a small shipbuilding company based in New Orleans. Before WWII, Higgins designed and produced a variety of amphibious crafts for oil and gas exploration in Louisiana. Since amphibious boats were capable of delivering both people and equipment from the water to land without the use of a harbor, Higgins was awarded large government contracts to produce his "Higgins Boats" for use in every theater of fighting during the war. His craft included amphibious LCTs, LCPLs, and the famous LCVP which was used during the D-Day landings at Normandy to land troops and equipment on to the beaches. Higgins Industries produced more than 20,000 Higgins Boats, along with PT and other supply boats during the war during the war. The company was the first plant in New Orleans to fully integrate, paying men and women, regardless of race, age or disability, equal wages for the same type of work. The wartime legacy of Andrew Higgins and Higgins Industries, and the work of historian Stephen Ambrose is the reason why The National WWII Museum is located in New Orleans today.

# "Out-Producing the Enemy" American Production During WWII

## LESSON PLAN

### INTRODUCTION:

Before the Japanese bombed Pearl Harbor and the United States entered WWII in December 1941, the American economy was still weak from The Great Depression. In 1939, the U.S. unemployment rate was high at 17.2% and America's military was small, ranking 18th largest in the world after the nation of Romania.

A year before America's entry into the war in 1940, Adolf Hitler, the Nazi leader of Germany, predicted that American war supplies would not be enough to help the Allies win the war. Hitler said that "an American intervention by mass deliveries of planes and war materials will not change the outcome of the war." However, U.S. president Franklin Delano Roosevelt was determined to prove Hitler and the Axis Powers wrong. Roosevelt told the American people that they must all work together to win the war because "powerful enemies must be out-fought and out-produced."

In this lesson, discover how the United States was able to out-produce all other countries during World War II and create a "production miracle." Students will analyze and graph historical statistics, and use primary sources like photographs, quotes, and propaganda posters to explain how U.S. production helped the Allies to win the war.

### OBJECTIVES:

**Student will be able to:**

Identify and analyze primary and secondary sources including quotes, photographs, and propaganda posters to learn about the American Home Front experience during WWII.

Define the term "production miracle" and explain why this term is used to describe American economic production during WWII.

Discuss the historical factors that contributed to the US wartime "production miracle." Use WWII production statistics to calculate and graph the rate of US production from 1941-1945 and compare/contrast this with aircraft production by Great Britain, Germany, and Japan during the same time period.

### GRADE LEVEL:

6-8

### STANDARDS:

**Common Core ELA Standards for Writing & Literacy in History/Social Studies (6-8)**

CCSS.ELA-Literacy.W.7.9: Draw evidence from literary or informational texts to support analysis, reflection, and research.

**CCSS.ELA-Literacy.RH.6-8.1:** Cite specific textual evidence to support analysis of primary and secondary sources.

**CCSS.ELA-Literacy.RH.6-8.7:** Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

### Common Core Mathematics Standards for Content, Ratios & Proportional Relationships (6-8)

**CCSS.MATH.CONTENT.7.RP.A.2A:** Recognize and represent proportional relationships between quantities.

### National Center for History in the Schools

**Historical Thinking Standard 2:** the student comprehends a variety of historical sources by using visual and mathematical data and literary sources.

**Historical Thinking Standard 3:** the student engages in historical analysis and interpretation.

## TIME REQUIREMENT:

90 minutes

## MATERIALS:

**Out-Producing the Enemy:** Student Primary Source Analysis worksheet

**Out-Producing the Enemy:** How Much Did the U.S. Produce During the War? Math worksheet

## KEY TERMS:

**Allied Powers:** the countries that were fighting against the Axis Powers during WWII. Included the United States, Great Britain, and Soviet Russia after the Germans invaded Russia in June 1941.

**Assembly Line:** an arrangement of workers, machines, and equipment in which the product being made passes from work station to work station until completed. Also called a production line.

**Axis Powers:** the countries that were fighting against the Allied Powers during WWII. Included Nazi Germany, Italy, and Japan.

**Civilians:** the men, women and children of a country who are not fighting in the military during a war. Great Depression: a long period of worldwide economic collapse after the U.S. Stock Market Crash in 1929 in which many people were out of work and many banks and businesses failed. This period lasted in the U.S. until the country entered WWII and began producing goods for the war effort.

**Home Front:** the name given to the homeland or civilian area of a country that is at war and whose military is fighting away from home.

**Primary Source:** an original or first-hand document, story, or object that was created by someone during the time period under study.

**Production Miracle:** the term given to America's enormous rate of economic production during WWII.

**Rationing:** the government's program to provide enough food and materials to fight the war by equally dividing up limited resources of food, gas, and other materials among all Americans using a coupon and point system. Secondary source: an account, object, or interpretation of an event which was created by someone without first-hand experience of the time period under study.

**Total War:** an unrestricted type of war in which both the military and civilians at home are expected to contribute to the war effort and run the risk of being attacked by the enemy.

## DIRECTIONS:

## PART ONE:

1.) Brainstorm/problem-solving activity: As the students enter the room, explain that they will be learning about U.S. participation and production in WWII today. To begin, divide them into pairs and ask them to imagine that they are meeting with U.S. President Franklin Roosevelt and his advisors in the early 1940s to discuss U.S. preparations for war. To prepare for this meeting, student groups will need to answer the question, "What types of things do you need to win a war?" They have three minutes to think about, list and discuss all of the things (people, materials) that are needed to win a war and to write these in their notebooks. (3 min.)

2.) Reconvene as a class to review and discuss group responses and list answers on the board. Ask students to explain how/why their answer is needed to win a war. Examples can include men to fight in the military, guns to be used in battles, metal to make weapons, women to work in the factories while the men are off fighting, factories to produce weapons and other materials,etc. (7 min.)

3.) Explain that before the US entered WWII in 1941, it was not clear that the country would be able to produce enough of the goods necessary to fight the war in the large quantities that were needed. America was still in the Great Depression, with high unemployment and in 1939, the US military was also 18th largest in the world after the country of Romania. The US had approximately 630,000 soldiers compared with Germany and Japan, who had over 4 million soldiers each. Share the Hitler quote and ask, "What does this tell you about what the enemies of the US thought about America's production power and importance in the war? (10 min.)

4.) "...An American intervention by mass deliveries of planes and war materials will not change the outcome of the war." —Adolf Hitler, leader of Nazi Germany, 1940.

a. Follow up this quote by sharing the Roosevelt quote: "Powerful enemies must be out-fought and out-produced." —Franklin Delano Roosevelt, President of the United States, 1941-2

a. Tell students that they are going to figure out how the United States was able to out-produce its enemies by exploring historical clues made during WWII or primary sources. Review the terms primary and secondary sources. After this primary source investigation, they will use math to figure out how much more the US was able to produce than its enemies or Allies during the war.

5.) Hand out the primary source sheet. Explain that students will have 25-30 minutes to study each source closely and explain what important information that it tells them about US production during WWII by completing the primary source analysis chart. (25 min.)

a. Note: It is up to the teacher to decide if they want students to complete the source analysis activity as a group or individually. Alternatively, sources can be divided up and assigned to different students or groups to shorten the length of time needed for this activity.

6.) Reconvene the class after the primary source analysis activity and take volunteers to describe each source and explain what the source tells them about life on the American home front. Ask the students at the end of each report out: "What information does this source tell me about U.S. production during WWII?" Their classmates can also take notes in their notebooks or on their worksheets as the teacher records responses on the board. (10 min.)

## PART TWO:

1.) Next, explain to the class that they will be doing a math activity using production statistics from WWII to learn what types of things that the US produced for the war effort and how much of each item they made between 1941 and 1945. Introduce the term, "production miracle" and tell the students that this is a name that is often given to America's enormous amount of production during the war. Ask the students to think about and share definitions of what that term might mean and tell them that the class will revisit this term after they complete the math and line graph activity sheet.

2.) Handout worksheet, colored pencils, and calculators. Note: The recommended time amount for this activity is 25-30 min. If there is not enough time in class for students to begin or complete the worksheet, the math activity can also be assigned for home work.

3.) Conclude the class by asking them to reflect on and share their answers to these two questions: **How did the U.S. perform a production miracle? In your opinion, what were some of the most important factors that contributed to the high rate of U.S. production?** (10-15 min.)

## TAKE HOME ACTIVITY:

Now that the students have had an opportunity to learn more about American production and life on the Home Front during WWII, they must create a motivational WWII propaganda or recruitment poster based on what they have learned today. Each poster must have a strong message and image that recruits or otherwise encourages Americans to increase wartime production to win the war. They can look for inspiration and learn more about WWII propaganda techniques by visiting the classroom resources area of The National WWII Museum's We Can...We Will...We Must! Allied Propaganda Posters of WWII website.

## ASSESSMENT:

Components for assessment include the **Out-Producing the Enemy: Student Primary Source Analysis worksheet, the Out-Producing the Enemy: How Much Did the U.S. Produce During the War?** Math worksheet,classroom discussion, and take home art reflection activity.

## ENRICHMENT:

Teachers can deepen student knowledge of U.S. Home Front production by pairing this lesson with the "Who's Who in WWII Production" fact sheet and industrialist Facebook profile activity and the "Manufacturing Victory Matching Activity: Who Produced What for the War?, Additional primary sources like oral histories with factory workers and government propaganda films can be found on the Manufacturing Victory exhibition website.

The "Out-Producing the Enemy" lesson can also be used in conjunction with the study of the changing roles and expectations of, as well as discrimination faced by women, African Americans and others during WWII, or to enhance a pre-existing WWII unit. To find additional information about these topics, visit The National WWII Museum's Focus On and Fact Sheets pages. Students can also explore and listen to oral histories of women and African Americans on The Digital Collections of The National WWII Museum.

What was life like for students on the Home Front during WWII? How did they contribute to the war? Find out how and apply this Home Front spirit to today by signing up your class for Get in the Scrap! Inspired by the scrapping efforts of students during World War II, Get in the Scrap! is a national service learning project for students all about recycling and energy conservation. Your students have the power to affect positive change on the environment, much like students 70 years ago played a positive role on the Home Front in securing victory in World War II.

Students can also explore this topic by investigating the Museum's See You Next Year:" High School Yearbooks From WWII website and The Classroom Victory Garden Project website.

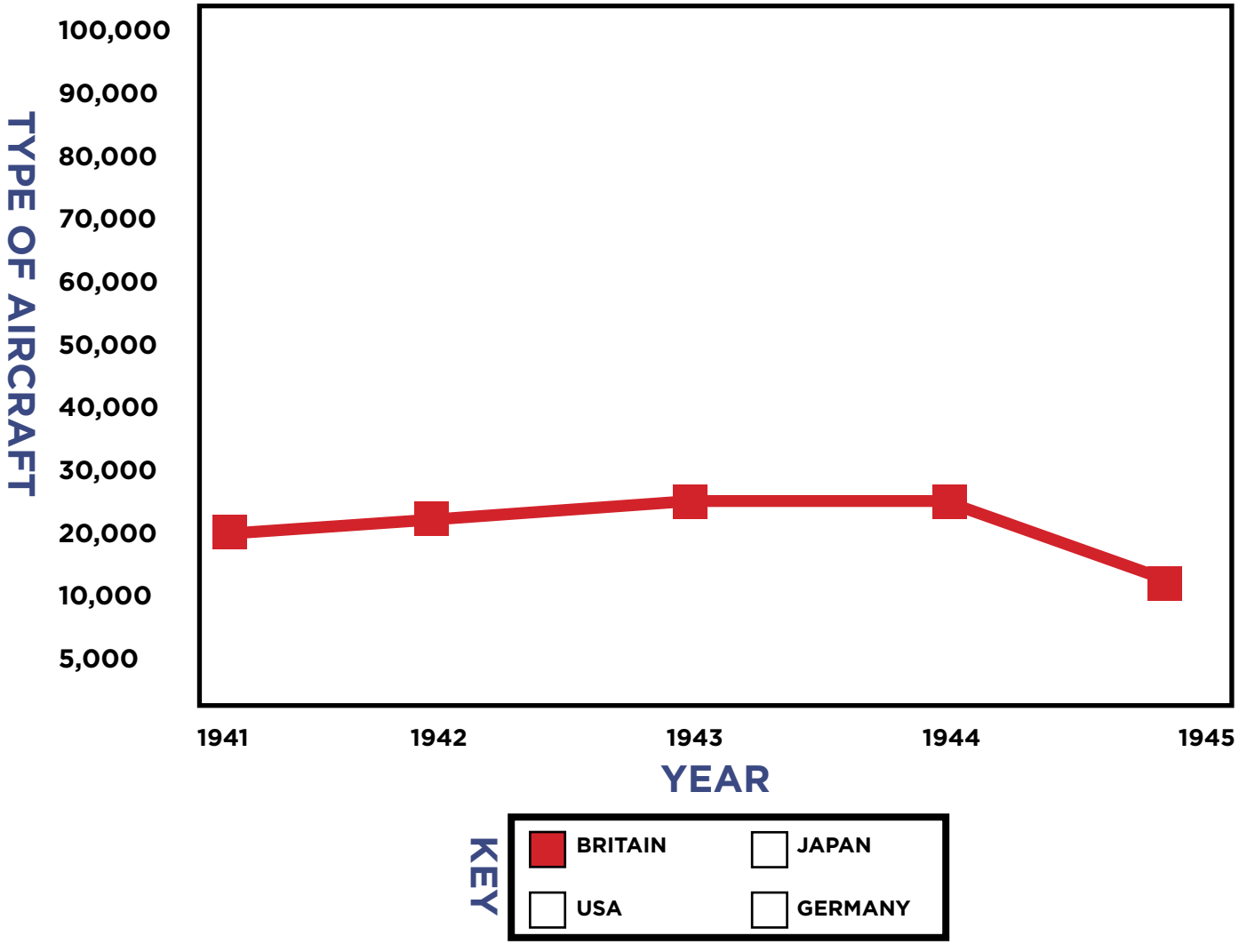
# STUDENT HANDOUT

## PART ONE: WWII Aircraft Production by Country

**DIRECTIONS:** The U.S. produced an incredible amount of weapons during the war. How much was it producing compared to other countries like its ally Great Britain, and its enemies, Germany and Japan? To find out, use the aircraft production table below, and plot the production levels of each country to complete the line graph. Great Britain has already been graphed for you. When you are finished graphing, answer the following questions about the graph.

### Amount of WWII Aircraft Production By Country, 1941-1945 (all types)

| Country/ Year | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|
| **United States** | 19,433 | 47,836 | 85,898 | 96,318 | 46,001 |
| **Great Britain** | 20,094 | 23,672 | 26,263 | 26,461 | 12,070 |
| **Germany** | 12,401 | 15,409 | 24,807 | 40,593 | 7,540 |
| **Japan** | 5,088 | 8,861 | 16,693 | 28,180 | 8,263 |



# STUDENT HANDOUT

**DIRECTIONS:** Use your completed line graph to answer the following questions

1. What year did U.S. aircraft production surpass: Great Britain?

Germany?

Japan?

2. Using your prior knowledge of WWII history, give 2-3 reasons why you think U.S. aircraft production rapidly increased while the other three countries started to slow down during the war.

## PART TWO: Total U.S. Military Production in WWII (1941-1945)

**DIRECTIONS:** From its entry into the war in 1941 until 1945 when WWII ended, the United States was able to out produce both its allies and its Axis enemies. How much did the U.S. actually produce during the war? Below is a table of the total amount of war supplies that the United States produced during the 45 months that it was at war during WWII (1941-1945). Calculate approximately how much of each item was produced by the U.S. each month during this 45 month time period to complete the table below.

### Total U.S. Wartime Military Production Table:

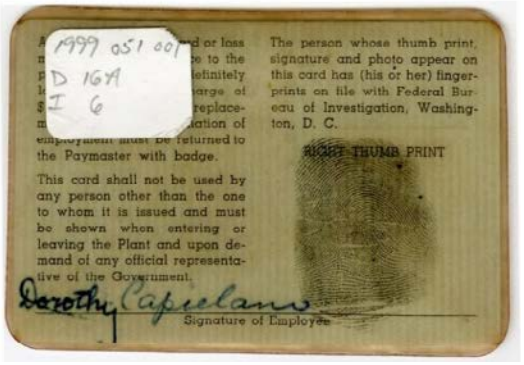
| Military Item | Total Number Produced during WWII | Approximate Number Made Per Month (Total Number Produced ÷ 45 months at war) |
|---|---|---|
| Aircraft Carriers | 107 | 2 per month |
| Tanks | 352 | |
| Airplanes | 300,000 | |
| Machine Guns | 2.6 million | |
| Bullets | 4.1 billion | |

# STUDENT SOURCE ANALYSIS WORKSHEET

**DIRECTIONS:** Below are historical sources that provide you with clues about why the US was able to produce massive amounts of war supplies during WWII. Study each source carefully. Using your prior knowledge of US history and powers of observation, explain why your source is important and what it tells you about American production on the Home Front during WWII.

| Primary Source | Describe the Source: | Who was this source made for or used by? How can you tell? | What information does this source tell me about US production during WWII? |
|---|---|---|---|
|  "United We Win" poster. War Manpower Commission, Washington, D.C.,1943. The National WWII Museum, 2013.077.113 | | | |

# STUDENT SOURCE ANALYSIS WORKSHEET

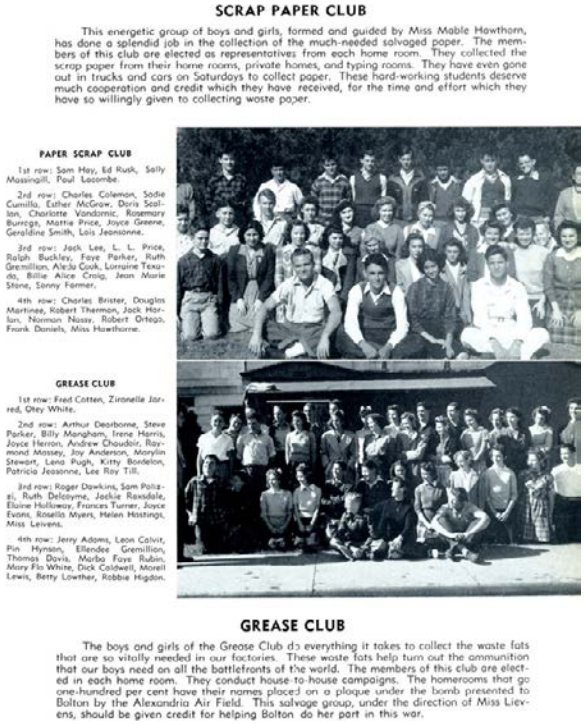
| Primary Source | Describe the Source: | Who was this source made for or used by? How can you tell? | What information does this source tell me about US production during WWII? |
|---|---|---|---|
|  <br>  <br>Dorothy Capielano, Higgins Aircraft Plant Identification Badge, 1943. Gift of Gerald Lanoix.<br>The National WWII Museum, 1999.051 | | | |

# STUDENT SOURCE ANALYSIS WORKSHEET

| Primary Source | Describe the Source: | Who was this source made for or used by? How can you tell? | What information does this source tell me about US production during WWII? |
|---|---|---|---|
| "[Working at the shipyard in Mobile, Alabama] was seven days a week. And during the war when [production] was so strong, it was twelve-hour days, five days a week, ten hours on Saturday, [and with only] eight hours on Sunday, you felt like you had a week off."<br><br>—Clyde Odom, foreman at Alabama Dry Dock Ship and Building Company.<br>Quote from The War, September 2007. | | | |
|  <br>Chrysler Corporation's Detroit Arsenal Tank Plant, 1940s.<br>Courtesy of the National Automotive History Collection, Detroit Public Library. | | | |

# STUDENT SOURCE ANALYSIS WORKSHEET

| Primary Source | Describe the Source: | Who was this source made for or used by? How can you tell? | What information does this source tell me about US production during WWII? |
|---|---|---|---|



SCRAP PAPER CLUB

This energetic group of boys and girls, formed and guided by Miss Mable Hawthorn, has done a splendid job in the collection of the much-needed salvaged paper. The members of this club are elected as representatives from each home room. They collected the scrap paper from their home rooms, private homes, and typing rooms. They have even gone out in trucks and cars on Saturdays to collect paper. These hard-working students deserve much cooperation and credit which they have received, for the time and effort which they have so willingly given to collecting waste paper.

PAPER SCRAP CLUB

1st row: Sam Hay, Ed Rusk, Sally Massingill, Paul Lacombe.

2nd row: Charles Coleman, Sadie Cumilla, Esther McGraw, Doris Scallan, Charlotte Vandamic, Rosemary Burrage, Mattie Price, Joyce Greene, Geraldine Smith, Lois Jeansonne.

3rd row: Jack Lee, L. L. Price, Ralph Buckley, Faye Parker, Ruth Gremillion, Alecia Cook, Lorraine Texada, Billie Alice Craig, Jean Marie Stone, Sonny Farmer.

4th row: Charles Brister, Douglas Martinez, Robert Thermon, Jack Harlan, Norman Nassy, Robert Ortego, Frank Daniels, Miss Hawthorne.

GREASE CLUB

1st row: Fred Cotten, Zironelle Jarred, Otey White.

2nd row: Arthur Dearborne, Steve Parker, Billy Mangham, Irene Harris, Joyce Herron, Andrew Choudoir, Raymond Massey, Joy Anderson, Marylin Stewart, Lena Pugh, Kitty Bordelon, Patricia Jeasonne, Lee Roy Till.

3rd row: Roger Dawkins, Sam Polizzi, Ruth Delcayme, Jackie Rossdale, Elaine Holloway, Frances Turner, Joyce Evans, Rosella Myers, Helen Hastings, Miss Leivens.

4th row: Jerry Adams, Leon Calvit, Pin Hynson, Ellendee Gremillion, Thomas Davis, Marba Faye Rubin, Mary Flo White, Dick Caldwell, Morell Lewis, Betty Lowther, Robbie Higdon.

GREASE CLUB

The boys and girls of the Grease Club do everything it takes to collect the waste fats that are so vitally needed in our factories. These waste fats help turn out the ammunition that our boys need on all the battlefronts of the world. The members of this club are elected in each home room. They conduct house-to-house campaigns. The homerooms that go one-hundred per cent have their names placed on a plaque under the bomb presented to Bolton by the Alexandria Air Field. This salvage group, under the direction of Miss Lievens, should be given credit for helping Bolton do her part in this war.

Page from Bolton High School's *The Bruin* yearbook showing the Scrap Paper and Grease student clubs. Alexandria, LA: 1944.
The National WWII Museum.

**THINK:** Based on what you have learned, why do you think that people call the rate of U.S. WWII production a "production miracle?"

