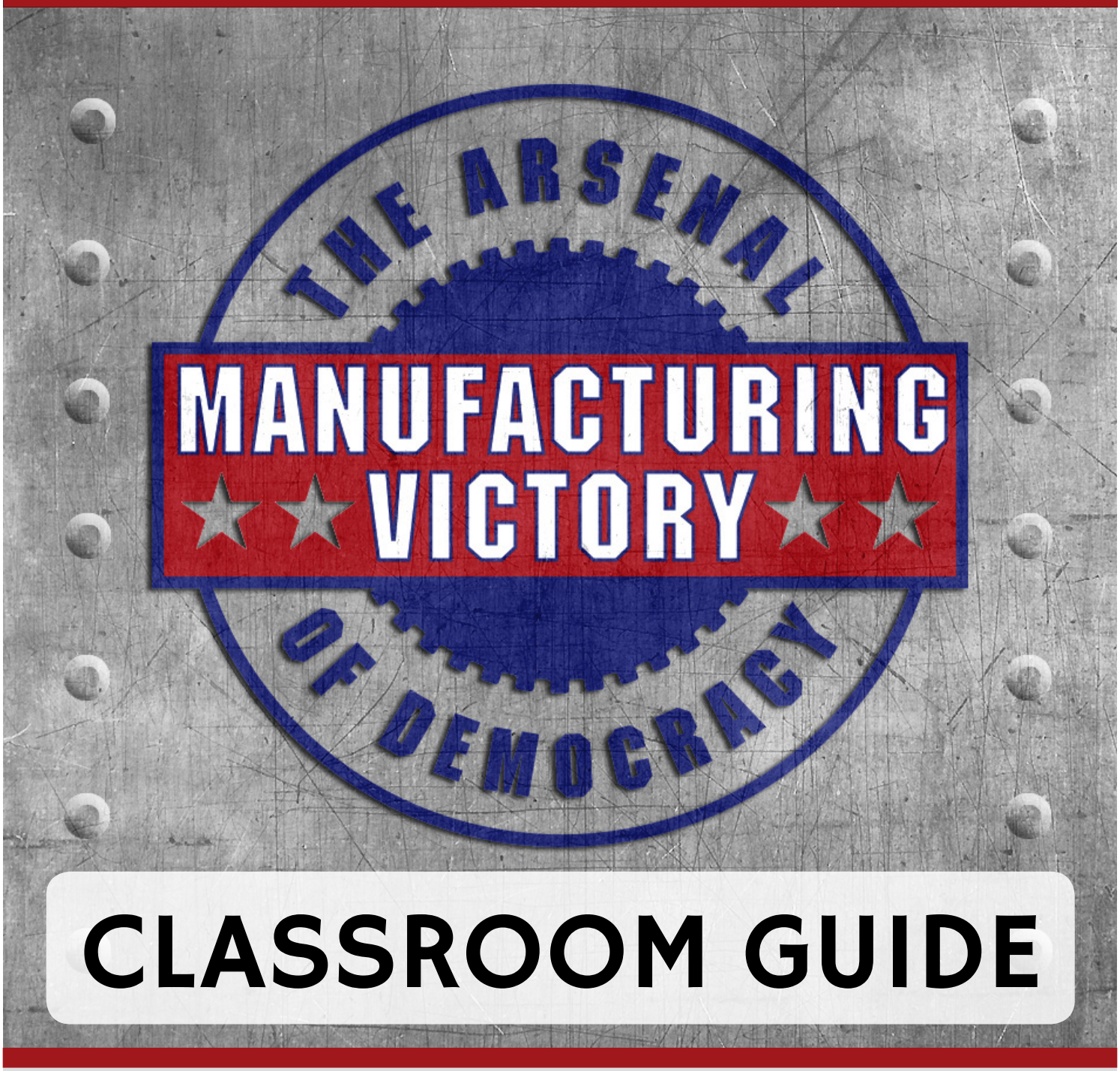
THE NATIONAL WWII MUSEUM
NEW ORLEANS



CLASSROOM GUIDE

The National WWII Museum
945 Magazine Street
New Orleans, LA 70130
manufacturing-victory.org

ABOUT THIS GUIDE

The National WWII Museum created this classroom guide to correspond with the special exhibit *Manufacturing Victory: The Arsenal of Democracy*. *Manufacturing Victory: The Arsenal of Democracy* tells the inspiring story of the Home Front effort that produced tanks, planes, ships, and guns with staggering speed and unparalleled energy. It was a surge in productivity that not only brought the country out of depression, but also created mighty military forces, supplied the Allies abroad, and opened new doors of opportunity and social change. The lesson plan aligns with Common Core and National Center for History in the Schools standards.

