Activity: "A War of Wits": Anti-Submarine Warfare in the Battle of the Atlantic
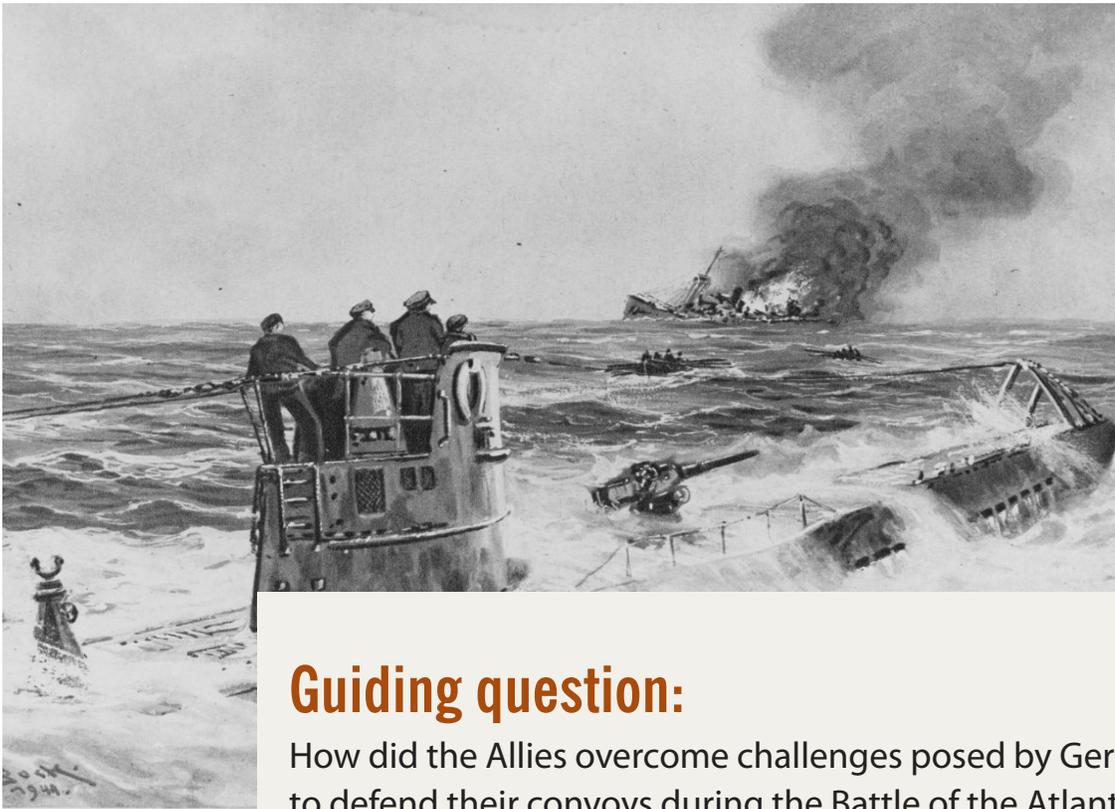
Guiding question:

How did the Allies overcome challenges posed by German U-boats to defend their convoys during the Battle of the Atlantic?

DEVELOPED BY LEIF LIBERG

Grade Level(s):	**9-12**
Subject(s):	**Social Studies**
Cemetery Connection:	**East Coast Memorial**
Fallen Hero Connection:	**Lieutenant (junior grade) John Laubach**

NHD NATIONAL HISTORY DAY

Overview

Using materials from the American Battle Monuments Commission and primary and secondary source documents, students will determine how U.S. forces developed ways to locate German U-boats and protect their convoys from attack. At the conclusion of the lesson, students will place themselves in the role of a U.S. Navy sailor, attempting to tell family and friends about how the Allies dealt with the challenges of the Battle of the Atlantic.

Historical Context

The Battle of the Atlantic was, in reality, a campaign that lasted the entire length of World War II. Between 1939 and 1945, German U-boats prowled the seas, attempting to locate and sink the merchant ships whose precious cargo of personnel, weapons, and supplies were helping maintain the Allied war effort. The Allies suffered unsustainable losses in the early years of the war. They developed new ways to detect and track the U-boats in order to defend their convoys from attack. After 1943, the U-boats increasingly found themselves on the defensive until Germany's surrender in May 1945. The efforts of the Allied navies and air forces to overcome the threat posed by the U-boats and win the Battle of the Atlantic significantly contributed to victory in World War II.