# Who Produced What for the War?

## MATCHING ACTIVITY

**DIRECTIONS:** During WWII, many well-known companies had to stop producing their regular consumer goods like cars or toys, to start producing war supplies for the US military. Match the companies below with one of the items that they made for the war effort.

1.) Ford Motor Company Before War: Manufactured Vehicles

2.) Mars Candy Company

3.) Brown and Root Construction Company Before War: Built Roads and Dams

4.) Motorola (Galvin Manufacturing Company)

5.) Chrysler Corporation Before War: Manufactured Vehicles

**A.** Handie-Talkie Radio

**B.** War Ship

**C.** B-24 Bombers


**D.** M&M's (doesn't melt in hands)

**E.** Tanks

# Who Produced What for the War?

## MATCHING ACTIVITY

# ANSWER KEY

C. In 1941, Ford Motor Company made plans to build a mile-long, quarter-mile long plant in Michigan named Willow Run. This plant produced over 8,000 B-24 Liberator planes, nearly half of the more than 18,000 B-24s produced during WWII.

D. Mars Candy Company made and patented M & M candies for soldiers in 1941. M & M's were designed with a hard shell coating to prevent the chocolate from melting in extreme conditions like the Pacific, and were only sold to the US military during WWII.

B. Brown and Root Construction Company in Texas promised to build whatever was needed for the U.S. war effort. Before the war, Brown and Root had only built roads and dams. However, during the war, they began producing much-needed destroyer escort boats, even though they had never build any boats before the start of the war.

A. The Galvin Manufacturing Corporation, later Motorola, received contracts from the US government to make a light-weight, battery powered, two-way AM radio that could be used by soldiers in battle. This product was called the "Handie-Talkie" and Motorola went on to make things like the handheld cell phones we use today.

E. Since no cars were being produced for civilians during the war, car companies like Chrysler converted their factories to make other war items like tanks.

# THE HOME FRONT

(Image: National Archives and Records Administration, 196387.)

# WHAT IT TAKES TO WIN

## MAPPING PRIMARY SOURCE EVIDENCE

### INTRODUCTION

Even before the Japanese attack on Pearl Harbor in 1941, American industries were already mobilizing to support the Allied war effort. Every region in the nation provided war-related products, sometimes retooling entire factories and retraining workers to produce what the Allies needed most. This lesson challenges students to analyze WWII-era newspaper articles to learn how various regions responded to the wartime demand for goods, and to visually represent that information on a resource map. The lesson also asks students to identify some of the challenges faced by companies, the government, and workers while maintaining such high levels of production.

### GRADE LEVEL

7–12

### TIME REQUIREMENT

1–2 class periods

### MATERIALS

+ Copies of the blank **United States Outline Map**

+ Copies of the **Student Worksheet**

+ Copies of the **Arsenal of Democracy Scrapbook**

+ Reference material to help students place the various points on their maps (atlases, maps, etc.)

### OBJECTIVES

Students will analyze primary sources to find examples of defense-related products being produced around the United States and will represent that information spatially on a map of their own creation. In addition, they will identify successful strategies and challenges relating to wartime production, citing textual evidence to support their claims.

### COMMON CORE STANDARDS

**CCSS.ELA-LITERACY.RH.6-8.1**
Cite specific textual evidence to support analysis of primary and secondary sources.

**CCSS.ELA-LITERACY.RH.9-10.1**
Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

**CCSS.ELA-LITERACY.RH.11-12.1**
Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.

### ONLINE ACTIVITY

You can find an online version of the **What It Takes To Win** lesson plan by using the QR code left. This online lesson walks students through background information on the US war effort and asks students to answer a central historical question through primary source analysis. Students will explore an interactive map, read and analyze newspaper articles from locations across the Home Front, and draw conclusions from these sources. At the end of the activity, students can download their responses to each question to submit to their teachers.

### ONLINE RESOURCES

ww2classroom.org

- Manufacturing Victory Video
- Rosemary Elfer Oral History
- Transporting the Arsenal of Democracy Map

## NATIONAL STANDARDS FOR HISTORY

**HISTORICAL CONTENT ERA 8, STANDARD 3B**
The student understands World War II and how the Allies prevailed.

**HISTORICAL CONTENT ERA 8, STANDARD 3C**
The student understands the effects of World War II at home.

**HISTORICAL THINKING STANDARD 4**
The student is able to support interpretations with historical evidence in order to construct closely reasoned arguments rather than facile opinions.

## PROCEDURES

1. Start out by asking students, "What do you think the Allies needed to win World War II?" Have students start by listing the "big" items like tanks, ships, bombs, weapons, jeeps, and people. Then, challenge the students to list the various materials and parts that go into each of the big items they listed—things like nuts, bolts, engines, rope, gunpowder, and even as specific as oil, food, iron ore, paper, and corn. Get as detailed as you like, depending on the time you have available, even getting down to the raw materials needed to manufacture the smallest items, like the steel needed to create nuts, bolts, and screws. You may choose to keep track of one list for the entire class on the board, or have students break into groups and make their own lists, or a combination of both.

2. Choose a couple of items from the list and ask students where they think those items were produced, and why they think so. You could also ask which items from the list students believe might have been produced locally. The object here is to get students to make educated guesses based on their existing knowledge of history and geography (i.e. ships would be made along the coasts; food products probably came from states with a long history of agricultural production).

3. Explain that students will now analyze primary sources to further explore American wartime production and represent their findings on a map. Divide the class into groups of 5-7 students. Each group will analyze the **Arsenal of Democracy Scrapbook**, complete the **Group Evidence Sheet**, and create a resource map to show their findings.

**NOTE: There are a total of 25 newspaper articles in the Arsenal of Democracy Scrapbook. In classes with younger students or lower-level readers, make the groups larger so that each student is responsible for fewer articles, or you may choose to only have each group be responsible for a portion of the Scrapbook.**

4. Make sure each group has a copy of the **Arsenal of Democracy Scrapbook**, a copy of the **United States Outline Map**, and copies of the **Student Worksheet** for each group member. Inform students whether you expect each group to analyze all of the articles in the Scrapbook or only a specific portion of them. You may choose for group members to either divide the articles up and analyze them individually, or you may have them analyze each article together.

5. Instruct students to begin analyzing the newspaper articles in the **Arsenal of Democracy Scrapbook**. For each article they analyze, students should complete a line in the table under Part I on the **Student Worksheet**. Their response for "Product Category" should be one of the seven categories listed in the instructions. Students should read these articles carefully, even the short ones, because:
    a) the name of the newspaper doesn't necessarily tell you the place the article is discussing, and
    b) some articles discuss multiple products or multiple locations.

6. Once the group has finished analyzing the **Arsenal of Democracy Scrapbook**, instruct students to begin filling out the **United States Outline Map**. For each line in Part I of the **Student Worksheet**, students should place a point in the appropriate spot on the map with a symbol to indicate what category of product was produced there. Students may come up with their own symbols and/or color-code the points by category. Instruct them to include a key or legend on their map.

7. After students have completed their maps, instruct them to answer the questions in Part II of the **Student Worksheet**, which will help them draw conclusions about the diversity of industrial production during World War II, as well as some of the challenges involved in such an immense nationwide undertaking.

8. Return to the whole class and ask students to share some of their answers to the questions in Part II of the **Student Worksheet**. Return to the list of defense-related needs the class created at the very beginning of the activity and encourage students to identify where some of the items were produced based on their findings. This would also be a good opportunity to show what kinds of defense-related goods were produced locally.

## ASSESSMENT

You will be able to assess students' ability to analyze primary sources based on how accurately they identify the products and locations given in the articles they analyze, as noted on the **Student Worksheet**. You will be able to assess their ability to discern less concrete ideas in primary sources by what they write in the "Challenges or Strategies" column in the table in Part I of the **Student Worksheet**, and how well they articulate these observations during discussion. Finally, you will be able to assess students' ability to represent information on a map based on their completed **United States Outline Map**.

## EXTENSION/ENRICHMENT

1. Have students create a similar resource map specifically for their state, using newspaper articles, yearbook advertisements, city directories, contemporary magazines, or other primary sources to find out where in the state various products were produced during World War II.

2. Have students conduct research on one particular local business or industry that operated during World War II and report on it to the class, explaining how that business either contributed directly to wartime production needs or helped supply the Home Front. Consider creating a map of the community, county, or region showing the locations of these businesses and the products they produced.

NAME: DATE:

## PART I: PRIMARY SOURCE ANALYSIS

**Directions:** Each newspaper clipping in the **Arsenal of Democracy Scrapbook** mentions one or more war-related items being produced someplace in the United States during World War II. Use the table below to list each product, where it was produced, and what category it falls under. Also, for each article, try to identify either a challenge the industries being discussed were facing at the time, or a strategy they were using to meet the wartime demand for goods. Once your group has finished analyzing all of the newspaper clippings, use the **United States Outline Map** to show where the various war-related goods were produced around the country.

**Product Categories:**
AVIATION | EQUIPMENT | FOOD | GROUND VEHICLES | RAW MATERIALS | SHIPS | WEAPONS

| PRODUCT | WHERE WAS IT PRODUCED | PRODUCT CATEGORY | CHALLENGES OR STRATEGIES |
|---|---|---|---|
| *Phosphates* | *Florida* | *Raw Materials* | *Companies provided housing to attract nonlocal workers.* |
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## PART II: DRAWING CONCLUSIONS

**Directions:** Answer the following questions as a group, citing specific examples from the newspaper clippings you and your fellow group members have analyzed. Use additional sheets if necessary.

1. Identify some of the common challenges faced by businesses working to produce enough of the right kinds of goods to support the war effort.

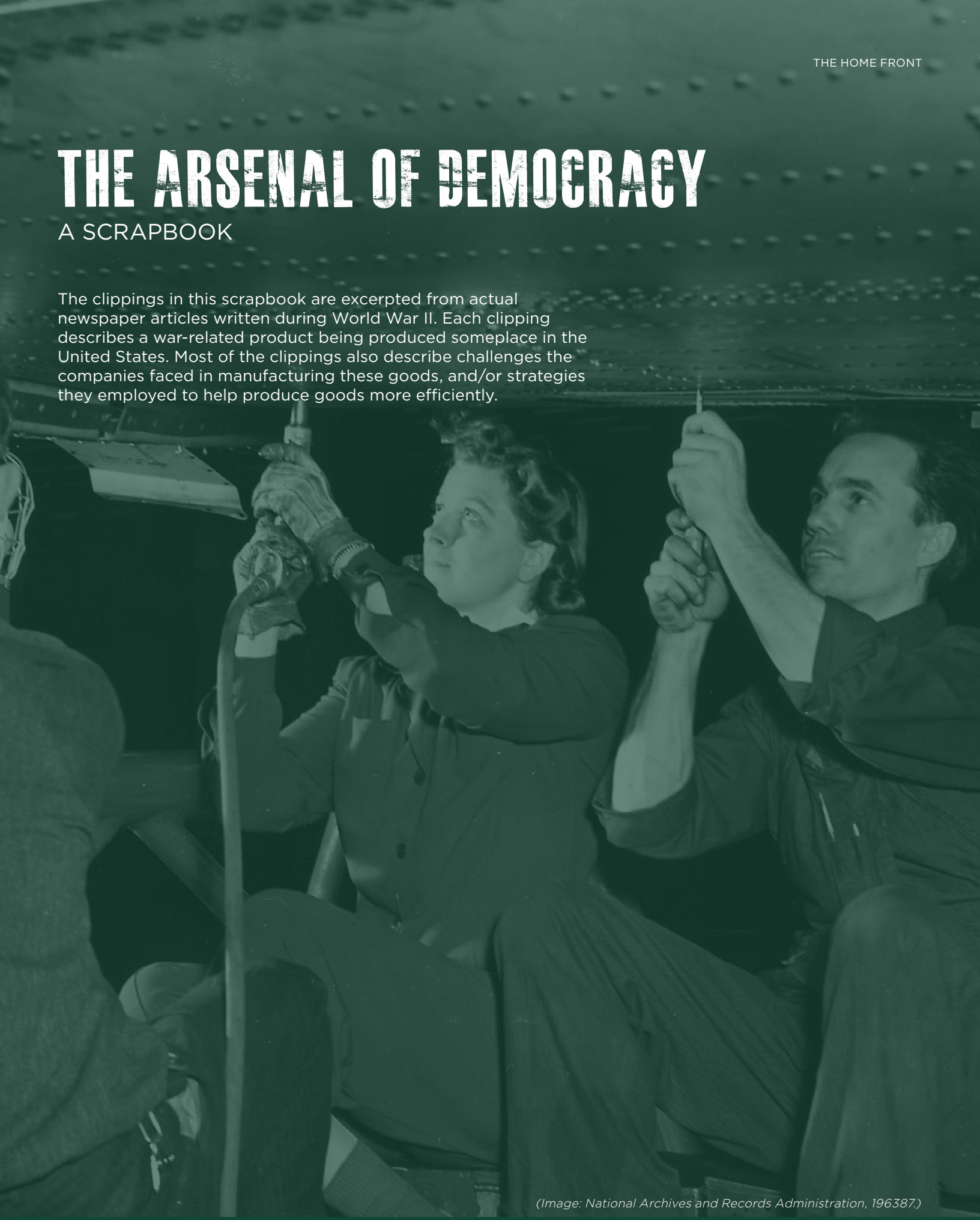
2. Using the map your group has created, describe any patterns you see. Do geographic features affect the kinds of goods a region produces? If so, how?

3. Based on the evidence in the newspaper clippings, how would you describe the relationship between the government and private businesses during World War II? Cite examples to support your reasoning.

# THE ARSENAL OF DEMOCRACY

## A SCRAPBOOK

The clippings in this scrapbook are excerpted from actual newspaper articles written during World War II. Each clipping describes a war-related product being produced someplace in the United States. Most of the clippings also describe challenges the companies faced in manufacturing these goods, and/or strategies they employed to help produce goods more efficiently.



*(Image: National Archives and Records Administration, 196387.)*

## Aluminum Said To Be Above Demand

***The Tennessean* – June 14, 1941**

ALCOA, Tenn., June 13—Correspondents surveying the nation's major defense centers today toured the gigantic plant here of the Aluminum Company of America and found it ahead of demand with about 30 days reserve stock piled up awaiting shipment.

This condition may not continue, however, unless there are rains on the watershed of the Little Tennessee River, which generates about half of the enormous amount of electric power needed for production of the light metal which today rivals steel as the basic material of war. Tenessee Valley Authority supplies the balance.

## Radio Fuse Weapon Kept Secret at State War Plant

***Indianapolis Star*—September 22, 1945**

Bloomington, Ind., Sept. 21—Real identity of RCA-Victor Corporation's mysterious "Madame X," a proximity fuse which explodes electronically when it reaches the vicinity of a target and turns near misses into "bulls eyes," came as a complete surprise to employees of the firm's Bloomington plant, where the secret war weapon had been manufactured for three years.

Not more than 20 of the 2,000 employees knew of the fuse, which has been ranked as second only to the atomic bomb as a scientific war achievement by Assistant Secretary of the Navy H. Struve Hensel.

## Tribute Paid To Higgins for Landing Boat

**March 6, 1943**

***Shreveport Times***

Washington, DC, March 5—Tribute to Andrew Jackson Higgins, New Orleans boatbuilder, is contained in the Congressional Record published today.

Representative Joseph O'Brien (R.-N.Y.) placed in the record an editorial describing the adventures of Warrant machinist James D. Fox and Chief Boatswain's Mate Hunter A. Wood, who have been with the American forces at Guadalcanal.

"The one man in the South I want especially to see is Andrew Jackson Higgins," Fox was quoted as saying. "I want to tell him, face to face, that Higgins's landing boats such as we had at Guadalcanal are the best in the world. They do everything but talk; honest, they do."

## Arkansas Receives Defense Contract

***Northwest Arkansas Times***
**February 27, 1941**

Helena, Ark., Feb. 27—Helena residents today hailed the first major defense contract to be awarded an Arkansas firm—and agreement by the Metals Reserve Corporation, FRC subsidiary, to take 100,000 tons of grade A manganese ore for defense use from the Manganese Cooperative Producers association company of Helena, at a price of $4,611,000.

The plan calls for construction of a plant on five acres at Helena where the company would process ore to be hauled from the Independence County fields around Batesville. [Senator] Ezekiel Candler "Took" Gathings said the Missouri and Arkansas and Missouri Pacific Railroads, and truck lines, would be utilized in the hauling, and that the plant would have a weekly payroll of $2,100 exclusive of salaries of executives, salesmen, and office employees. The government contract calls for delivery of the manganese before December 31, 1944.

Chalco is projecting a net loss might not

## Rubber Plant for Houston Area

***Denton Record-Chronicle***
**June 4, 1942**

HOUSTON, Texas, June 4—The Humble Oil & Refining Company announced here that two plants, one to make synthetic rubber and the other to supply a basic ingredient, would be built in the Houston area at a total investment of about $43,000,000.

The government will build the plants at a cost of $18,000,000 each and lease them to Humble for operation. A portion of the total investment will be made by Humble in its new refinery for the production of raw materials used in manufacturing butyl rubber, the announcement stated.

The exact location of the plant was termed restricted military information.

## Called "Maneuver"

**May 30, 1941**

***The Danville Bee***

LOS ANGELES, California, May 30—Anti-aircraft guns and army pursuit planes were stationed at Southern California aviation plants today. Col. Ira C. Eaker described the action as a tactical maneuver. Headquarters were established in the Army Air Corps hangar at Los Angeles Municipal Airport, near the North American Aviation aircraft plant. Detachments of soldiers manned anti-aircraft guns at the Consolidated Aircraft Corp. plant in San Diego, the Douglas Aircraft Company's Santa Monica and El Segundo plants, the Lockheed Aircraft Corporation's Burbank factory, and the Vultee Aircraft plant in Downey.

# Volunteers Save Sugar Beets of Sheridan Region

**July 23, 1942**

***Wyoming Eagle***

Sheridan, Wyoming, June 22–(U.P.)–A thousand acres of the vital sugar beet crop of the Sheridan area has been saved for the war effort through the energy of volunteer workers.

G.W. Hardy, Chairman of the Sheridan County labor subcommittee for the agriculture war board, says that from the first call for volunteers up through the weekend more than 450 persons have registered to work in the beet fields. The volunteers include high school boys and girls, men and women from local business firms and practically every miner from the Sheridan area coal mines.

Hardy says the work of thinning the bets probably will be finished early next week and he declared the amount of sugar saved by the volunteers will fill at least 36,000 sacks.

## US Will Ask For Bigger Crops in Colorado

***Denver Post* – October 12, 1941**

Believing that food will win the war and write the peace, county supervisors of the Agricultural Adjustment Administration will visit farmers in Colorado in the near future and discuss with them increased farm production for 1942.

The national plan envisions the United States supplying food for more than 10 million persons in Great Britain, for an increased demand in this country, and a sufficient surplus for export to countries throughout the world needing food. The plan calls for a great increase in dairy products and substantial increases in supplies of eggs, pork, beef, lamb and mutton, for the abolition of limitations on sugar beet acreage and for larger truck crops.

## Farms Score Food Victory

***Omaha World-Herald* – January 1, 1944**

Nebraska's 120,000 farmers and ranchers can present the following year's end report to their fellow citizens:

If 1944 turns out as well as the year just past, we can say again at its end that Nebraska's agriculture, its great resource, has made a worthwhile contribution to the causes of victory and peace.

You've read lately of the markets being glutted with hogs. That's because, while answering the nation's call, we raised a whacking big crop of spring pigs–4,581,000 head, three and one-half hogs for every man, woman and child in the state, a 52 per cent increase over the spring of 1942.

# 2,000 Mexican Workers in ND

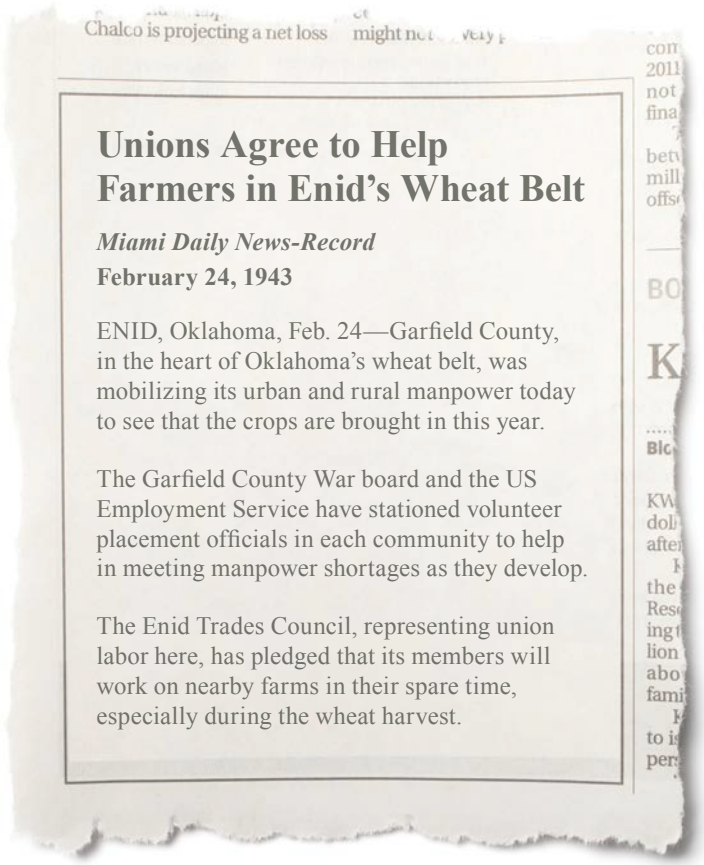
**June 15, 1944**

***Bismarck Tribune***

More than 2,000 Mexican sugar beet workers already are in the state and many of these will be available to North Dakota farmers when the haying harvesting season begins, the NDSU Extension Service said Thursday.

All have been brought into the state through the combined efforts of the Extension Service, the United States Employment Service and the American Crystal Sugar Beet Company of Grand Forks.

"Except for some 200 who are working in the McKenzie County area, the workers for the most part have been placed in the Red River Valley, where the largest acreage of beets has been planted," H.W. Herbison, supervisor of the emergency farm labor program, said.