TABLE OF CONTENTS

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

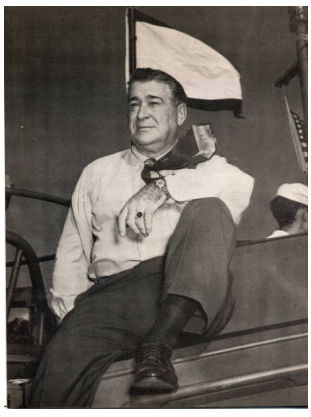
R.G. Le Tourneau, Inventor and Founder of Le Tourneau Technologies:

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:

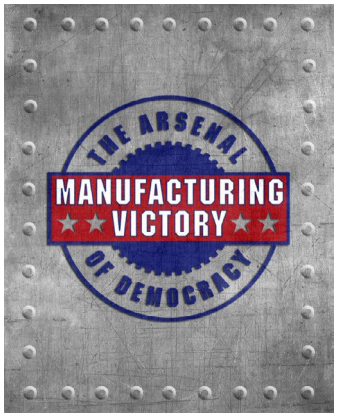
Fred Geier (1983-1981) was the son of German immigrants. Born in America, Geier was a well educated and quiet man who was at the forefront of America's preparation for war. During his pre-war travels to Germany in the 1930s as president of the Cincinnati Milling Machine Company, Geier witnessed Germany's 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 types of 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:

5. "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.

6. 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.

7. 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 stu-

dents 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.

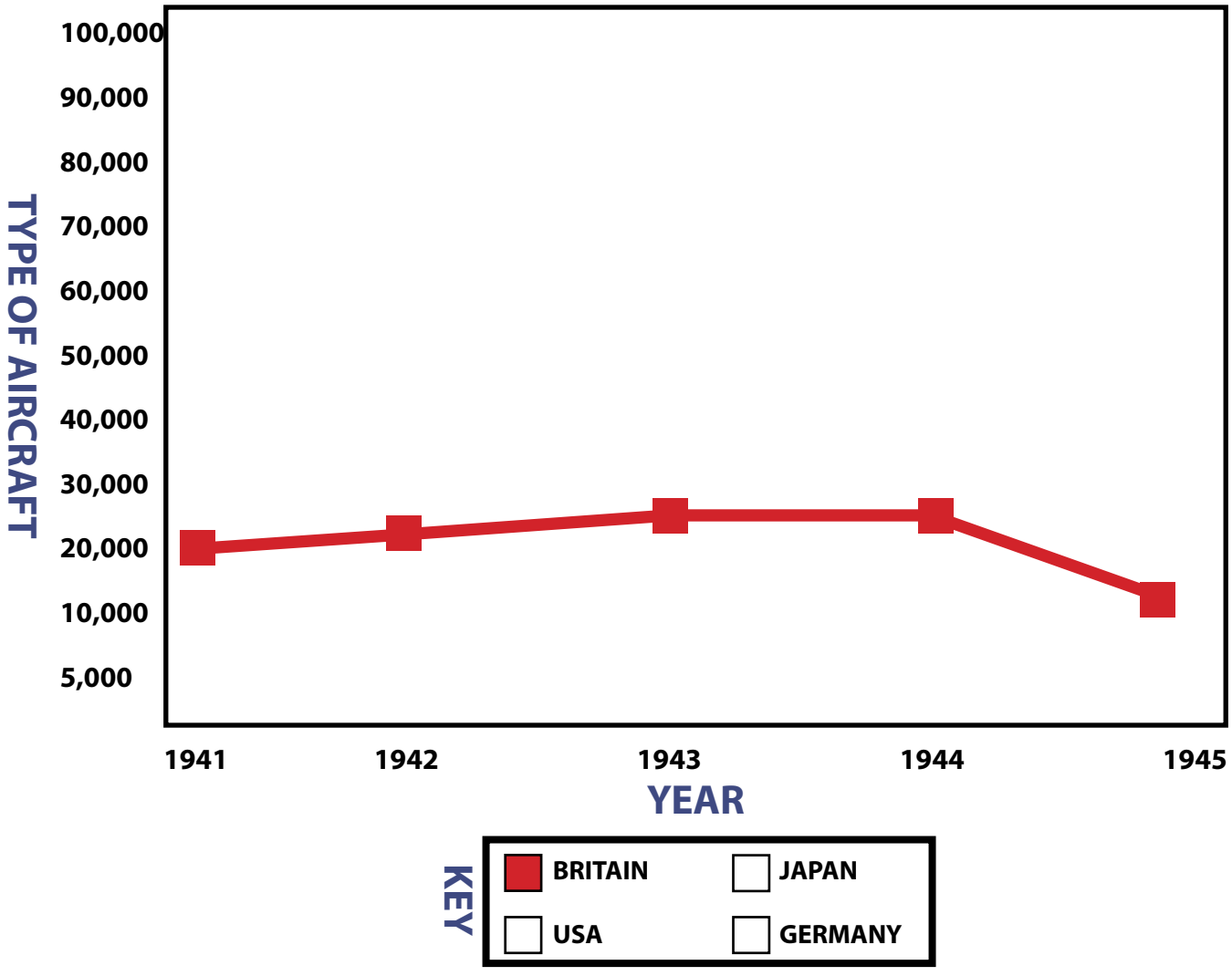
STUDENT HANDOUT

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:

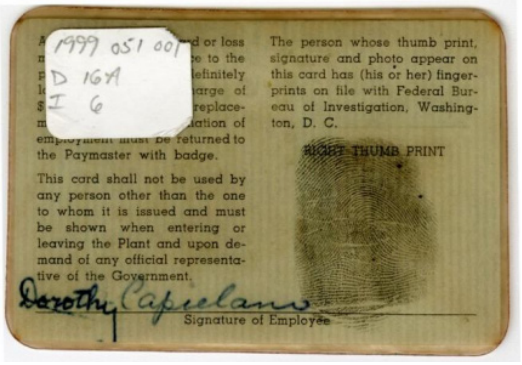
Military Item	**Total Number Produced during WWII**	**Approximate Number Made Per Month** (Total Number Produced ÷ 45 months at war)
Aircraft Carriers	107	2 per month
Tanks	352	
Airplanes	300,000	
Machine Guns	2.6 million	
Bullets	4.1 billion	

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			

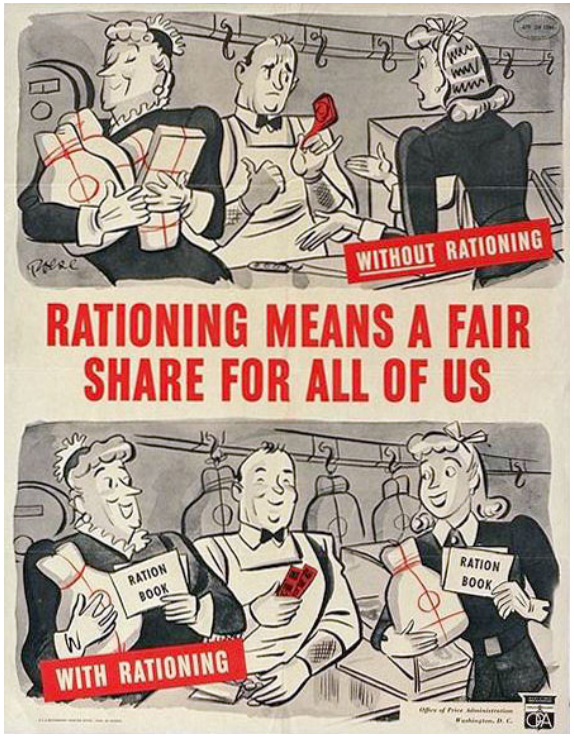
STUDENT SOURCE ANALYSIS WORKSHEET

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?
  Dorothy Capielano, Higgins Aircraft Plant Identification Badge, 1943. Gift of Gerald Lanoix. The National WWII Museum, 1999.051			

STUDENT SOURCE ANALYSIS WORKSHEET

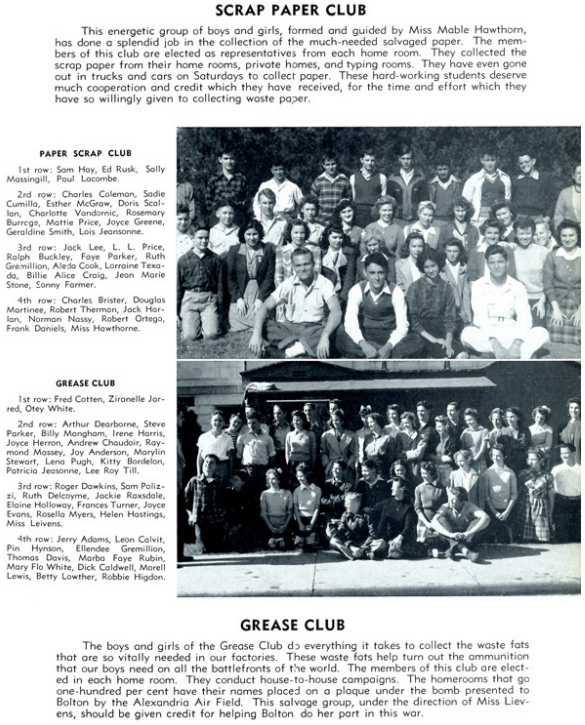
Primary Source	Describe the Source:	Who was this source made for or used by? How can you tell?	What information does this source tell me about US production during WWII?
"[Working at the shipyard in Mobile, Alabama] was seven days a week. And during the war when [production] was so strong, it was twelve-hour days, five days a week, ten hours on Saturday, [and with only] eight hours on Sunday, you felt like you had a week off." —Clyde Odom, foreman at Alabama Dry Dock Ship and Building Company. Quote from The War, September 2007.			
 Chrysler Corporation's Detroit Arsenal Tank Plant, 1940s. 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?
 "Rationing Means a Fair Share for All of Us," poster. US Office of Price Administration, Washington, D.C., 1943. Courtesy of the National Archives and Records Administration.			

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 Vandornic, Rosemary Burrcga, Mattie Price, Joyce Greene, Geraldine Smith, Lois Jeansonne.

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

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

GREASE CLUB

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

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

3rd row: Roger Dawkins, Sam Polizzi, Ruth Delcoyme, Jackie Roxsdale, Elaine Halloway, 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

1. 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.

2. 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.

3. 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.

4. 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.

5. 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.