Chalco is projecting a net loss might not

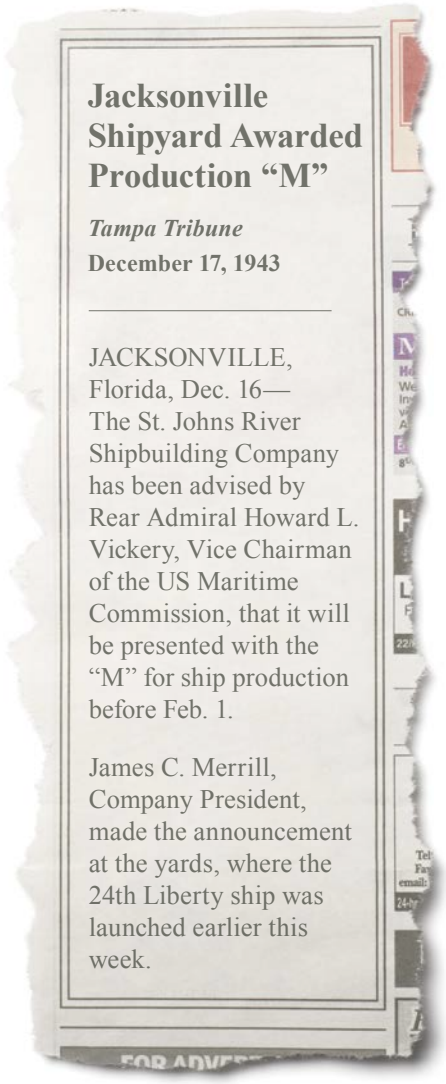
## Unions Agree to Help Farmers in Enid's Wheat Belt

***Miami Daily News-Record***
**February 24, 1943**

ENID, Oklahoma, Feb. 24—Garfield County, in the heart of Oklahoma's wheat belt, was mobilizing its urban and rural manpower today to see that the crops are brought in this year.

The Garfield County War board and the US Employment Service have stationed volunteer placement officials in each community to help in meeting manpower shortages as they develop.

The Enid Trades Council, representing union labor here, has pledged that its members will work on nearby farms in their spare time, especially during the wheat harvest.

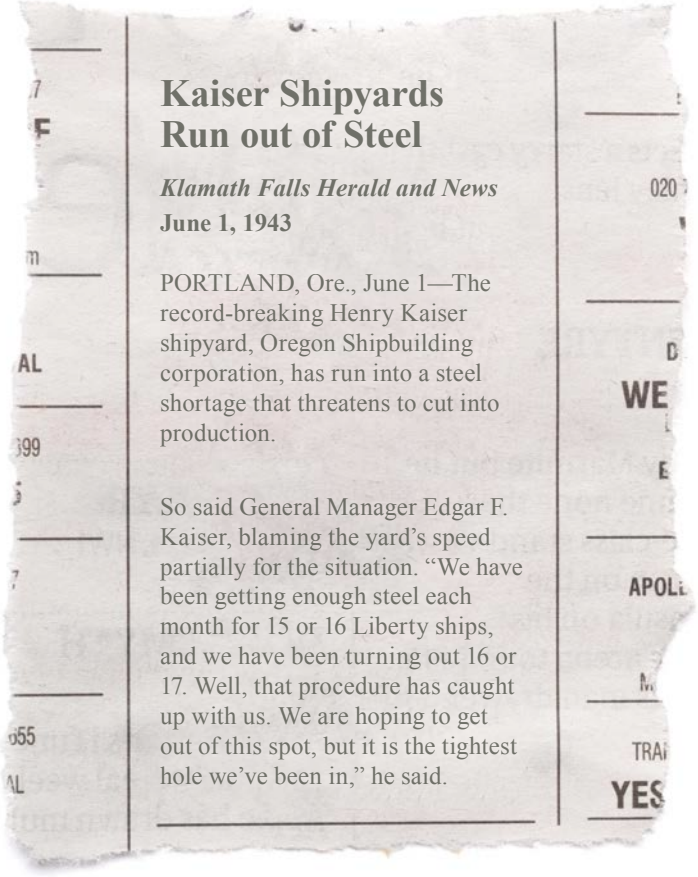


## Jacksonville Shipyard Awarded Production "M"

***Tampa Tribune***
**December 17, 1943**

JACKSONVILLE, Florida, Dec. 16—The St. Johns River Shipbuilding Company has been advised by Rear Admiral Howard L. Vickery, Vice Chairman of the US Maritime Commission, that it will be presented with the "M" for ship production before Feb. 1.

James C. Merrill, Company President, made the announcement at the yards, where the 24th Liberty ship was launched earlier this week.



## Kaiser Shipyards Run out of Steel

***Klamath Falls Herald and News***
**June 1, 1943**

PORTLAND, Ore., June 1—The record-breaking Henry Kaiser shipyard, Oregon Shipbuilding corporation, has run into a steel shortage that threatens to cut into production.

So said General Manager Edgar F. Kaiser, blaming the yard's speed partially for the situation. "We have been getting enough steel each month for 15 or 16 Liberty ships, and we have been turning out 16 or 17. Well, that procedure has caught up with us. We are hoping to get out of this spot, but it is the tightest hole we've been in," he said.

## 19th Ship Launched

***Lumberton Robesonian*** **– July 8, 1942**

Wilmington, North Carolina, July 8—The Hugh Williamson, third Liberty freighter to be launched at the yard of the North Carolina Shipbuilding Company here within the past 10 days, slid down the ways yesterday afternoon after being christened by Mrs. Richard D. Dixon of Edenton. It was the 19th ship launched here since last December 6.

January 23, 1944

# Willow Run Aims at Goal of One Bomber an Hour

***Port Huron Times-Herald***

Detroit, Michigan, Jan. 22—The dream of volume production of gigantic four-engine bomber planes, long a subject of controversy among automotive experts, is being realized at the Ford-operated Willow Run plant west of here.

The big "warships of the air," whose cost runs into several hundred thousand dollars each are rolling off the automotive-type assembly lines daily in increasing numbers; in addition complete "sets" of parts for assembly at other plants are being shipped in mounting volume.

Most, if not all of the credit for what has been accomplished at Willow Run goes to 62-year-old Danish-born Charles E. Sorensen, longtime associate of Henry Ford and production genius of the Ford Motor Company. Willow Run was Sorensen's brain-child. As he long ago developed the moving assembly line for automobile production, so did he adapt automobile production methods to the big bomber plant.

Chalco is projecting a net loss ... might not ...

## Citrus to be Used to Make War Explosives

***Tampa Tribune* – October 8, 1942**

The much-discussed issue of using citrus by-products, and solving the disposal problem of citrus peel waste from canning plants, will find a dramatic solution in Winter Haven soon, when the newly-formed Florida Chemical Company begins manufacture of alcohol and molasses from pressed citrus juice and the wastewater of the citrus peel.

[The owner of the new factory] said today the federal government desired that this plant be in position to operate on Cuban molasses during the season when citrus is unavailable, and wants to use the alcohol distilled by the local plant, at the Edgewood Arsenal facility in Alabama, in the production of smokeless powder.

## Firms Will Seek War Contracts

***Arizona Republic* – December 1, 1943**

Four Phoenix manufacturing plants are preparing to submit bids within a few days for the production of ship parts for the U.S. Maritime Commission, D.L. Bouse, District Manager of the Smaller War Plants Corporation, announced yesterday. The four firms are Allison Steel Manufacturing Company, Johnson Brothers Manufacturing Company, Arizona Metal Manufacturing Company, and Karlson Machine Works.

Two local firms, Allison Steel and Johnson Brothers, now are engaged on contracts for the Maritime Commission. Submission of information on the facilities of local firms to the Maritime Commission by the district SWPC office has been mainly responsible for much of this work coming to Arizona.

## Pittsburgh Mills Produce Record Quantity of Steel

***Pittsburgh Press* – January 2, 1942**

Pushing facilities to the limit to meet war demands, Pittsburgh district steel mills produced a record quantity of metal in 1941 and headed for higher levels as extensive expansion programs were launched.

Close to 19 million tons of ingots were manufactured in the past 12 months in this area—the greatest single steel-producing center in the nation—and an even higher tonnage would have been forthcoming were it not for an acute shortage of iron and steel scrap.

This volume of Pittsburgh steel is almost three times as much as Japan can produce in a year and is almost seven times greater than Italy's capacity.

## North Carolina's Military, Natural Resources Geared for War

***Nashville Graphic* – December 11, 1941**

North Carolina has converted pine woods and bare fields into vast defense establishments. War orders have placed the textile industry on an overtime basis to fill more than $40,000,000 in contracts for cotton and woolen products essential to outfitting fighting forces.

Demands of war have revived industries dormant, or languishing, since World War I, created new ones and spurred production to new levels in enterprises established in the state within the last decade, particularly those of the chemical industry.

## *"Painless Boomtown" Operates in Georgia*

**July 14, 1944**

***King City Chronicle***

At least one small town in America has proved beyond all doubt that a boom town created by the war need not be subject to the usual problems—that, in fact, a "Painless Boom Town" is quite possible.

The town is Marietta, Georgia, which awoke one morning to hear the news that it had been selected as the site for the new Bell Bomber Plant which would turn out the world's largest battle planes, the B-29s.

Citizens of the territory promptly registered fear of boom town expansions, but Mayor "Rip" Blair, as soon as he heard the news, developed plans for a painless boom town. Instead of giving way to honky tonks and undesirable road houses, Marietta outlawed them immediately. Beer and liquor licenses were restricted to those already issued. Renewals of some which had expired were refused.

# Ordnance Plant Project Outlined by Major Grosse

**June 23, 1942**

***Eau Claire Leader***

The first authoritative public statement on the Eau Claire Ordnance Plant and what it would mean to the city and citizens of Eau Claire and adjacent area was made Monday to this paper by Major Boone Grosse, US [Army], in charge of the plant.

In brief, this is what the Eau Claire Ordnance Plant will be:

The Gillette Tire plant here has been taken over by the war department and will be converted into a small arms munitions plant for the manufacture of 25, 30, and 50-calibre shells, mostly for automatic firearms.

A plant for loading the shells made in the plant here is being built on the 700-acre tract of land acquired by the government four miles northeast of Eau Claire.

## First of Billion Dollar String of Plants Open

***Press and Sun-Bulletin*** **– March 14, 1941**

Washington, DC, March 14—Three months ahead of schedule, a critically-needed smokeless powder plant reached completion today, the first of a $1,000,000,000 string of government-financed munitions factories ready for production.

Under Secretary of War Robert Patterson, Governor James Price of Virginia, Major General Charles M. Wesson, the Army's Chief of Ordnance, and Major General Edmund B. Gregory, Quartermaster General, arranged to attend the formal opening of the new $44,000,000 Ordnance Works at Radford in southwestern Virginia.

The first production line will start full-time operations the beginning of next week. Its expected daily output of 100,000 pounds will more than double the Army's existing flow of powder from one arsenal and smaller commercial sources.

## US to Finish War Plants Within Utah

***Salt Lake Tribune***
**May 19, 1942**

WASHINGTON, DC, May 18—The federal government does not intend to abandon any war or defense plants under construction in Utah, Senator Abe Murdock and Representative J.W. Robinson reported Monday.

The announcements came after the senator and representative made an investigation into Sunday press reports that many plant projects, especially steel plants, would be abandoned in order to divert structural steel to plants manufacturing guns, tanks, and other war materials.

The two congressmen said they each made a careful inquiry Monday into the press reports and were assured that the reports had little foundation as far as Utah is concerned.

Chalco is projecting a net loss ... might not ... very ...

## Conductorettes to Serve Riders

***Arizona Republic***
**May 28, 1943**

Smiling conductorettes will greet Goodyear war workers who ride the trailer-type busses now in use on the Phoenix-Goodyear Aircraft plant run. The conductorettes will collect fares and punch tickets, and also serve as contact between the passengers and the driver who sits in the cab of this type of bus. Use of girls for this work will release more men for war work and the military service.

## Report Greater Demand for Bay State Products

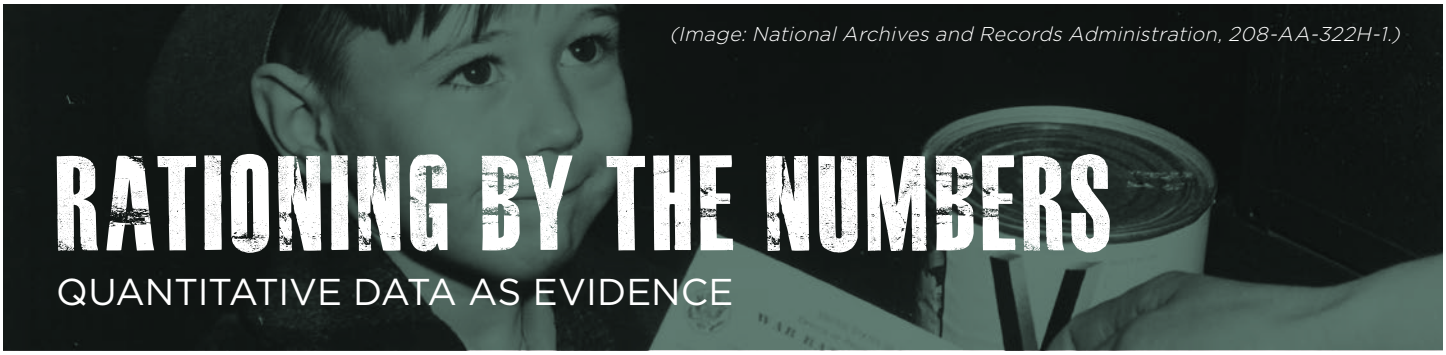
**March 24, 1942**

***Fitchburg Sentinel***

Boston, Massachusetts, March 24—The demand for the products of Massachusetts factories reached a new high in February, the Associated Industries of Massachusetts reported today.

The association said in a statement that the demand for metal trade products was extremely heavy. A sustained demand for cotton textiles and a sharp increase in calls for wool fabrics was noted.

Demand for shoes, leather, and paper, although showing a slight reduction compared with January, remained high, the report said.



*(Image: National Archives and Records Administration, 208-AA-322H-1.)*

# RATIONING BY THE NUMBERS

## QUANTITATIVE DATA AS EVIDENCE

### INTRODUCTION

Rationing affected the lives of all citizens on the US Home Front during World War II. The sharp increase in demand for a wide variety of raw materials and consumer goods led government officials to develop controls designed to give the military the tools it needed for fighting while limiting the impact on families at home. The sale of food, medicines, rubber, paper, and even typewriters and bicycles was restricted to varying degrees during the war. This activity challenges students to draw conclusions about the country's wartime rationing program by analyzing sources of quantitative data, and then use that information to strengthen the points made in a secondary source.

### GRADE LEVEL

7–12

### TIME REQUIREMENT

1 class period

### MATERIALS

+ Copies of the **Source Analysis Worksheets**

+ Copies of the **"Rationing"** overview essay

### OBJECTIVES

Students will analyze quantitative data presented in multiple formats and use the information to draw conclusions about the US rationing program during World War II. They will also use the data from the sources and their conclusions about their meaning to strengthen a piece of historical writing.

### COMMON CORE STANDARDS

**CCSS.ELA-LITERACY.RH.6-8.7**
Integrate visual information (e.g. in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

**CCSS.ELA-LITERACY.RH.6-8.9**
Analyze the relationship between a primary and secondary source on the same topic.

**CCSS.ELA-LITERACY.RH.9-10.7**
Integrate quantitative or technical analysis (e.g. charts, research data) with qualitative analysis in print or digital text.

**CCSS.ELA-LITERACY.RH.9-10.9**
Compare and contrast treatments of the same topic in several primary and secondary sources.

### ONLINE RESOURCES

ww2classroom.org

- America Responds Video
- Robert Gurr Oral History

**CCSS.ELA-LITERACY.RH.11-12.7**
Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. visually, quantitatively, as well as in words) in order to address a question or solve a problem.

**CCSS.ELA-LITERACY.RH.11-12.9**
Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.

## NATIONAL STANDARDS FOR HISTORY

**HISTORICAL CONTENT ERA 8, STANDARD 3B**
The student understands World War II and how the Allies prevailed.

**HISTORICAL CONTENT ERA 8, STANDARD 3C**
The student understands the effects of World War II at home.

**HISTORICAL THINKING STANDARD 2**
The student comprehends a variety of historical sources, therefore the student is able to utilize visual and mathematical data presented in graphs, including charts, tables, pie and bar graphs, flow charts, Venn diagrams, and other graphic organizers to clarify, illustrate, or elaborate upon information presented in the historical narrative.

**HISTORICAL THINKING STANDARD 4**
The student is able to support interpretations with historical evidence in order to construct closely reasoned arguments rather than facile opinions.

## PROCEDURES

1. Begin by briefly reviewing the US system of rationing during World War II, using the **"Rationing"** overview essay as needed. Have students take a moment to write down a list of the kinds of information they would need to research if they were going to write an essay on this topic. What kinds of questions would the essay need to answer? Offer a few examples to get the students started, ideas including the kinds of products that were rationed, the effects of rationing on the average American family, etc. Ask students to share some of their answers, and challenge them to think of sources that might offer the kinds of information they feel they would need to tell this story properly.

2. Explain that students will now have the opportunity to use quantitative data to learn more about rationing in the United States during World War II. If necessary, review the difference between quantitative data and qualitative data.

   **Quantitative data** is information that can be measured and expressed in numbers (e.g. the number of tanks produced in the United States during the war or the maximum speeds of different kinds of aircraft).

   **Qualitative data** is information that cannot be expressed in numbers or percentages (e.g. the rank of a soldier or the hometown of a civilian munitions factory worker).

3. Students may complete this activity individually, in small groups, or as a whole class. Depending on the abilities of your students, you may want to analyze one source as a class and then direct the students to tackle the other sources on their own.

4. Distribute copies of the **Source Analysis Worksheets**, and (optionally) the **"Rationing"** overview essay for reference purposes. Each worksheet includes a set of quantitative data relating to rationing in the United States during World War II, plus questions to guide the students' analysis. Review the instructions with the students

and direct them to begin analyzing the sources you have assigned them.

5. If you have provided students with copies of the **"Rationing"** overview essay, you may also choose to instruct students to extend their analysis by locating a place in the essay where adding data from their source(s) would strengthen the points it makes about the US rationing program.

## ASSESSMENT

You will be able to evaluate each student's ability to interpret visually presented quantitative data and draw conclusions from it based on their responses on the **Source Analysis Worksheets**. You will also be able to measure their ability to find connections between this data and a related secondary source based on how well they integrate information from their source into the **"Rationing"** overview essay.

## EXTENSION/ENRICHMENT

1. Have students visit **ww2online.org** and search for oral histories that discuss rationing, noting instances where the subject's recollections confirm or differ from the information from the sources in this activity.

2. Have students make a list of the items that might be rationed or otherwise restricted in the event of a modern-day war or emergency situation.

NAME: DATE:

## SOURCE ANALYSIS WORKSHEET 1

**Directions:** Use the quantitative data in the source below to answer the questions that follow.

### SELECTED RATION POINT VALUES FOR FRUITS AS OF FEBRUARY 1943

| KIND OF FRUIT | RATION POINTS PER 19-22 OZ CAN | RATION POINTS PER POUND |
|---|---|---|
| CANNED OR BOTTLED | | |
| Apples | 10 | 8 |
| Apricots | 16 | 13 |
| Cherries | 14 | 11 |
| Grapefruit | 10 | 8 |
| Peaches | 14 | 11 |
| Pineapple | 16 | 13 |
| FROZEN | | |
| Cherries | 16 | 13 |
| Peaches | 16 | 13 |
| Strawberries | 16 | 13 |
| Other berries | 16 | 13 |
| DRIED/DEHYDRATED FRUITS | | |
| Prunes | 25 | 20 |
| Raisins | 25 | 20 |
| All other fruits | 10 | 8 |

**Source:** Office of Price Administration

1. What kind of information does this table provide?

2. Who published this information, and who was likely their intended audience?

3. Notice the differences between point values for the various fruits. What factors do you think might have caused these differences?

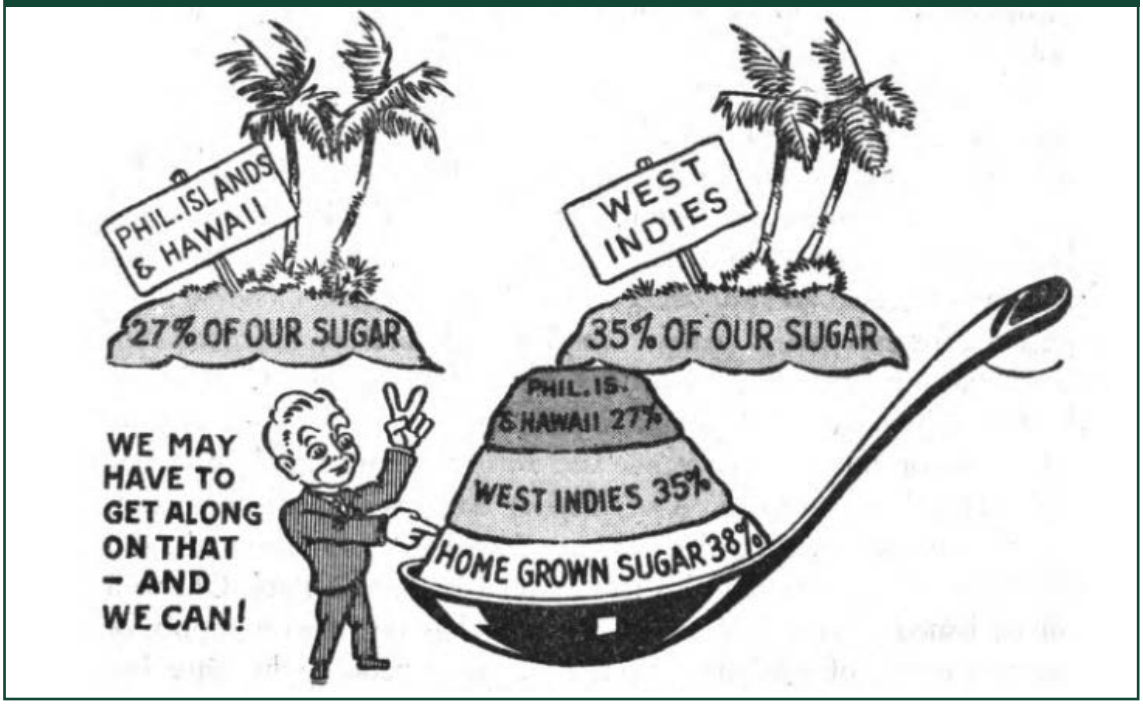
4. What are two conclusions you can draw about rationing in the United States based on the information in this table?

NAME: DATE:

## SOURCE ANALYSIS WORKSHEET 2

**Directions:** Use the quantitative data in the source below to answer the questions that follow.

**SOURCES OF THE US SUGAR SUPPLY AS OF 1942**




**Source:** Office of Price Administration

1. What kind of information does this graphic provide?

2. Who published this information, and who was likely their intended audience?

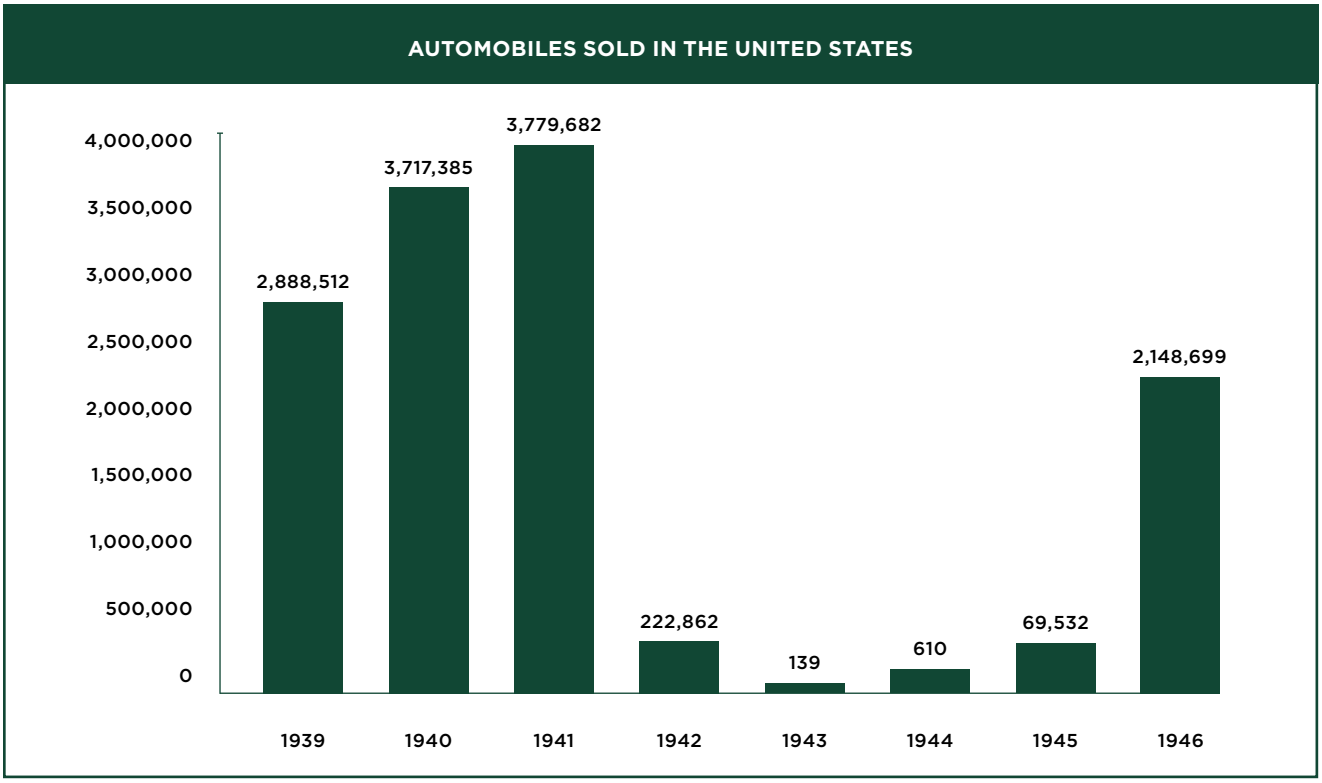
3. What message do you think the creators of this graphic wanted to convey to their readers?

4. What are two conclusions you can draw about rationing in the United States based on the information in this graphic?

NAME: DATE:

## SOURCE ANALYSIS WORKSHEET 3

**Directions:** Use the quantitative data in the source below to answer the questions that follow..




**Source:** *Historical Statistics of the United States* (1960)

1. What kind of information does this table provide?

2. Who published this information, and who was likely their intended audience?

3. Based on what you know about rationing in the United States, how do you explain the dramatic shifts in the number of automobiles sold in the United States during the war?

4. What are two conclusions you can draw about rationing in the United States based on the information in this table?


# RATIONING

*(Image: The National WWII Museum.)*

World War II put a heavy burden on US supplies of basic materials like food, shoes, metal, paper, and rubber. The Army and Navy were growing, as was the nation's effort to aid its allies overseas. Civilians still needed these materials for consumer goods as well. To meet this surging demand, the federal government took steps to conserve crucial supplies, including establishing a **rationing** system that impacted virtually every family in the United States.

**Rationing** involved setting limits on purchasing certain high-demand items. The government issued a number of "points" to each person, even babies, which had to be turned in along with money to purchase goods made with restricted items. In 1943 for example, a pound of bacon cost about 30 cents, but a shopper would also have to turn in seven **ration** points to buy the meat. These points came in the form of stamps that were distributed to citizens in books throughout the war. The Office of Price Administration (OPA) was in charge of this program, but it relied heavily on volunteers to hand out the **ration** books and explain the system to consumers and merchants. By the end of the war, about 5,600 local **rationing** boards staffed by over 100,000 citizen volunteers were administering the program.

Tires were the first product to be **rationed**, starting in January 1942, just weeks after the attack on Pearl Harbor. Everyday consumers could no longer buy new tires; they could only have their existing tires patched or have the treads replaced. Doctors, nurses, and fire and police personnel could purchase new tires, as could the owners of buses, certain delivery trucks, and some farm tractors, but they had to apply at their local **rationing** board for approval. Good, functional tires became so valuable that the boards often advised auto owners to keep track of the serial numbers on their tires in case they were stolen.

> "PLAN YOUR VICTORY GARDEN NOW. GET YOUR GARDEN PLOT LINED UP. GET THE ADVICE OF A GARDEN EXPERT IF YOU NEED IT. AND BE PREPARED TO GROW YOUR OWN FOR VICTORY.
>
> *DIG FOR VICTORY NEWSREEL, 1943*

Personal automobiles met a similar fate in February 1942 as auto manufacturers converted their factories to produce jeeps and ambulances and tanks. Gasoline was **rationed** starting in May of that year, and by the summer even bicycle purchases were restricted.

The government began **rationing** certain foods in May 1942, starting with sugar. Coffee was added to the list that November, followed by meats, fats, canned fish, cheese, and canned milk the following March. Newspapers, home economics classes, and government organizations offered all sorts of tips to help families stretch their **ration** points and have as much variety in their meals as possible. **Propaganda** posters urged Americans to plant "victory gardens" and can their own vegetables to help free up more factory-processed foods for use by the military. Restaurants instituted meatless menus on certain days to help conserve the nation's meat supply, and advertisers offered up recipes for meatless dinners like walnut cheese patties and creamed eggs over pancakes. Macaroni and cheese

## ONLINE RESOURCES

ww2classroom.org

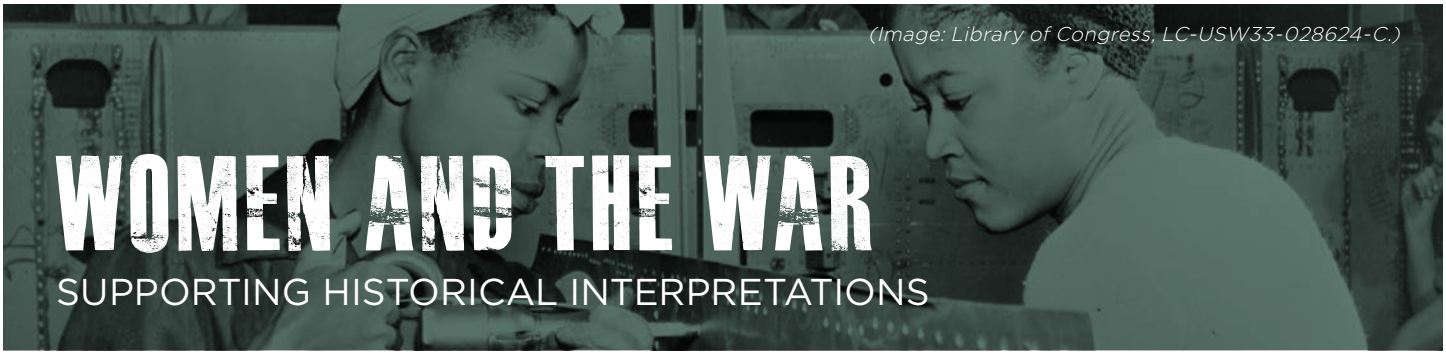
- America Responds Video
- Robert Gurr Oral History


**Citizens line up outside their local War Rationing Board office on Gravier Street in New Orleans, 1943.**
*(Image: Library of Congress, LC-USW3-022900-E.)*

became a nationwide sensation because it was cheap, filling, and required very few **ration** points. Kraft sold some 50 million boxes of its macaroni and cheese product during the war.

The system wasn't perfect. Whenever the OPA announced that an item would soon be **rationed**, citizens bombarded stores to buy up as many of the restricted items as possible, causing shortages. **Black market** trading in everything from tires to meat to school buses plagued the nation, resulting in a steady stream of hearings and even arrests for merchants and consumers who skirted the law. Store clerks did what they could to prevent hoarding by limiting what they would sell to a person or by requiring them to bring in an empty container of a product before purchasing a full one. State legislatures passed laws calling for stiff punishments for **black market** operators, and the OPA encouraged citizens to sign pledges promising not to buy restricted goods without turning over **ration** points.

As World War II came to a close in 1945, so did the government's **rationing** program. By the end of that year, sugar was the only commodity still being **rationed**. That restriction finally ended in June 1947. Plenty of other goods remained in short supply for months after the war, thanks to years of pent-up demand. Before long, however, manufacturers had caught up, and Americans could buy all the butter, cars, and nylon hosiery they wanted.



(Image: Library of Congress, LC-USW33-028624-C.)

# WOMEN AND THE WAR

## SUPPORTING HISTORICAL INTERPRETATIONS

### INTRODUCTION

Women were essential to the American war effort during World War II. They worked in defense industries, organized scrap drives and bond sales, administered rationing programs, joined the military, and completed countless other tasks to move the Allies closer to victory. In many cases, they made these contributions while still meeting family obligations back home. There's no question that World War II challenged conventional ideas about the role of women in American society, but scholars debate the permanence of that shift. In this lesson, students evaluate two opposing historical arguments about how World War II impacted the role of women in American society, using primary sources to make their case.

### GRADE LEVEL

7–12

### TIME REQUIREMENT

1– 2 class periods

### MATERIALS

+ Copies of the **Student Worksheet**

+ **Evidence Strips** included as inserts with the printed guide and online at **ww2classroom.org**

### OBJECTIVES

Students will evaluate two competing historical arguments about the impact of World War II on the role of women in American society. They will then support their conclusions using evidence from a combination of primary and secondary sources.

### COMMON CORE STANDARDS

**CCSS.ELA-LITERACY.RH.9-10.1**
Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

**CCSS.ELA-LITERACY.RH.9-10.8**
Assess the extent to which the reasoning and evidence in a text support the author's claims.

**CCSS.ELA-LITERACY.RH.9-10.9**
Compare and contrast treatments of the same topic in several primary and secondary sources.

**CCSS.ELA-LITERACY.RH.11-12.7**
Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g. visually, quantitatively, as well as in words) in order to address a question or solve a problem.

### ONLINE RESOURCES

ww2classroom.org

- The Home Front Overview Video
- America Responds Video
- Rosemary Elfer Oral History
- Lorraine Taix-McCaslin Oral History
- Evidence Strips

## NATIONAL STANDARDS FOR HISTORY

**HISTORICAL CONTENT ERA 8, STANDARD 3B**
The student understands World War II and how the Allies prevailed.

**HISTORICAL CONTENT ERA 8, STANDARD 3C**
The student understands the impacts of World War II at home.

**HISTORICAL THINKING STANDARD 3**
The student is able to compare competing historical narratives and evaluate major debates among historians concerning alternative interpretations of the past.

**HISTORICAL THINKING STANDARD 4**
The student is able to support interpretations with historical evidence in order to construct closely-reasoned arguments rather than facile opinions.

## PROCEDURES

1. Begin by reviewing the participation of women in the US military, defense industries, civilian defense activities, and other aspects of the American war effort. Use information from the overview essays as needed. Ask students the following questions: How do you think these contributions impacted the roles of women in American society compared with what we have observed earlier in the twentieth century?

2. Introduce the two interpretations from historians William Chafe and D'Ann Campbell regarding the impact of World War II on the role of women in American society. Have students identify the similarities and differences between the two arguments, and clarify difficult vocabulary. Remind students that historical writing is interpretive, meaning that historians write their narratives by examining evidence and drawing conclusions about what they believe the evidence suggests. It is possible for two historians to examine the same set of historical events but interpret them very differently. Chafe's and Campbell's interpretations of World War II as a watershed moment in the experiences of American women provide a good example of this.

3. Inform students that they will now have the opportunity to examine multiple primary and secondary sources in order to evaluate the competing claims presented by Chafe and Campbell. Divide the class into groups of 2-4 students each and give each group copies of the **Student Worksheets**, the **Visual Sources**, and the **Evidence Strips**. Another method is to have each group examine and discuss one source at a time and then rotate sources with a nearby group.

**NOTE: You may also want to include additional sources, especially if you have locally significant newspaper articles, letters, photographs, or other items at your disposal.**

4. Instruct students to decide which historical interpretation (Chafe or Campbell) each **Evidence Strip** or **Visual Source** supports, and record their decision on the **Student Worksheet** along with an explanation of their reasoning. Remind students to be attentive to the date, origin, and type of source they are examining and to consider how those attributes might impact the source's reliability. You may want to examine one or two of the sources as a group to model this process.

5. Once the groups have assigned all of their sources to one historical interpretation or the other, have students choose which historical interpretation they find most convincing and articulate their reasoning in a couple of sentences.

6. Return to the whole group and have students share their conclusions and their reasoning. If students are divided over which interpretation is most convincing, encourage them to debate the issue by using the evidence they examined to support their claims.

**While asking students about the evidence they selected, challenge them to think critically about the reliability and explanatory power of the sources. Do the dates of the source make a difference? How about the role of the author? Do the author's conclusions seem to be based on qualitative observations or statistics?**

## ASSESSMENT

You will be able to assess students' ability to analyze primary sources based on the notes they take on the **Student Worksheets** and the discussions they have in the whole group. Their written responses to Step 5 will demonstrate their ability to evaluate competing historical claims and deploy primary source evidence to support their reasoning.

## EXTENSION/ENRICHMENT

1. Have students write a 250-word text panel for a museum display discussing the impact of World War II on American women and their role in society. Emphasize to students that, given space limitations, they will need to choose an argument or point of view to frame their narrative.

2. Have students collect additional primary sources pertaining to the role of women in American society during World War II (e.g. newspaper articles, advertisements, political cartoons, letters, yearbook entries, oral histories, magazine articles, etc.), and determine which historical interpretation (Chafe or Campbell) they best support.

## TWO INTERPRETATIONS OF THE IMPACT OF WORLD WAR II ON AMERICAN WOMEN

**INTERPRETATION 1**

**"Within five years, World War II had radically transformed the economic outlook of women. Instead of frowning on women who worked, government and the mass media embarked on an all-out effort to encourage them to enter the labor force. The war marked a watershed in the history of women at work, and, temporarily at least, caused a greater change in women's economic status than half a century of feminist rhetoric and agitation had been able to achieve."**

William Henry Chafe, *The American Woman: Her Changing Social, Economic, and Political Roles, 1920-1970* (New York: Oxford University Press, 1972), 135-136.

**INTERPRETATION 2**

**"It is difficult to argue that World War II, in itself, constituted a watershed in the experience of American women. For the majority of American women, the war years may have altered some specific activities, but they did not change their interpretations of their primary roles."**

D'Ann Campbell, *Women at War with America: Private Lives in a Patriotic Era* (Cambridge: Harvard University Press, 1984), 236.

**Women hard at work in the Republic Drill and Tool Company in Chicago, Illinois, 1942.**
*(Image: Library of Congress, LC-USE6-D-005713.)*

NAME: DATE:

## INTERPRETATION 1

**Directions:** For each primary or secondary source that you examine, record any evidence you believe supports the interpretation below. For each piece of evidence you select, write a brief explanation of how or why it supports the interpretation.

---

**Interpretation:** "Within five years, World War II had radically transformed the economic outlook of women. Instead of frowning on women who worked, government and the mass media embarked on an all-out effort to encourage them to enter the labor force. The war marked a watershed in the history of women at work, and, temporarily at least, caused a greater change in women's economic status than half a century of feminist rhetoric and agitation had been able to achieve."

William Henry Chafe, *The American Woman: Her Changing Social, Economic, and Political Roles, 1920-1970* (New York: Oxford University Press, 1972), 135-136.

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## EVIDENCE

Source:

Explanation:

Source:

Explanation:

Source:

Explanation:

Source:

Explanation:

Source:

Explanation:

NAME: DATE:

## INTERPRETATION 2

**Directions:** For each primary or secondary source that you examine, record any evidence you believe supports the interpretation below. For each piece of evidence you select, write a brief explanation of how or why it supports the interpretation.

---

**Interpretation:** "It is difficult to argue that World War II, in itself, constituted a watershed in the experience of American women. For the majority of American women, the war years may have altered some specific activities, but they did not change their interpretations of their primary roles."

D'Ann Campbell, *Women at War with America: Private Lives in a Patriotic Era* (Cambridge: Harvard University Press, 1984), 236.

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## EVIDENCE

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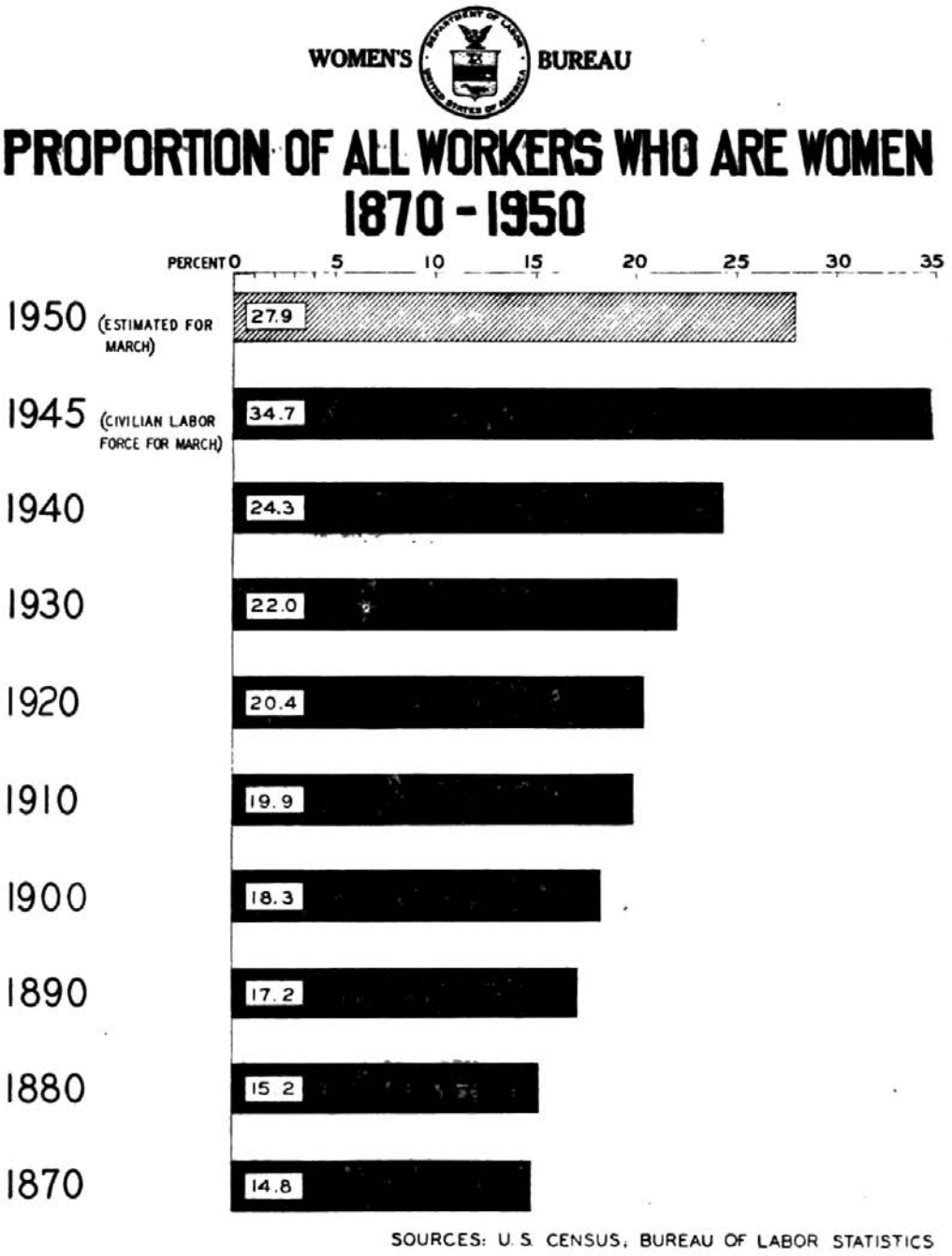
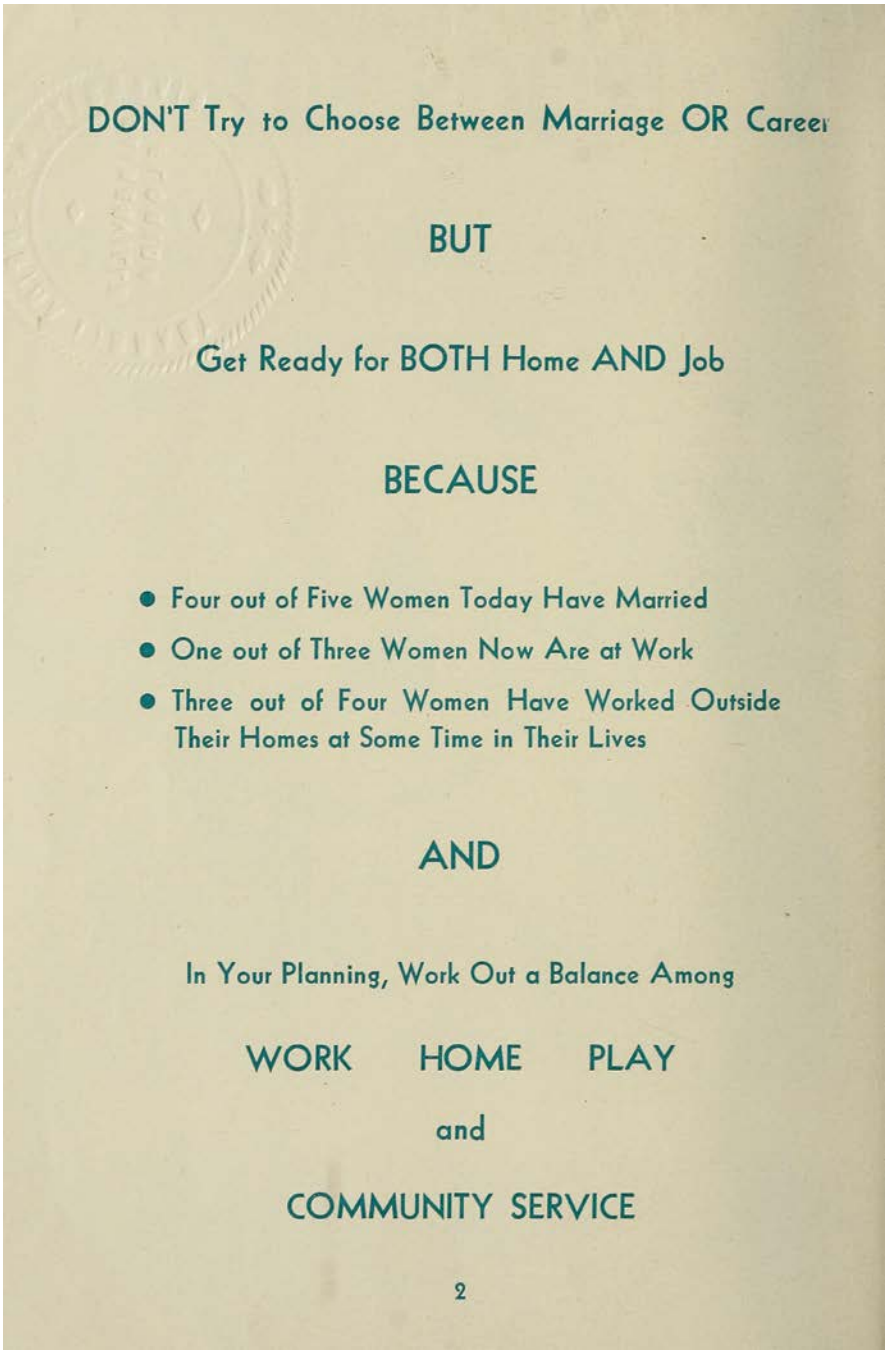



**Source: US Congress, Senate, Committee on Education and Labor, *Hearings before a Subcommittee of the Committee on Education and Labor*, 79th Congress, 1st session, 1945, 18.**




**Source: Women's Bureau, US Department of Labor, *Your Job Future after High School* (Washington: Government Printing Office, 1949), 2.**

**The following is a case study taken during a survey of women who worked in defense industries in Baltimore, Maryland. The survey was conducted by the United States Department of Labor, Women's Bureau:**

"Mrs. K., a young married woman with a 12-year-old child, worked before the war as a waitress. During the war she had a job as an assembler in the radio division of an electrical plant. In 1944, she looked forward to stopping work when her war job ended and devoting full time to her family. In the 1946 interview, it was found she had left the war plant in 1945, stayed home for 11 months, and then went back to work. She commented, 'I must continue to work and make ends meet due to the rise in the cost of living.' During the war she 'took home' in her pay envelope $31.00 and contributed half to household expenses. In 1946, she earned $22.50 and turned it all in for current expenses."



**The following is an excerpt from Senate Bill 1178, which was identified as "a bill providing equal pay for equal work for women, and for other purposes" (79th Congress, 1st session):**

"SECTION 1. (a) The Congress hereby finds that the existence in industry of differentials based on sex is an inequity in compensation standards which constitutes an unfair wage practice and (1) leads to labor disputes; (2) depresses wages and living standards of employees, male and female; (3) interferes with and prevents the maintenance of an adequate standard of living by such workers and the families dependent on them for support; (4) in particular, has serious detrimental effects on the standard of living of families of deceased or disabled veterans; (5) prevents the maximum utilization of our available labor resources and plant capacity essential for full production, in war and in peace; and (6) endangers the national security and the general welfare, and thereby burdens, affects, and obstructs commerce.

It is hereby declared to be the policy of this Act, through the exercise by Congress of its power to regulate commerce among the several States, to correct and, as rapidly as possible, to eliminate discriminatory wage practices based on sex."

The bill was introduced by Senator Claude Pepper of Florida on June 21, 1945. It was favorably reported by the House Committee on Education and Labor, but the full Senate did not take up the bill for consideration.



**The following is an excerpt from a statement made before the Senate Committee on Education and Labor by Elisabeth Christman, Secretary-Treasurer of the National Women's Trade Union League, in support of legislation prohibiting wage discrimination against women:**

"I have taken the time to describe some of the highlights in my long connection with the equal-pay struggle for a particular reason. The war is over, and the War Labor Board has announced the time of its own termination. The need for federal support of the equal-pay principle is far from over. Employers are already going back as quickly as possible to the age-old custom of paying lower rates to women."

**The following is an excerpt from a 1947 report by the United States Department of Labor, Women's Bureau, about female workers in Bridgeport, Connecticut, after the end of World War II:**

"As demobilization progresses, many of the jobs assigned to women during the war are again becoming men's work. During the war women operated lathes, grinders, milling machines, and automatic screw machines—jobs usually performed by men. Although occasionally women are still performing these operations, their number is proportionately less than during the war. Veterans with machine-shop experience have been given preference in filling such jobs. During the war some women did blanking and forming (processes involved in sheet metal manufacturing) on heavier work than to which they had been assigned in the prewar period. This has been largely discontinued, but women still predominate as light-press operators."



**The following is an excerpt of an article titled "Labor Market Status of Women since Victory Day," published in an April 1946 edition of *The Labor Market*, published by the United States Employment Service (USES):**

"Several large areas report that women are being replaced by men in the better-paid, more attractive jobs, leaving only lower-paid and less attractive jobs in sales, clerical, and service occupations open to them. New York reports that after V-J Day, a return to the prewar pattern of preferences for male and female workers became evident."



**The following is an excerpt of an article published by the United States Employment Service (USES) titled "Post-Victory Day Placements of Women by USES," that ran in a February 1946 edition of *The Labor Market*:**

"Victory over Japan Day brought not only a shift in the industries providing most jobs for women, but a change in the types of occupations in which they could be placed in large numbers. USES placements of women became a smaller proportion of the total placements in all occupational groups except service. Only in service occupations did female placements become an increased proportion of total placements."

**The following excerpt describes conclusions reached by the Women's Bureau of the United States Department of Labor following a study of women workers and their postwar employment plans:**

"Three conclusions of particular postwar significance stand out from the series of home interviews by representatives of the Women's Bureau with women who were employed in 10 war production areas in 1944 and 1945.

First, the war brought about great increases in the number of women employed in each of the 10 areas and in the number of women who planned to remain in the labor force in the respective areas.

Second, there were tremendous increases in the proportions of women employed in industries producing directly for war purposes, and the 'take-home' earnings of these women considerably exceeded the 'take-home' earnings of women employed in other industries.

Third, a high proportion of the women employed during the war period reported that they carried heavy economic responsibilities at home, and a high proportion of those who planned to continue working after the war gave economic reasons for their decisions."



**The following is an excerpt from a speech given by Mrs. Kay Cavender, Public Relations Director of Women's Activities for a major metal products manufacturer, to the Women's National Republican Club in 1948:**

"Women are playing a big part in operating the railroads of America. The first woman to work on railroads was Susan Morningstar in 1885, and at the present time 67,448 women are so employed, many as executives. The New York Central Railroad alone employs 7,005 women in various capacities. The fairest thing of all is that female employees are paid the rate prescribed for the positions they hold. In other words, they receive the same compensation as male employees occupying similar positions. On the Central, one woman is Assistant Manager of the Pullman Reservation Bureau and two are passenger representatives."



**The following is an excerpt from an oral history interview with Inez Sauer, who worked as Chief Clerk in a toolroom at Boeing in Seattle:**

"My mother warned me when I took the job that I would never be the same. She told me I'd never want to go back to being a housewife. At the time I didn't think it would change a thing. But she was right, it definitely did. I had always been in a shell; I'd always been protected. But at Boeing I found a freedom and an independence I had never known. After the war I could never go back to playing bridge again, being a clubwoman and listening to a lot of inanities when I knew there were things you could use your mind for. The war changed my life completely. I guess you could say, at 31, I finally grew up."

**The following is an excerpt from an oral history interview with Winona Espinosa, who worked as a riveter for Rohr Aircraft in San Diego, California, during World War II. Here she describes what life was like after her time working in defense industries:**

"When I came back, I went to work for the San Diego Transit driving buses and streetcars. I just saw a sign on a bus downtown one day that read 'I need you,' and I went and applied. I hadn't even been driving very long. I only learned to drive a car after I got to San Diego, and I didn't know anything about driving a big vehicle like that. But the war really created opportunities for women. It was the first time we got a chance to show that we could do a lot of things that only men had done before."



**The following is an excerpt from an oral history interview with Adele Erenberg, who worked as a machinist in a factory near Los Angeles:**

"It's ironic that when the union finally got into the plant, they had me transferred out. They were anxious to get rid of me because, after we got them in, I went to a few meetings and complained about it being a Jim Crow union. So they arranged for me to have a higher rating instead of a worker's rating. This allowed me to make 25 cents an hour more, and I got transferred to another plant. By this time I was married. When I became pregnant I worked for about three months more, then I quit. For me, defense work was the beginning of my emancipation as a woman. For the first time in my life I found out that I could do something with my hands besides bake a pie."



**The following is an excerpt from an oral history interview with Sybil Lewis, who left her home in Sapulpa, Oklahoma, during the war to become a welder and riveter at a series of aircraft plants near Los Angeles:**

"The war years had a tremendous impact on women. I know for myself it was the first time I had a chance to get out of the kitchen and work in industry and make a few bucks. This was something I had never dreamed would happen. In Sapulpa, all that women had to look forward to was keeping house and raising families. The war years offered new possibilities. You came out to California, put on your pants, and took your lunch pail to a man's job. This was the beginning of women feeling that they could do something more. We were trained to do this kind of work because of the war, but there was no question that this was just an interim period. We were all told that when the war was over, we would not be needed anymore."

**The following is an excerpt from a letter written by Anne Bosanko (later Green), a member of the Women's Army Corps, to her father on August 24, 1945:**

"Post-war Plans: Go to the University of Chicago. I don't want to go back to the U of M and get in the same rut I joined the Army to escape. Besides, if I stayed home, I'd want to spend all my time working on the farm and I'd never get any studying done. I can do decorating long distance and on weekends. When I come home in November on furlough (hope, hope) I will discuss it at length. I think I can get two years' tuition free from Uncle Sugar with the help of the American Legion."



**The following is an excerpt of an oral history interview between Florida State University researcher Stacy Tanner and Lucile Olsen, who lived in the vicinity of Tampa, Florida, during World War II:**

"Stacy Tanner: What do you think were the most important lessons that you learned from the war?

Lucile Olsen: I learned then that it's possible that women would have to work, you know? People in those days condemned women for working. Number one, they should leave their jobs for the men, but during the war when the men were gone, somebody had to do the work. So they accepted the women. And I learned that there are always circumstances that alter cases. Everything is not just one big black and white, you know? There are circumstances that alter the cases."



**The following is an excerpt from a 1946 article in *The Washington Post*:**

"Increasingly in print and on platform, the charge is made that women are chasing will o' the wisps in competing with men, and should go back to house work and child rearing. The 'restless' woman of today is analyzed as being in revolt against her biological destiny. If she could even return to such creative work as spinning, weaving, or at least bread baking, it is argued, she might regain some of her lost contentment. Added to this psychological panacea is the insistence of many solid citizens that what this country needs is a revival of old-fashioned, stay-at-home womanhood."

**The following is an excerpt of a 1946 article in *The Christian Science Monitor* regarding postwar employment for women:**

"Lauded as a Home Front heroine during the war, the woman worker today is just a Jane looking for a job. Prospects are, however, that she will find it eventually. Probably not in heavy industry, where she so recently won her wartime laurels, but back where she came from—the restaurant, the hotel, the laundry, the store. Nevertheless, her retreat from the industrial field will be orderly and according to plan. At least, that is the prediction of authorities in the employment field. There are jobs for women today—plenty of jobs, according to reports from many areas. But these jobs do not offer the pay of the wartime occupations which they have just left. Naturally, women who have been drawing $30 to $40 a week and more are not attracted by jobs which pay only $16 or $20."



**The following is an excerpt of an article from *The Christian Science Monitor* in 1944:**

"It is the belief of the War Manpower Commission (WMC)—at least locally—that 'a lot of the women now employed in defense work will go back where they came from,' namely to their households, once the war is over, and that there is no serious problem involved, no need for planning on postwar re-employment. A spokesman for WMC said today, 'Nobody is thinking about it around here. We're still too concerned with waging the war to bother with what we're going to do with women job-seekers after the war.'"



**The following is an excerpt from a 1944 article in *Los Angeles Times* regarding the role of women after World War II:**

"Susan Laughlin, Chief Woman Counselor [of the aircraft manufacturer Lockheed] says: 'Women who return home will definitely be more alert to the world around them. They will not sink back into the rut they were in at the outset of the war. They will have a civic pride. They will understand their husbands better, because they will know what it is to try to hold down a job. Paying bills and taxes will have a real significance.'

Women will be glad to return to their homes, Mrs. Laughlin believes, but they won't return to the old monotonous routines. They will seek out the companionship of other women, but not from a social point of view. It will be a civic and a political one. They all are talking politics in the rest periods and lunch hours now. They realize that schools and nursery care are as much a part of politics as candidates and taxes."

**The following is an excerpt from an article in *The Daily Boston Globe* written by journalist Dorothy Dix about the employment of women after World War II:**

"Of course, the shutting down of war industries threw many women out of employment. Ineptness, lack of ambition, and resentment of regulations sent many others back to their hereditary occupation that they could slight when they didn't feel like doing it. But a postwar labor analysis that has recently been made shows that soon 17 million women will still be gainfully employed outside their homes.

This is one of the epoch-making migrations of history, and it is one for which we were totally unprepared. For we still clung to the belief that every woman's theme song was 'Home, Sweet Home,' and that one was never so happy as when she was making up a batch of biscuits or hanging out her wash ahead of the woman next door. This fond illusion that all women had a passion for domesticity made us overlook the cold fact that not all women are born cooks any more than that all men are born workers."



**The following is an excerpt from a 1948 newspaper article discussing the results of a United States Department of Labor survey measuring trends in women's employment:**

"The shift of women away from domestic service was emphasized today in an analysis by the Women's Bureau of the Department of Labor of women's occupational trends since 1940. Women workers in domestic service declined 29 percent in the eight years, while the number of women in clerical jobs rose 78 percent, and the total of saleswomen was up 62 percent. The comparatively small group of women proprietors and officials doubled, and women labor operatives and craftsmen increased by 60 percent.

Miss Frieda Miller, Director of the Women's Bureau, attributed the continuing flight of the housemaid from the United States home 'simply to the fact that there are better and more desirable jobs for women.'"


*(Image: Library of Congress, LC-USW36-133)*


Get in the Scrap!
WITH THE NATIONAL WWII MUSEUM

LESSON PLAN:

# GET IN THE SCRAP!

*(Image: NARA, 196331.)*

## INTRODUCTION

During World War II, Americans answered the call to serve their country. Whether joining the military or working on the Home Front, young and old across the country mobilized for war. People on the Home Front contributed in a variety of ways, from rationing and buying war bonds to working in defense factories and growing victory gardens.

One important way students banded together in this common cause was through scrapping materials. Through a nationwide campaign, schools were encouraged to organize school-wide salvage drives. Recycled steel, rubber, paper, nylon, and even kitchen grease became critical materials for factories to produce heavy equipment, weaponry, aircraft, vessels, and the multitude of other items necessary for victory.

Students were a key part of collecting scrap as they scoured their neighborhoods and filled their wagons with old tires, worn-out bed springs, broken garden hoses, dented pots and pans—all to be recycled for the war effort. Although people living in the United States were far from the battlefronts, they felt they were in aiding their country in a time of great need.

## OBJECTIVES

By analyzing primary source materials and artifacts, students should critically assess the roles and perspectives of students who lived during World War II. This assessment should help the students to see in specific ways how children of all ages contributed to the war effort and also how their actions bettered their community.

## TIME REQUIREMENT

1 class period

## KEY THEMES

HISTORY

SCRAPPING

TEAMWORK

## COMMON CORE STANDARDS

CCSS.ELA-LITERACY.RH.6-8.1
Cite specific textual evidence to support analysis of primary and secondary sources.

CCSS.ELA-LITERACY.RH.6-8.9
Analyze the relationship between a primary and secondary source on the same topic.

CCSS.ELA-LITERACY.RH.9-10.2
Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.

CCSS.ELA-LITERACY.RH.11-12.2
Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.

## NATIONAL STANDARDS FOR HISTORY

HISTORICAL THINKING STANDARD
Historical Content Era 8, Standard 3C: Explain how the United States mobilized its economic and military resources during World War II.

HISTORICAL THINKING STANDARD 2
The student is able to identify the central question(s) the historical narrative addresses and the purpose, perspective, or point of view from which it has been constructed.

> The student is able to describe the past on its own terms, through the eyes and experiences of those who were there, as revealed through their literature, diaries, letters, debates, arts, artifacts, and the like; to consider the historical context in which the event unfolded – the values, outlook, options, and contingencies of that time and place; and to avoid "present-mindedness," judging the past solely in terms of present-day norms and values.
>
> Draw upon the visual, literary, and musical sources including: (a) photographs, paintings, cartoons, and architectural drawings; (b) novels, poetry, and plays; and, (c) folk, popular and classical music, to clarify, illustrate, or elaborate upon information presented in the historical narrative.

HISTORICAL THINKING STANDARD 3
The student is able to consider multiple perspectives of various peoples in the past by demonstrating their differing motives, beliefs, interests, hopes, and fears.

## PROCEDURES

1. Have your students as a class read the Home Front Fact Sheet to themselves.

2. Divide students up into five groups. Each group will receive a different Primary Source worksheet about the Home Front/ scrapping and will need to answer questions about the artifacts.

3. Once the students finish answering the questions, select one student from each group to share their artifact and what it is about with the entire class.

4. Facilitate discussion as a class around the following question: How did students help out during World War II? Create a word cloud surrounding this question on your whiteboard and have your students come up to the board and write their responses.

5. Tell students that just like children during World War II, they too can make a big difference in the world around them. Make sure they understand that scrapping and recycling are the same thing. Introduce students to the Get in the Scrap! project, where they will work together as a class to learn about and improve their environment through completing certain activities. They will receive prizes for the work that they do. You can find details about the project and register your class at getinthescrap.org.

6. Students will then create a team name, and the class will complete the Get in the Scrap! Project Pledge.

## ASSESSMENT

Through written and verbal responses, students should demonstrate an understanding of specific ways children living during World War II aided the war effort and of why they were interested in doing so. In thinking about ways students living during World War II took actions to support the war, your students should then apply that thinking to actions they can take today to better their community. They can detail these examples in either a written format or verbally during the class discussion.

## EXTENSION/ENRICHMENT

1. Have your students explore the variety of Home Front activities they took part in through the "See You Next Year! High School Yearbooks from World War II" digital collection, available at www.ww2yearbooks.org. Have your students browse the yearbook from their home state or a state of their choosing to answer the following question: How did the war affect the lives of students?

*(Image: NARA, NWDNS-2000(S)PSC-16.)*

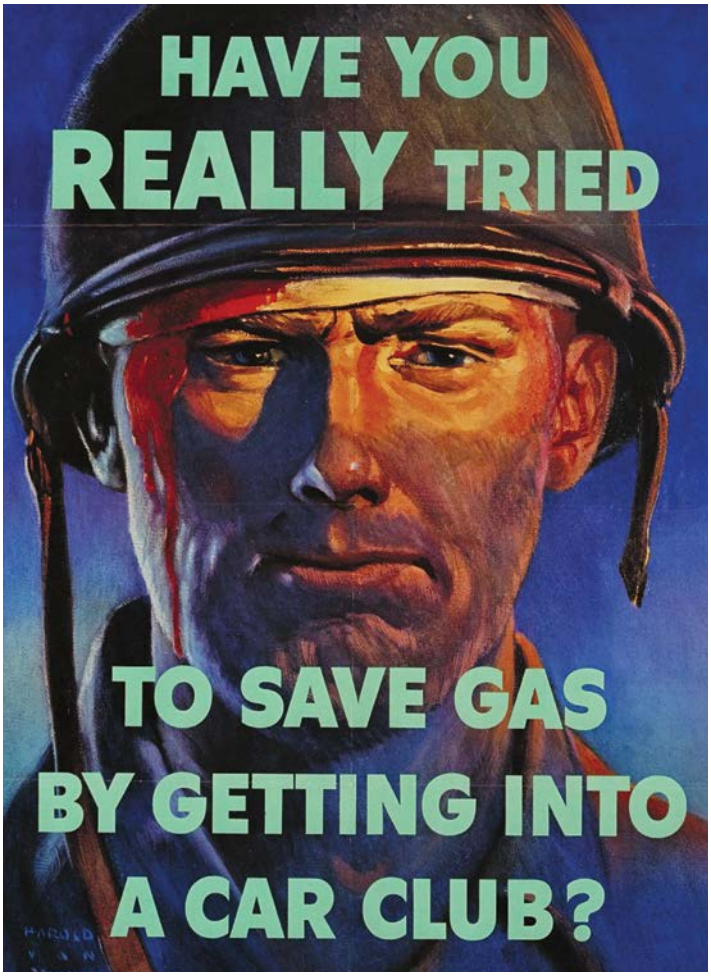
# THE HOME FRONT DURING WWII

> **WE ARE NOW AT WAR. WE ARE NOW IN IT—ALL THE WAY. EVERY SINGLE MAN, WOMAN, AND CHILD IS A PARTNER IN THE MOST TREMENDOUS UNDERTAKING OF OUR AMERICAN HISTORY.**
>
> *PRESIDENT FRANKLIN DELANO ROOSEVELT*

President Franklin Delano Roosevelt (FDR) made this statement on December 9, 1941, during his weekly radio address to the nation. With the bombing of Pearl Harbor, America had formally entered the war as a partner of the Allies in the fight for democracy. And life on the Home Front would never be the same.

Total war meant that all levels of the economy and all segments of society would have to dedicate themselves to victory. FDR urged Americans to join the war effort by "out-producing and overwhelming the enemy." While scarcity, rationing, and shortages became regular topics of conversation, so too did talk of duty, patriotism, unity, and victory. Once the nation entered the war, the United States, which had the world's 18th largest military in 1939, mobilized itself for total war production. The immediate conversion of peacetime industries into war production facilities involved companies of all sizes and types. Toy companies began to manufacture compasses. Typewriter companies made rifles, and piano factories produced airplane motors. The Ford Motor Company ceased producing cars and began turning out tanks and bombers. The Depression was over. Full employment was a reality and confidence in victory was strong. Behind each soldier stood hundreds of civilian workers making everything an army needs to fight around the globe.

From 1940 until the Japanese surrender, the United States produced more than 300,000 aircraft, 86,000 tanks, and 12.5 million rifles. Its shipyards were just as productive, building 107 aircraft carriers, 352 destroyers, and 35 million tons of merchant shipping. The United States also supplied a majority of war materials for its Allied partners, producing by 1945 more than twice the war supplies of Germany, Italy, and Japan combined.




**Propaganda encouraged Americans to do their part and preserve rationed items, like gasoline.**
*(Image: Northwestern University, 9969586164202441.)*

While returning to work and earning more money, Americans on the Home Front also had to learn to ration their food, recycle their scrap, plant backyard "Victory Gardens," and cut back on travel. The government regulated the economy to control inflation, maintaining price and wage controls and instituting tight rationing programs throughout the war. Every family received ration books with stamps and coupons for food items such as meat, sugar, and butter, and other goods, like tires and gasoline. The government further encouraged civilians to collect fabric, scrap metal, and old tires for recycling. Rationing even led to changes in fashion styles. Women's slacks and skirts became slimmer and shorter to save fabric and men's suits became cuffless and vestless. Millions of families observed Meatless Mondays, and millions more helped fund the war by buying War Bonds.

The war permeated every aspect of life on the Home Front. Comic books, popular music, movies, and Broadway shows all had patriotic themes. Propaganda supporting the war effort was everywhere. Slogans like "Kick 'Em in the Axis" and "Can All You Can" became popular and made people feel that they could play a vital role in producing victory. This battle on the Home Front changed America in vital ways as the workforce expanded to include women and minorities. People relocated to fill war industries, and the United States fulfilled its role as "the arsenal of democracy." These changes were not always easy, but Americans made them with the same determination and optimism that they exhibited on the battlefields around the world.


**Home front workers played a critical role in both production and government loans called war bonds.** *(Image: Northwestern University, 9969588164202441.)*

## PRIMARY SOURCE 1: PROPAGANDA POSTER


*(Image: NARA, 515347.)*

**NAME:** **DATE:**

## WORKSHEET FOR PRIMARY SOURCE 1

**Directions:** Answer the questions below about your artifact.

**Primary Source:** Original items or records that have survived from the past and were part of a direct experience of a time or event. Examples of primary sources can include the following: photographs, letters, speeches newspapers, journals, artifacts, works of art, film footage, and oral histories.

1. What kind of primary source do you have? What sort of information can this kind of primary source provide to us?

2. Describe what you see happening in the poster. What do the tin cans turn into?

3. In the poster, who is saving the cans? What evidence from the image can you provide to support your answer?

4. How does the artist create a direct connection between the Home Front and the battlefront?

5. Why do you think people needed to "prepare tin cans for war?"

## PRIMARY SOURCE 2: PHOTOGRAPH

*(Image: Library of Congress, 2017694010.)*

**NAME:** **DATE:**

## WORKSHEET FOR PRIMARY SOURCE 2

**Directions:** Answer the questions below about your artifact.

**Primary Source:** Original items or records that have survived from the past and were part of a direct experience of a time or event. Examples of primary sources can include the following: photographs, letters, speeches newspapers, journals, artifacts, works of art, film footage, and oral histories.

1. What kind of primary source do you have? What sort of information can this kind of primary source provide to us?

2. Describe the scene in the picture.

3. Roughly, what age are the people in the photograph? Where do you think they are gathered?

4. What are the students carrying in their wagon?

5. What do you think the children are doing when this image was taken? What evidence from the image can you provide to support your answer?

## PRIMARY SOURCE 3: LETTER

# AMERICAN INDUSTRIES SALVAGE COMMITTEE

OFFICERS

ROBERT W. WOLCOTT, *Chairman*
CHARLES R. HOOK, *Vice-Chairman*
H. L. HUGHES, *Treasurer*
*Vice-President*, United States Steel Corporation
FRANK BLOCK, *Secretary*

***Representing groups of industrial concerns and operating with funds provided by them***

**350 FIFTH AVENUE**
**NEW YORK, N. Y.**

COMMITTEE

CHARLES R. HOOK, *President*, American Rolling Mill Company
O. E. MOUNT, *President*, Steel Founders' Society of America
WALTER S. TOWER, *President*, American Iron and Steel Institute
R. S. WILSON, *Vice-President*, The Goodyear Tire & Rubber Company
ROBERT W. WOLCOTT, *President*, Lukens Steel Company

January 29, 1943

Mr. Billy C. Michal
Zimmerman Rural School
Zimmerman, La.

Dear Billy:

We'd like to take time out from our own scrap campaigning to commend you and your schoolmates for the way you pitched into the school drive for scrap last Fall.

We're proud of you, not because you were chosen to christen a Liberty Ship, but because you contributed more than your share to the building of one.

It wouldn't be quite right for us to say "Thanks" for what you did. The men who really have the right to thank you are those men who are now sailing the Liberty Ship you helped launch and the others now being supplied on the battlefield with cargo from that very ship.

It was a privilege for us to enable you to make the trip to the launching. We hope you will remember that you and your schoolmates have played an important part in helping to preserve your birthright - to grow up as free men and women.

As a leader in the scrap activities of your school we are sure you will keep on "getting in the scrap" in campaigns soon to come.

Sincerely,

Frank Block

Frank Block, Secretary

*(Image: The National WWII Musuem, 2002.479.)*

**NAME:** **DATE:**

## WORKSHEET FOR PRIMARY SOURCE 3

**Directions:** Answer the questions below about your artifact.

**Primary Source:** Original items or records that have survived from the past and were part of a direct experience of a time or event. Examples of primary sources can include the following: photographs, letters, speeches newspapers, journals, artifacts, works of art, film footage, and oral histories.

1. What kind of primary source do you have? What sort of information can this kind of primary source provide to us?

2. What organization sent Billy the letter and what do you think the organization did during World War II? What do you think "salvage" means?

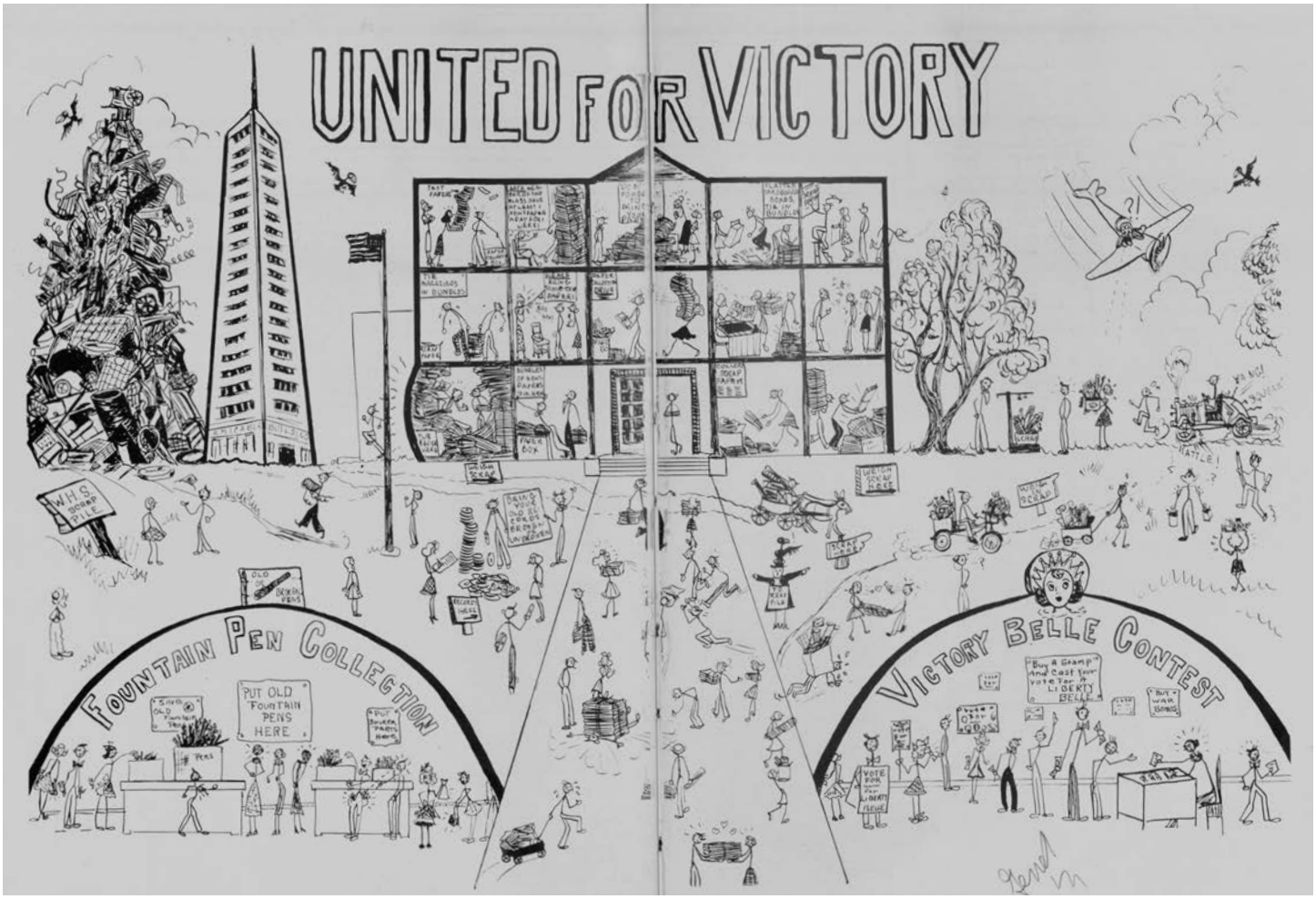
3. Why are they thanking Billy and his schoolmates?

4. What did Billy get to travel to see as a reward for collecting scrap? What evidence from the text can you provide to support your answer?

5. Based on the letter, what do you think a Liberty Ship was?

6. How do you think Billy's scrap collecting made a difference during the war? What evidence from the text can you provide to support your answer?

## PRIMARY SOURCE 4: CARTOON FROM HIGH SCHOOL YEARBOOK




*(Image: The National WWII Museum Education Collection.)*

**NAME:** **DATE:**

## WORKSHEET FOR PRIMARY SOURCE 4

**Directions:** Answer the questions below about your artifact.

**Primary Source:** Original items or records that have survived from the past and were part of a direct experience of a time or event. Examples of primary sources can include the following: photographs, letters, speeches newspapers, journals, artifacts, works of art, film footage, and oral histories.

1. What kind of primary source do you have? What sort of information can this kind of primary source provide to us?

2. What is the setting of the drawing? Provide some examples from the drawing to justify your answer.

3. What are some activities happening in the drawing? What do they call the tower of junk in the left corner?

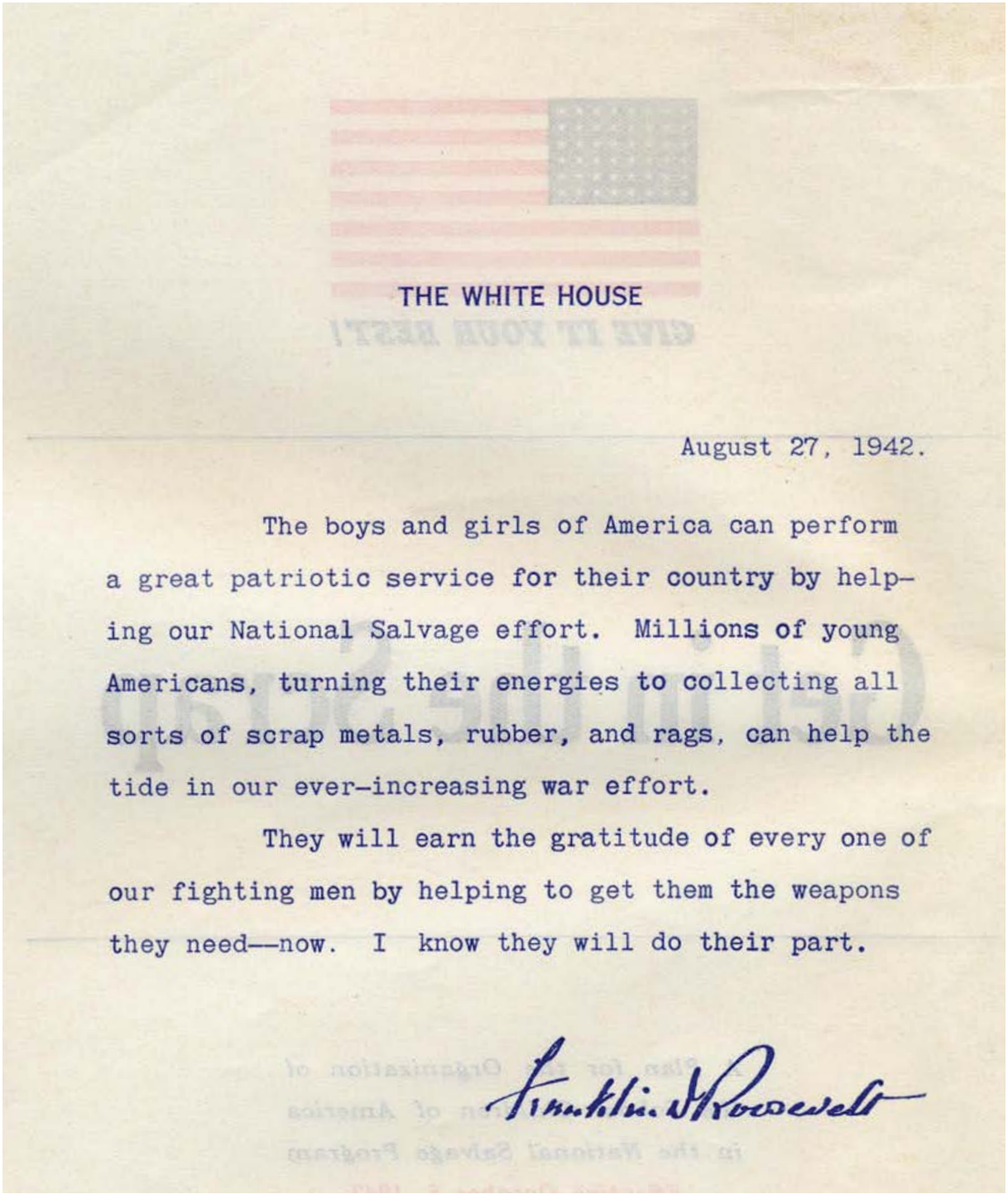
4. What kind of items are they scrapping?

5. What do you think was the artist's purpose in creating this cartoon?

6. What do you think "United for Victory" means? How does scrapping help bring about victory?

## PRIMARY SOURCE 5: PAMPHLET

To get all of the country's schools on board with scrapping, the government released this pamphlet Get in the Scrap! It took a lot of planning and preparation to start a salvage program at schools, and this guide helped teachers, school administrators, and students along the way.



THE WHITE HOUSE

August 27, 1942.

The boys and girls of America can perform a great patriotic service for their country by helping our National Salvage effort. Millions of young Americans, turning their energies to collecting all sorts of scrap metals, rubber, and rags, can help the tide in our ever-increasing war effort.

They will earn the gratitude of every one of our fighting men by helping to get them the weapons they need--now. I know they will do their part.

Franklin D. Roosevelt

*(Image: The National WWII Musuem, 2002.479.)*

## PRIMARY SOURCE 5: PAMPHLET (CONTINUED)

# America's Junior Army

# Can Fight The War With Salvage

### A Plan for the Organization of School Children as the Third Front for Victory

Sponsored by the Conservation Division, War Production Board, Washington, D. C., and indorsed by the U. S. Office of Education.

In this war, the *Front* is made up of our Army, Navy, Coast Guard, Marines, and Air Corps, engaged in actual battle with the enemy.

The *Second Front* consists of our factories, shipyards, and farms, where civilian workers are producing guns, tanks, planes, ships, and food for our fighting men.

The *Third Front* includes every man, woman, and child in the United States, whose chief duty is to comb the entire Nation for the scrap materials that are absolutely necessary to keep our factories running—absolutely necessary for Victory.

The principal scrap materials needed now are:

Iron and steel
Rubber
Copper, brass, bronze, aluminum, zinc, and lead
Old rags

Millions of tons of these materials have already been collected and used in the early months of the war. Millions of tons more must be collected quickly—and the collection must go on without let-up until the last shot is fired. Truly, scrap will win the war. Without it, our steel mills and munitions plants will be forced to shut down, the production of guns, tanks, ships, and shells will falter, and our Armies will face defeat.

*(Image: The National WWII Musuem, 2002.479.)*

**NAME:** **DATE:**

## WORKSHEET FOR PRIMARY SOURCE 5

**Directions:** Answer the questions below about your artifact.

**Primary Source:** Original items or records that have survived from the past and were part of a direct experience of a time or event. Examples of primary sources can include the following: photographs, letters, speeches newspapers, journals, artifacts, works of art, film footage, and oral histories.

1. What kind of primary source do you have? What sort of information can this kind of primary source provide to us?

2. From where was the letter sent? (look at the top of the page for a hint)? Who is Franklin Roosevelt?

3. How does the author of this pamphlet want students to feel about their part in the war effort? Cite examples from the text.

4. Why would the pamphlet call students a "Junior Army?"

5. What three different 'Fronts' do they describe? How does the 'Third Front' help the others?

# PLEDGE TO GET IN THE SCRAP!

We _____ of _____'s class will **GET IN THE SCRAP!** and help our school, home, and community become more environmentally-friendly. Like students during World War II united for a common cause, we, _____, will work together to make a difference by **CONSERVING** the resources we use, **REUSING** and **RECYCLING** materials, and **PROTECTING** our planet. We will change bad habits and create new ones that help the environment. We will inspire others to join with us in our common cause and share our hard work with our fellow students, teachers, parents, and the community.

Signed,

Get in the Scrap!
WITH THE NATIONAL WWII MUSEUM

LESSON PLAN:

# TIN CAN VICTORY GARDEN

*(Image: NARA, 196479.)*

## INTRODUCTION

During World War II, the United States rationed food to help support troops stationed all around the world. One of the government's efforts to make sure that there was enough food for everyone was a campaign promoting citizens to grow their own vegetables. Millions of Americans grew victory gardens in their backyards, on rooftops, and in window boxes to supplement their wartime rations. During World War II, victory gardens provided 40 percent of vegetables grown in the country.

## MATERIALS

+ Used tin can

+ Printed label from template

+ Gardening soil

+ Vegetable or herb seeds

## OBJECTIVES

Through this lesson, students will see how they, too, can grow their own vegetables or herbs. Taking similar actions to kids who helped grow food during World War II, students can start their own victory gardens, one can at a time. This lesson will help students bring the past into their present lives through the simple act of planting a seed.

## TIME REQUIREMENT

1 class period

## KEY THEMES

ART

HISTORY

SCRAPPING

## COMMON CORE STANDARDS

CCSS.ELA-LITERACY.RH.6-8.7
Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

CCSS.ELA-LITERACY.RH.6-8.8
Distinguish among fact, opinion, and reasoned judgment in a text.

## PROCEDURES

1. Have your students save a used tin can from home.

2. Print out one label template per student.

3. Have your students analyze the provided propaganda poster using the background information and primary source analysis questions.

4. Students can then select the vegetable seed and use art supplies to decorate their labels. Once decorated, a label can be taped to the tin can.

5. Students should fill the tin can 3/4 of the way with gardening soil. Have your students select their vegetable or herb seed and then plant it about two inches under the soil. Your students can use their fingers to push a small hole up to their knuckle into their soil to plant their seeds. All seeds should be covered lightly watered.

## ASSESSMENT

Combine the activity of creating tin can victory gardens with an analysis and discussion of the included propaganda posters encouraging Americans to grow their own food during World War II. Have students determine why the US government wanted citizens on the Home Front to grow their own food and if the posters were successful in promoting that message.


*(Image: Boston Public Library, 07_01_000007.)*

**NAME:** **DATE:**

## TIN CAN VICTORY GARDEN WORSHEET

**Directions:** Answer the questions below about your artifact.

**Primary Source:** Original items or records that have survived from the past and were part of a direct experience of a time or event. Primary sources can include the following: photographs, letters, speeches, newspapers, journals, artifacts, works of art, film footage, and oral histories.

1. What kind of primary source do you have?

2. What sort of insights and information can this kind of primary source provide to us?

3. Describe what you see happening in the poster.
   Why is it important that the image include both adults and young people?

4. How does gardening help contribute to the war effort?

5. Why do you think people needed to "prepare tin cans for war?"

GLUE OR TAPE


GLUE OR TAPE

**New York, New York. School victory garden on First Avenue between Thirty-fifth and Thirty-sixth Streets.**
*(Image: Library of Congress, 2017865752.)*


*(Image: Library of Congress, 2017823615.)*

## LESSON PLAN:

# CREATE YOUR OWN PROPAGANDA POSTER

### INTRODUCTION

To ensure that the American public was 100 percent behind the war effort during World War II, the government produced thousands of posters that encouraged people to join the Army and Navy, to not waste food, to volunteer their time, and to help pay for the war by buying War Bonds. Many posters encouraged people to Get in the Scrap. These posters are known as propaganda posters.

### OBJECTIVES

Students should engage in visual analysis of the propaganda posters to determine the key meaning and purpose of the image. This analysis should include an assessment of the intended audience of the poster and an understanding of what might have motivated the United States government to produce such an image.

### MATERIALS

+ WWII propaganda poster examples

+ Paper

+ Art supplies: markers, colored pencils, glitter—whatever you choose!

### TIME REQUIREMENT

1 class period

### KEY THEMES

ART

ENERGY CONSERVATION

HISTORY

SCRAPPING

## COMMON CORE STANDARDS

CCSS.ELA-LITERACY.RH.6-8.2
Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.

CCSS.ELA-LITERACY.RH.6-8.7
Integrate visual information (e.g. in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

CCSS.ELA-LITERACY.RH.6-8.4
Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.

CCSS.ELA-LITERACY.RH.6-8.6
Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).

## PROCEDURES

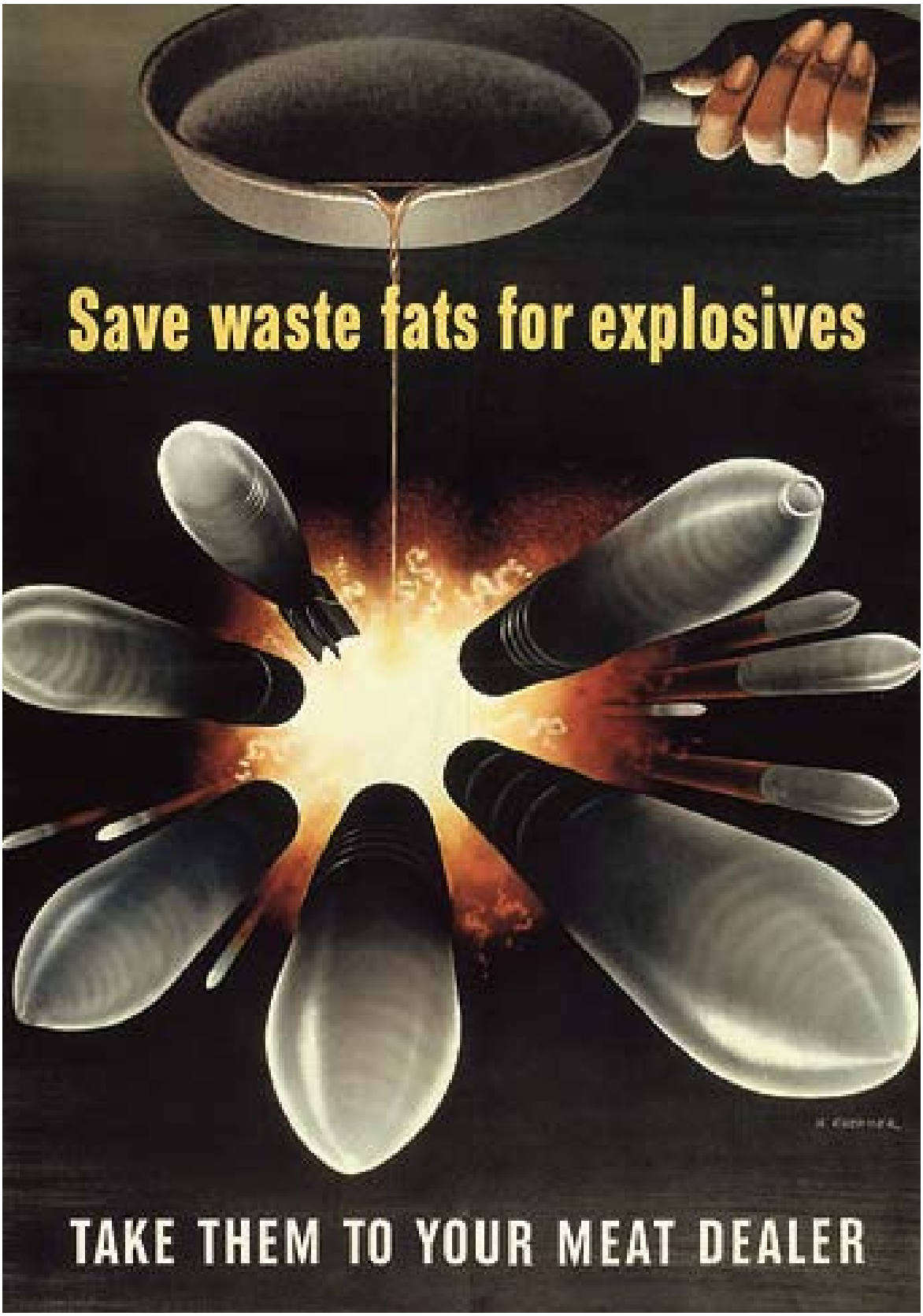
1. Share sample propaganda posters from World War II with your students. Have them study the images, symbols, words, and colors used.

2. Now your students will use these ideas (and ones they brainstorm) to create a poster that encourages their fellow students to Get in the Scrap! They can work individually or in small groups. Hang the posters in your classroom, or better yet, hang them around the school.

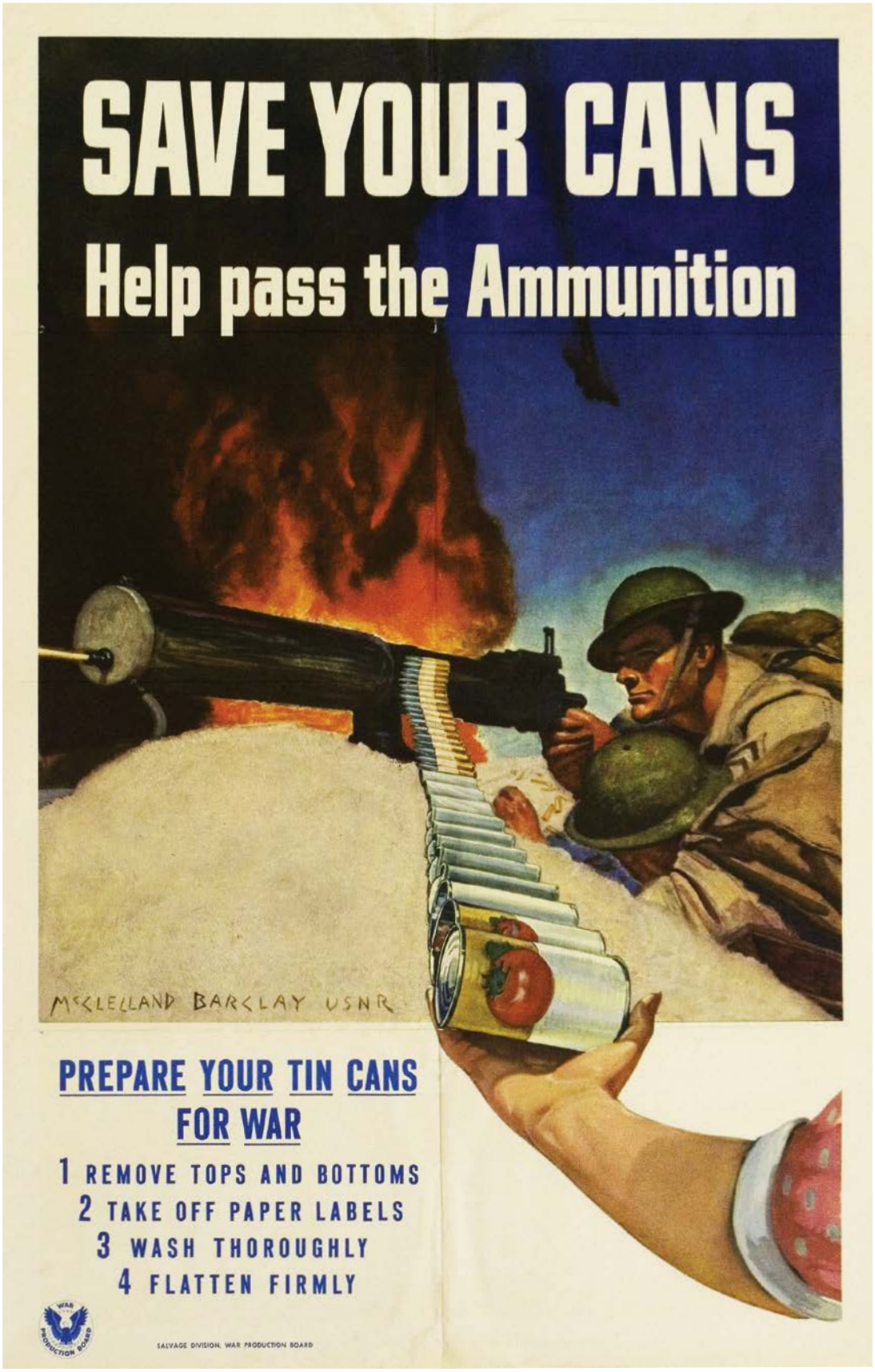
## ASSESSMENT

Students should demonstrate their ability to analyze visual source materials, determining how and why these posters contributed to the war effort on the Home Front. Students should be able to connect their analysis of the primary source propaganda posters to the creation of their own posters (through the inclusion of an intended audience, central motivator, etc.).

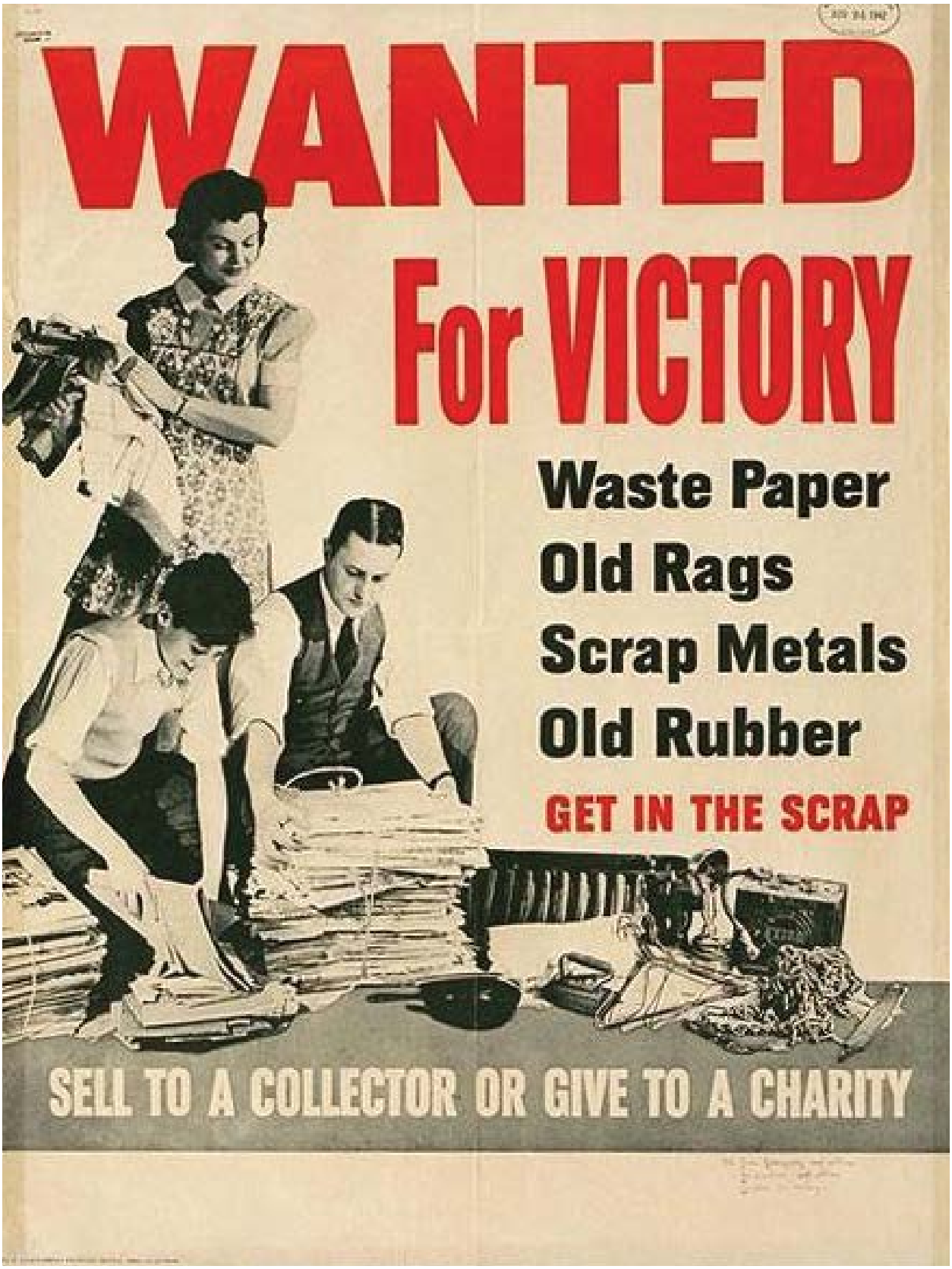

*(Image: Boston Public Library, 07_01_000012.)*




*(Image: NARA, NWDNS-44-PA-380.)*




*(Image: Library of Congress, 99400729.)*




*(Image: The National WWII Museum Education Collection.)*

LESSON PLAN:

# ENERGY AUDIT

*(Image: Library of Congress, 2017829435.)*

## INTRODUCTION

Have students conduct a simple home energy audit using the form provided. This activity will get them focused on a variety of simple ways they can start conserving energy at home. You can adapt this form to conduct a school audit, too

## MATERIALS

+ Energy Audit Worksheet

## OBJECTIVES

Through the completion of the energy audit, students should gather data and quantify energy use in their own homes or possibly at school. When this information is complied, students should be able to see how they can adjust behaviors to help contribute to energy conservation.

## TIME REQUIREMENT

1 class period

## KEY THEMES

ENERGY CONSERVATION

## COMMON CORE STANDARDS

CCSS.ELA-LITERACY.WHST.6-8.7
Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

CCSS.ELA-LITERACY.RST.6-8.9
Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

## PROCEDURES

1. Send your students home with this easy energy audit. Encourage them to complete the audit with their families so that everyone can see the results.

2. Discuss the question "What changes can I make at home to use less energy and water?" On the board, create a list of the reasons. Have students copy them on the provided worksheet.

3. Extension: Modify this audit to complete in your classroom/school.

4. Students and their parents can learn more about making their homes more energy efficient by visiting www.energy.gov.

## ASSESSMENT

Students who successfully fill out the energy audit form should apply the gathered data toward an understanding of larger behavior patterns. In this way, they will be able to critically assess their own energy usage. Successfully connecting the data to their behaviors will demonstrate the students' knowledge of how their actions can lead to changes either at home, at school, or both.

**NAME:** **DATE:**

## ENERGY AUDIT WORKSHEET

**Directions:** Count the number of the following.

### WATER USE

_____ How many minutes do you spend in the shower?

_____ Do you leave the faucet on while you brush your teeth?

_____ How many faucets are there in your house?

_____ How many faucets are leaky?

_____ How many toilets in your house?

_____ Do any of the toilets continue to run?

_____ How long is the clothes washer cycle?

_____ How long is the dishwasher cycle?

_____ Do you use a sprinkler to water the lawn?

_____ How many hours per week do you water the lawn??

### ENERGY USE AND ENERGY LOSS

_____ Incandescent Lights Bulbs

_____ CFL Bulbs

_____ How many windows are in your house?

_____ How many windows have cracks in them?

_____ How many windows don't close completely?

_____ Do you leave the television on when you leave the room?

_____ How many things are plugged in around your house?

_____ How many of these things are currently being used?

_____ Does your house have solar panels on the roof?

What changes can I make at home to use less energy and water?


*(Image: Northwestern University, 9969585534202441.)*

ACTIVITY:

# PENNY WARS

*(Image: Library of Congress, LC-DIG-fsa-8b07566.)*

## INTRODUCTION

During World War II, copper was a vital war material for ammunition and military equipment. Since copper was at such a high demand, the US Treasury started to make steel pennies in 1943. How do you distinguish steel from copper pennies? In addition to their difference in color, the steel penny is magnetic and a magnet can pick it up!

As a nod to the WWII steel penny, challenge your class to a penny war. This one-week competition will motivate students to fundraise for a cause using the change in their pockets. All money earned can go towards buying more recycling bins for the school or even towards planting a tree on school property. You can even have your students vote on contributing their funds to a specific cause.

## MATERIALS

+ Water jug or jar

+ Change (quarters, dimes, nickels, pennies)

## PROCEDURES

1. Divide your class into two groups. Or if there are multiple classes in the school participating, your classes can compete against one-another.

2. Each group should use water jugs or large jars for gathering pennies that have been brought in. During the week, both groups will bring in as many pennies as they can and will place them into each team's jar. The group with the most pennies wins. To detract from the totals of the other teams, students can bring in nickels, dimes, and quarters to put into an opposing team's jar. These extra coins will count towards the total amount raised, but will detract from the total of a specific group.

3. At the end of the week, have the students add up all of the change.

4. All money earned can go towards the cause of their choice.

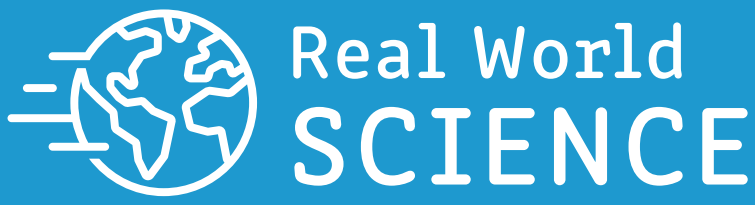
## TIME REQUIREMENT

1 class period

## KEY THEMES

MATH

TEAMWORK


Real World
SCIENCE

GRADE LEVEL: 3-8 | TIME REQUIREMENT: 1-2 CLASS PERIODS

# INNOVATION AND PROBLEM SOLVING

**1 READING**

## INTRODUCTION

The following is a short essay that presents a framework for understanding how innovation happens. Using examples from WWII innovations to introduce an Adopt-Adapt-Apply framework, the essay asks students to think of how they could use examples of WWII innovations to solve today's problems using this framework.

The Adopt-Adapt-Apply framework is used throughout the curriculum and is simple enough to explain and understand even if you use later parts of the book without this essay. However, this essay provides a model of how the WWII stories will be introduced and used throughout the curriculum.

## OBJECTIVE

In the beginning of the year, you can use this essay and its prompts to begin a discussion about problem-solving, innovation, and STEM careers. The essay can serve as a framework for any other activities you choose to do from the curriculum. You can supplement the reading and discussion by showing the linked video on the Real World Science curriculum webpage.

## STANDARDS

NGSS DCI ETS1.B
Developing Possible Solutions

NGSS DCI ETS2.B
Influence of Engineering, Technology, and Science on Society and the Natural World

NGSS SEP
Asking Questions and Defining Problems and Constructing Explanations and Designing Solutions

NGSS CCC
Systems and System Models

## PERFORMANCE EXPECTATIONS

3-5-ETS1-2
Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

MS-ETS1-2
Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

## ADDITIONAL RESOURCES

To learn more about problem solving and the ideas behind the Adopt-Adapt-Apply framework, try these books:

+ *Where Good Ideas Come From* by Steven Johnson, Riverhead Books
+ *Eureka* by Gavin Weightman, Yale University Press


**Glider pilot in front of WACO CG4 Glider, May 1944.**
*(Image: The National WWII Museum, 2014.005.051.)*

## READING

# ADOPT-ADAPT-APPLY

When the United States entered World War II in December 1941, success was not guaranteed. In the Japanese attack on Pearl Harbor, the event that led to the United States entering the war, about 3,500 military servicemen were killed or wounded, and more than a dozen ships and hundreds of aircraft were heavily damaged or destroyed. In just one morning, our already small military suffered a great loss. At that time, the German and Japanese militaries were 10 times as large as ours. Each of those nations had been spending years preparing for war, while the United States had hardly invested in its military since World War I.

At the same time, Great Britain, the biggest ally of the United States, was under siege and being targeted by frequent air attacks. Tens of thousands had died in cities and industrial areas as result of German bombing. The Atlantic Ocean was patrolled by German U-boats that terrorized shipping and passenger lines. France had fallen, with much of it under German occupation. Japan had conquered large parts of China and Southeast Asia and controlled the natural resources there, as well as the shipping lanes of the western Pacific.

And yet the United States and its allies won.

The people of the United States rallied to the war effort, enlisted in the military, grew Victory Gardens, recycled materials, and took jobs in factories. In the industrial sector, our nation's leaders turned to **Science, Technology, Engineering, and Mathematics (STEM)** professionals to solve big problems and help us win the war. The STEM innovations of World War II can be grouped into three categories:

**ADOPT**

Some existing civilian and military technologies were used for new military and war production purposes with little change.

**ADAPT**

Some existing technologies were modified to be used for new military and war production purposes.

**APPLY**

Some recent advances in our understanding of how the world works were put to use in new military technologies.

When you look at WWII innovations, you can use these categories to explain how things were developed. You can also use them to think of how innovation occurs today.

- **Is something made from new information (apply)?**
- **Is it lightly modified for a new purpose (adopt)?**
- **Is it changed to match a new necessity (adapt)?**

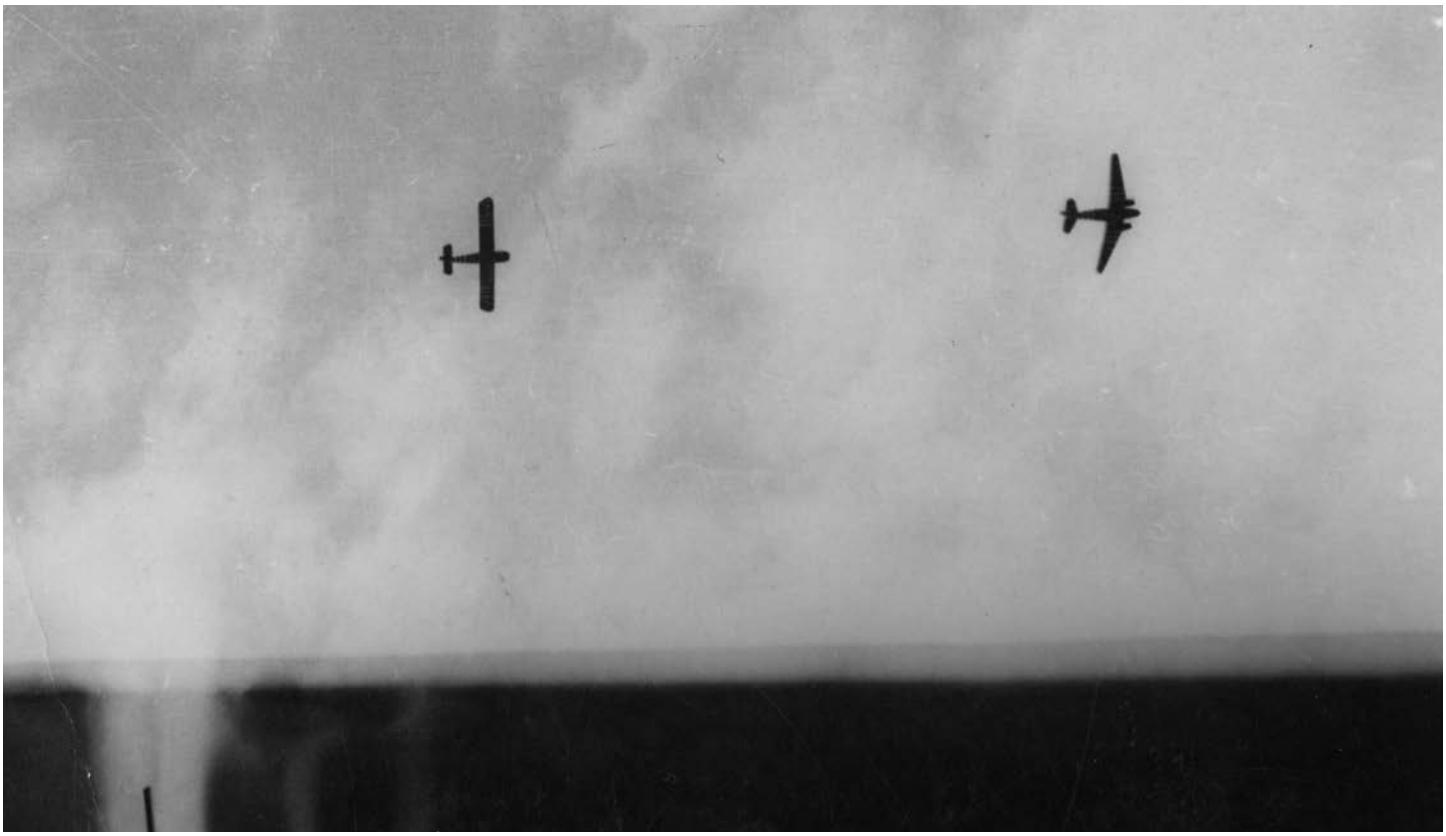
For example, the famous Higgins Boats, which made the landings at Normandy on D-Day possible, were developed by modifying boats Higgins Industries designed for fishing and working in the wetlands of south Louisiana. These boats are examples of **adaptations** of civilian technology for military use in the war. Similarly, the C-47 airplanes that dropped paratroopers behind enemy lines on D-Day were lightly modified from the DC-3 commercial airliner. The C-47 airplanes were **adopted** for military use.

Two of the biggest innovations of World War II, RADAR and atomic weapons, were **applications** of previous research. Great Britain was a center for the development of radio technology. While its cities and ports were under air attack by Germany, Great Britain sent some of its technology to the United States where it was then developed into RADAR that could be used in aircraft, boats, and ships to find the locations of enemy planes and ships. Another example of the application of discoveries is the development of atomic weapons. German scientists had discovered nuclear fission just before the outbreak of World War II. However, it was scientists in the United States who learned to control and deploy this discovery to make the first atomic bombs.

Today our society faces many problems, some of which seem as challenging as those faced by people in 1941. By looking back to the past and seeing how problems were solved, we can be better prepared to confront challenges today. We can **adopt** already existing technologies for new uses. We can **adapt** some past innovations to solve new problems. We can, and should, use our knowledge of both the past and the present to address some of today's most pressing needs.

1. **What are some technologies that you value? Write them down, and explain whether you think each is an example of adopt, adapt, or apply?**

**NAME:** **DATE:**



A C-47 pulling a glider across the sky. June 6 1944. D-Day, over the English Channel.
*(Image: The National WWII Museum, 2011.178.014.)*

**2. What is a big problem in the world today that matters to you? How could future STEM professionals (like you!) solve this problem?**

**3. Which of the three methods of innovation do you think will be the most important for solving the problems of today and tomorrow? Explain your thinking.**

GRADE LEVEL: 3-8 | TIME REQUIREMENT: 4 HOURS

# ENGINEERING SKILLS

**1 READING | 3 ACTIVITIES**

## INTRODUCTION

STEM is the most powerful way to teach science because it integrates science content with problem solving, communication, and calculation. The resources in this section all explore topics using a STEM approach.

## OBJECTIVE

Pair the reading with one or more of the activities. The most natural pairing is between **Kaiser Ship Building** and **Assembly Lines**. **Necessity Cards** can be used to encourage students to think creatively and to take on challenges themselves. Depending upon your objectives and on your estimation of student background knowledge, you might ask students to use only existing technologies in the **Necessity Cards** activity. **Inspected By** presents a chance for students to engage in quantitative analysis. Again, evaluating a process reminds them that engineering is not just for products, but for processes as well. These last two activities could also be used as stand-alone exercises to practice collaboration (**Necessity Cards**) or quantitative skills (**Inspected By**).

## STANDARDS

NGSS DCI ETS1.A
Defining and Delimiting Engineering Problems

NGSS DCI ETS1.B
Developing Possible Solutions

NGSS DCI ETS1.C
Optimizing the Design Solution

NGSS DCI ETS2.B
Influence of Engineering, Technology, and Science on Society and the Natural World

NGSS SEP
Asking Questions and Defining Problems, Analyzing and Interpreting Data, and Engaging in Argument from Evidence

NGSS CCC
Patterns, Scale, Proportion and Quantity

## PERFORMANCE EXPECTATIONS

3-5-ETS1-1
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2
Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3
Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

MS-ETS1-1
Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2
Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3
Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

## READING (1)

1. KAISER SHIP BUILDING

**Description**
A short reading describing how an assembly line was optimized to meet production needs. It is valuable for students to understand that processes, not just products, are engineered. This reading describes how the traditional process of ship building was adapted to make it faster and more efficient.

## ACTIVITIES (3)

1. ASSEMBLY LINES

**Description**
An activity in which students optimize their own hands-on assembly line. Using only ballpoint pens, students work in groups to quickly assemble the pens. Groups practice and optimize their process and then compete together to see which group had the fastest method. Differences in group size can become a discussion point, and a debriefing of how the different groups collaborated to improve their process is a chance for a productive discourse on effective teamwork and problem solving. We suggest using the activity at the beginning of their school year to set expectations for group work and collaboration.

**Supplies**
6 "Clickable" ballpoint pens per group

**Instructions**
Show the students how to take apart and reassemble a pen. Show how many parts there are and make sure they all know how to put them back together. Explain that students need to work in their team to optimize an assembly line to put the pens together. They can practice and iteratively improve their process, competing against the clock for 10-15 minutes. The pens have to be assembled correctly and have to work. After the practice times, have the teams compete to see which can put six pens together fastest. (It's a good idea to keep extra pen parts on hand.)

2. NECESSITY CARDS

**Description**
An activity in which students brainstorm solutions to problems. In groups, students are presented with challenges faced by the Allies in World War II. To fit your needs, you can adjust how much time they spend brainstorming and how they present their products. You could go as far as having them draw plans and make prototypes, or you could be as brief as an outline of ideas. The real key to the success of this activity is getting students to participate in accountable talk and into thinking of constraints and possibilities in innovation.

**Supplies**
Copies of the cards at the end of the activity.

**Instructions**
Divide students into teams and have each team take a card. Individually, students write down their ideas for solutions, then share them with the group, with the goal of creating a consensus solution. If you have more time, you can have groups get really involved and make prototypes and presentations, or you can just let them brainstorm and share ideas.

3. INSPECTED BY

**Description**
An activity in which students practice their quantitative skills to consider quality control. Groups count up the number and color of M&Ms in the bag they are given. Students then graph the number of each color and calculate percentages. When they compare their results across the class and pool them, there is another chance for students to practice using productive, accountable talk. In this activity students will also gain experience looking at variation and how pooling data can sometimes hide variation.

**Supplies**
1 Bag of plain M&Ms per team

**Instructions**
Explain that the candies are not to be eaten until after the investigation. Students in groups will count the number of candies per color and the total number of candies. You can then ask students to make a bar graph of results. Compare bar graphs across the class: Is the same color always the most frequent? Is the total number of candies consistent? What do the results tell you about the process of bagging candies?

## ADDITIONAL RESOURCES

To learn more about the use of engineering in World War II, try these books:

+ *Engineers of Victory* by Paul Kennedy, Random House
+ *Freedom's Forge* by Arthur Herman, Random House

READING

# KAISER SHIP BUILDING

On July 30, 1942, a passenger ship named the *SS Robert E Lee* was carrying 407 crew and passengers steaming towards New Orleans. Waiting off the coast of Louisiana, a German submarine (U-boat) shot a torpedo at the ship, sinking it. Twenty-five people died, and the rest were rescued by a civilian tugboat and two US patrol boats.

The *Robert E Lee* wasn't the only victim of U-boats. By July 1942, in the Gulf of Mexico and off the East Coast of the United States, U-boats had sunk over 300 ships. Supplies to the United States were threatened, as were food and military supplies sent to Great Britain.

While the military sought solutions to decrease the threat of U-boats, the US government saw the need to quickly make many new transport ships. These new ships were needed to bring resources to the United States, to replace ships sunk by U-boats, and to ship manufactured goods overseas to support the war effort.

One of the companies that responded to government requests to build transport ships, which came to be called Liberty Ships and Victory Ships, was Kaiser. Kaiser was a company that had helped build the Hoover Dam—one of the biggest engineering projects in history. One of Kaiser's great innovations and contributions to the war effort was prebuilding parts and assembling them in place.

Kaiser Shipyards built plants to make Liberty and Victory ships on the West Coast of the United States, near San Francisco, California, and Portland, Oregon. Using their new assembly processes, Kaiser Shipyards built 1,490 ships during the war. At Kaiser a ship took two-thirds of the time and one-fourth of the money to produce than at other factories.

Traditionally, the hull of a ship was made first. The hull is most of what you see of a ship: the outside part that floats in the water and rises up to hold the decks and deckhouses. After the hull was made, all the workers making the parts inside the ship climbed in and out of the ship, making for a slow process.

Engineers at Kaiser came up with a new idea. While the hull was being built, the pieces for the decks and deckhouses would be assembled in another part of the factory. Then when the hull was finished, the decks and other parts would be lowered into the hull and welded in place. All the parts had to be exactly the right size so that they would fit. Eventually Kaiser engineers got the production time down to between 40 and 50 days for one ship. Imagine that—a ship 442 feet long and weighing about 32 million pounds being built in 45 days.

Kaiser engineers **adapted** the ship building process, optimizing it for speed. They did this in two ways: by using what they had learned about premaking pieces of a large structure during their construction of giant dams, and by using the experience of automakers to make a more efficient assembly process. With their new process, Kaiser's ships helped win the war by bringing supplies and materials to the battlefronts.


**The Liberty ship *SS George Poindexter* is launched from Delta Shipbuilding Company shipyard, New Orleans, Louisiana, May 18, 1943.**
*(Image: The National WWII Museum, 1999.060.004.)*

**NAME:** **DATE:**

1. **What is a process you use at home or at school that could be more efficient? (Like getting ready for school, packing lunch, putting away your clothes.) What could you do differently, and how would it change the process?**

2. **The reading describes the Kaiser Shipyard process as an adaptation. Do you agree? Can an argument be made that it is an adoption or application instead? Explain your thinking.**

**Shipyard workers building an aircraft carrier, Newport News Virginia, January 21, 1944.** *(Image: The National WWII Museum, 2011.102.411.)*

**View of a Higgins boat assembly line, where PT Boats are being made. New Orleans, Louisiana circa 1941-1945.**
*(Image: The National WWII Museum, 2008.280.002.)*

ACTIVITY

# ASSEMBLY LINES

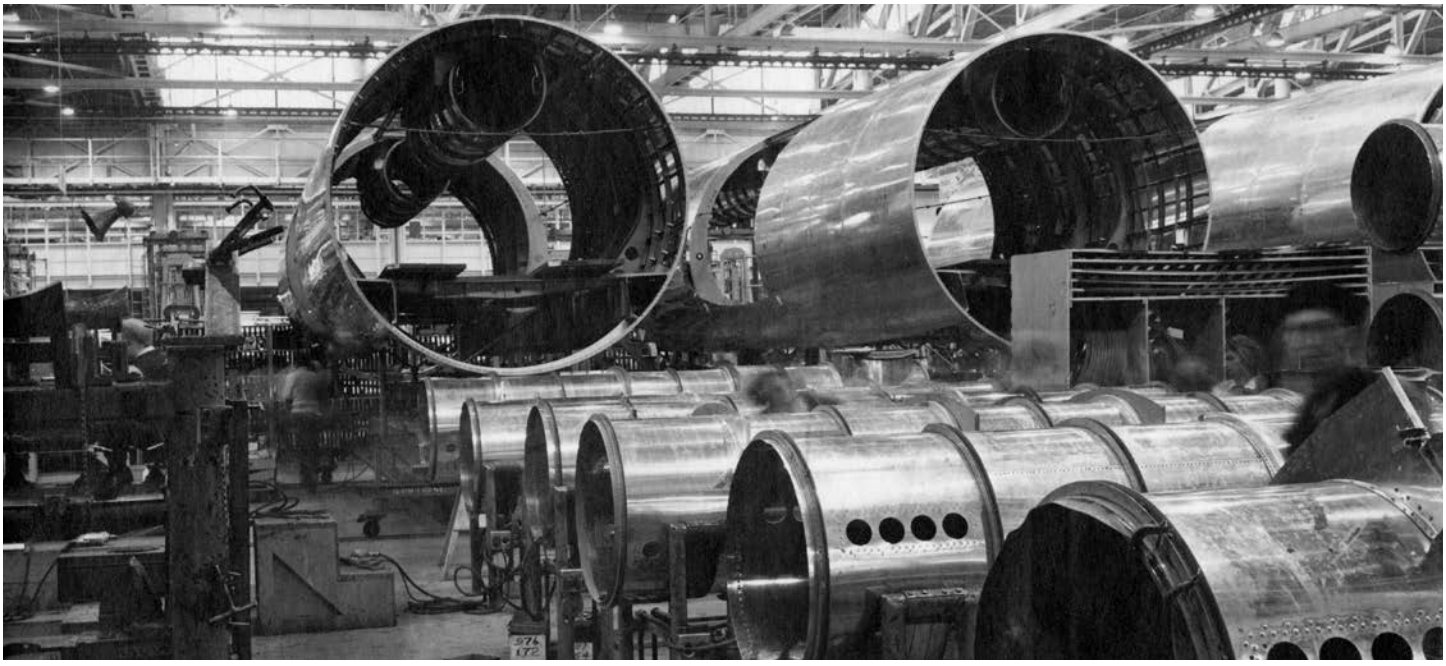
## INTRODUCTION

At home, do you put all your clothes in one drawer all mixed up, or do you have a drawer for socks, a drawer for shirts, and places in your room for every kind of thing? For school, do you just shove everything loose in your backpack, or do you have a notebook with dividers and sections for every class? Does your school have buses that roam the neighborhood looking for kids who need to come to school, or do they have set bus routes, with planned stops and pickup and drop-off times?

These are all questions about systems engineering. A systems engineer designs processes and procedures and systems to get things done efficiently. If you keep your clothes organized in different drawers, you are a systems engineer. The person at your school who sets up buses and drop-off points might be called an operations manager. Operations research is another name for systems engineering.

One way that engineers make things better is by taking already-made things apart to see how they work and to make improvements. This process is called reverse engineering. For example, in World War II, the United States captured a deadly Japanese plane called a "Zero" and took it apart to see how it worked. This procedure provided information on the strengths and weaknesses of the Japanese planes and the best ways to defeat them.

One strategy for putting things together efficiently is to use an assembly line. In an assembly line, all the different tasks to make something are divided up and put in order so that one person does a specific task. For example, cars are usually built on an assembly line. This approach is easier because one part is added in only one place at one time. For example, tires and tools needed for assembly are located in a specified place. Likewise, windshields are assembled in a different location. This approach means that if something goes wrong, like if the carburetor doesn't work, you can determine where something wasn't put together properly and how the error might be corrected. Every car should come off the assembly line the same because the same person put together the same parts in the same order for every car.



**Employees work on airplane parts on an assembly line at an airplane factory. Alliance, Ohio. Circa 1942-1945.**
*(Image: The National WWII Museum, 2013.176.057.)*

**NAME:** **DATE:**

**Directions:** Design an assembly line to manufacture ballpoint pens. Your team will design and test processes to put the pens together. You will modify (**adapt**) your design and practice your process to get faster and more efficient. This is what we call optimization.

At the end of your practice time there will be a competition. The team that can assemble six pens that work in the shortest amount of time will win.

| TRIAL | VARIABLE CHANGED | TIME | CHANGE IN TIME | NOTES / OBSERVATIONS |
|---|---|---|---|---|
| **Trial 1** | | | | |
| **Trial 2** | | | | |
| **Trial 3** | | | | |
| **Trial 4** | | | | |
| **Trial 5** | | | | |
| **Trial 6** | | | | |
| **Trial 7** | | | | |

**1. Describe your first assembly line attempt (include a diagram of your process):**

**2. Describe your final assembly line attempt (include a diagram of your process):**

**3. If you were starting an assembly line again, what would you be sure to do this time around?**

ACTIVITY

# NECESSITY CARDS

## INTRODUCTION

It doesn't take just smarts and creativity to make an invention work. It also takes necessity. Unless there is a strong need or desire for change, a new idea usually won't be adopted right away. A new idea needs people to invest time and money, and so there usually needs to be some sort of problem that forces people to make a change.

World War II was a time when there was a great need for change, from the battlefields to the factories and even to everyday life. The United States had to prepare its military, industry, and people for a war taking place all over the world. The country had to do all that without some of the important resources its factories were used to having because those resources were now under the control of the enemy.


**Soldiers making adjustments to a radio transmitter and receiver on a radio-controlled target plane.**
*(Image: The National WWII Museum, 2011.065.1176.)*

**NAME:** **DATE:**

**Directions:** Your team will get a card describing a problem that needs a solution. These all represent challenges the United States faced in World War II. Your assignment is to develop a detailed plan using what you know to propose a solution to the problem. Present your problem and your ideas to the class. Include how your solution plans will be developed. Your results will certainly involve diagrams and some written explanation.

Make a plan:

**1. Make a list of what you know about the ideas in the problem.**

**2. Brainstorm a list of ways your team thinks you could solve the problem.**

**3. Evaluate that list for the solutions that are best, easiest, cheapest, etc.**

**4. Pick one of the solutions to develop further.**

## REMOTE CONTROL

Sometimes air missions were very dangerous, and risking a crew was not a good idea.

It would be great if there were a way to send aircraft on missions and control them from the ground with no crew on board.

## PORTABLE RATIONS

There was an abundance of rations for soldiers in the field, but they took up space and were heavy and needed heating up.

It would be great if there was a packaged food that could be eaten without heating and that had ample energy and vitamins and nutrients.

## ALTERNATIVE FUEL

Fuel, which was in short supply, was necessary to use as gasoline for tanks, planes, cars, and generators. Rationing helped, but areas of conflict prevented exploration and development of new oil wells.

It would be great to have a way to make fuel from alternate resources that were readily available.

## STOPPING INFECTIONS

All through history more soldiers died of infections than anything else. Infections are caused by bacteria that reproduce exponentially and make people sick.

It would be great to stop infections somehow, either by removing bacteria, killing bacteria, or treating wounds differently.

## PORTABLE POWER

There were often power outages on bases that depended on generators or in cities occupied by troops.

It would be great to have lights, radios, and other equipment that had a way for their users to generate electricity.

## PORTABLE PENS

Pilots had to make notes on maps, but the pens they used were fountain pens that spilled ink and got clogged and smeared.

It would be great to have an easier way to record information in the field and write on maps.

## TREATING TRAUMA

When someone gets injured badly, he or she often loses a lot of blood. This loss of blood has serious effects on the body—causing a condition called shock. Blood transfusions can be used to treat shock, but it is hard to get enough blood, to preserve it, to make sure it's the right type, and to get it to wounded soldiers.

It would be great to have a way to treat trauma from shock by either giving more fluid to the body, by finding a way to treat symptoms of shock, or by preserving blood more effectively.

## HIGH ALTITUDE FLIGHT

Planes are vulnerable to being shot down when they fly at low altitude. But flying at high altitude is difficult because the air is thin. At high altitude, the air pressure is so low that fight crews get very cold and have trouble getting enough oxygen. They can bundle up and use oxygen tanks, but that limits how long they can stay up in the air.

It would be great to have a way to fly at high altitude and have planes with higher air pressure.

## MALARIA

Mosquitoes were prevalent and were biting troops, especially in the Pacific Theater. Many of these mosquitoes carried malaria. Malaria is a disease caused by single-celled parasites. The drugs used for malaria were not that effective and caused many side effects.

It would be great to have a way to prevent mosquito bites, get rid of mosquitos, or cure malaria.

## INSULATING CIRCUITS

Almost all the equipment in World War II used electrical circuits. Airplanes, tanks, ships, trucks, radios, radar—all depended on electrical circuits. Those circuits used wires that needed to be insulated. Insulation of wires needs a material that doesn't carry electricity and that can be easily and cheaply wrapped around a wire.

It would be great to have a material that could insulate wire and that could be produced with existing material.

## AMPHIBIOUS VEHICLES

Though our ships, trucks, and tanks were numerous, it was a demanding job to go from one to the other. Also, getting trucks, tanks, and soldiers from transport boats to shore was difficult. It was also especially hard to move people and material around on the islands in the Pacific where conditions were wet and rainy.

It would be great to have vehicles that could move from water to land more easily.

## PARACHUTE FABRIC

Parachutes were made of silk. Silk was light and strong and performed well in this function. But silk comes from caterpillar cocoons and is slow to make and is expensive. Also, silk also came from parts of Asia that the Japanese came to control.

It would be great to have a fabric that would be strong and light like silk but was easier and cheaper to make.

## ACTIVITY

# INSPECTED BY

### INTRODUCTION

When things are produced on a large scale, whether they are cars, planes, or candies, someone needs to make sure they came out right. This is called Quality Control.

Quality Control Engineers, or Inspectors, examine products carefully to make sure they meet their requirements. In this activity, you will act as quality control inspectors.

Take the package of candy your teacher gives you. Open it, but don't eat it!

**1. Make a data table to record information about the contents.**

| | | | | |
|---|---|---|---|---|
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## DID YOU KNOW

Did you know that M&Ms were a WWII invention? Throughout the war they were only available to the military. Chocolate and sugar were rationed during the war, so sweets were hard to get.

**NAME:** **DATE:**

**2. Record the number of pieces of candy in each color; also record the total number of candies in the bag.**

**3. Make a bar graph to show the number of pieces of each color. Calculate the percent of each color of candy in your bag. Share your data with the class.**

**4. What are the percentages of each color across the whole class?**

**5. Was anyone's bag very different from the rest?**

**6. Were the numbers of candies in each bag the same across the whole class?**

**7. If you had a giant container of these candies that held 5,000 of them, how many of each color would you expect to find?**

**8. What does the data tell you about the process for putting candies in a bag? Do you think someone is checking to make sure all the bags are filled the same?**

# ADDITIONAL RESOURCES

## MANUFACTURING VICTORY
Electronic Field Trip Classroom Guide

For additional resources related to the **Manufacturing Victory Electronic Field Trip**, explore the following:

### TEACHER RESOURCES:

**Manufacturing Victory Electronic Field Trip** recording
https://www.nationalww2museum.org/manufacturing-victory

**Electronic Field Trip** archive
https://www.nationalww2museum.org/electronic-field-trips

**The Home Front** curriculum set
https://www.ww2classroom.org/?q=search&subjects=3

**Get in the Scrap!**
https://getinthescrap.org

**Real World Science**
https://ww2steminnovations.org

### STUDENT RESOURCES:

**Battleship North Carolina**
https://www.youtube.com/watch?v=lbXIhuQU8rM

**Torpedo Junction**
https://www.youtube.com/watch?v=tgzeEPAB5w4

**SS Jeremiah O'Brien**
https://www.youtube.com/watch?v=aUnV-lGRCCs

**Women in WWII**
https://www.youtube.com/watch?v=5_8FsVMb0N8

**Salvage for Victory**
https://www.youtube.com/watch?v=L-dwO2CeurM

**Higgins Industries**
https://www.youtube.com/watch?v=HcDZ5r8cIPY

**Manufacturing Victory** online interactive for students
https://www.ww2mveftactivity.org

# MANUFACTURING VICTORY

## ELECTRONIC FIELD TRIP

THE NATIONAL WWII MUSEUM
NEW ORLEANS