"The Battle of the Atlantic is ignored in many secondary education curriculums, yet winning this campaign was central to Allied victory in World War II. The story of how the Allies overcame initial setbacks in their battle against German U-boats through the use of technology, intelligence, and strategy helped ensure that the personnel, weapons, and supplies needed to win the war could continue to flow across the Atlantic."
—*Leif Liberg*

Liberg is a teacher at Saint Mary's Ryken High School in Leonardtown, Maryland.

Objectives

At the conclusion of this lesson, students will be able to

- Analyze data related to the loss of Allied shipments to U-boat attacks and draw inferences about Allied success in the Battle of the Atlantic over the course of the war;

- Describe the role of HF/DF, RADAR, SONAR, and Ultra Intelligence in determining the location of U-boats, and assess the effectiveness of each of these tools;

- Describe how the Allies used naval and air forces to escort convoys in an effort to defend them against U-boat attacks; and

- Assess the consequences of Allied success in the Battle of the Atlantic.

Standards Connections

Connections to Common Core

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.6-8.5 Describe how a text presents information (e.g. sequentially, comparatively, causally);

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.

Connections to C3 Framework

D2.His.1.6-8. Analyze connections among events and developments in broader historical contexts.

D2.His.14.6-8. Explain multiple causes and effects of events and developments in the past;

Documents Used ★ indicates an ABMC source

Primary Sources

Blank V-mail envelope
University of North Texas Libraries Special Collections
https://digital.library.unt.edu/ark:/67531/metadc504978/m1/2/

Ernest Joseph King, *U.S. Navy At War, 1941-1945*.
Official Reports to the Secretary of the Navy, 1946 (excerpt)

Photograph, *Consolidated PB4Y-2B "Privateer"*
Naval History and Heritage Command (NH 92485)
https://www.history.navy.mil/content/history/nhhc/our-collections/photography/numerical-list-of-images/nhhc-series/nh-series/NH-92000/NH-92485.html

Photograph, *Convoy WS-12, November 27, 1941*
Naval History and Heritage Command (80-G-464654)
https://www.history.navy.mil/our-collections/photography/numerical-list-of-images/nara-series/80-g/80-G-460000/80-G-464654.html

Photograph, *Lowell Price Tabor at air search radar*, 1945
Battleship North Carolina (1982.010.0522)
https://battleshipnc.pastperfectonline.com/media/D73687DC-316B-438D-A45C-905209769073

Photograph, *Preparation for sonar recognition group training*
Naval History and Heritage Command (L55-03.07.02)
https://www.history.navy.mil/our-collections/photography/numerical-list-of-images/nhhc-series/naval-subjects-collection/l55-weapons/l55-03-07-02-preparation-for-sonar-recognition-group-training.html

Photograph, *Reservists study fundamentals of Navy sonar equipment*
Naval History and Heritage Command (L55-03.07.01)
https://www.history.navy.mil/our-collections/photography/numerical-list-of-images/nhhc-series/naval-subjects-collection/l55-weapons/l55-03-07-01--reservists-study-fundamentals-of-navy-sonar-equipm.html

Sketch, *German type XXI U-boat*, c. 1939-1945
Naval History and Heritage Command (NH 96068)
https://www.history.navy.mil/our-collections/photography/numerical-list-of-images/nhhc-series/nh-series/NH-96000/NH-96068.html

Sketch, *German U-Boat Sinks an English Freighter*, c. 1939-1945
Naval History and Heritage Command (NH 61838)
https://www.history.navy.mil/our-collections/photography/numerical-list-of-images/nhhc-series/nh-series/NH-61000/NH-61838.html

Secondary Sources

Maneuvering Board, *Figure 2. A Simplified Maneuvering Board*
National Oceanic and Atmospheric Administration
https://oceanservice.noaa.gov/education/lessons/ready_set_drift.html

Jerry Russel, *Ultra and the Campaign Against the U-boats in World War II*, May 20, 1980
Naval History and Heritage Command (SRH-142)
https://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/u/current-doctrine-submarines-usf-25-a.html

Stephen Puleo, *Due To Enemy Action: The True World War II Story of the USS Eagle 56* (excerpt)

World War II: A Visual History Interactive Timeline ★
American Battle Monuments Commission
https://www.abmc.gov/sites/default/files/interactive/interactive_files/WW2/index.html

Materials

- Battle of the Atlantic Document Packet
- Battle of the Atlantic Vocabulary Sheet
- Battle of the Atlantic V-Mail Grading Rubric
- Computer with projector and speakers

Lesson Preparation

- Make one copy of the Battle of the Atlantic Document Packet, Battle of the Atlantic Vocabulary Sheet, and Battle of the Atlantic V-Mail Grading Rubric for each student.
- Divide the class into partners or groups of three.
- Set up classroom technology.

Procedure

Activity One: Setting the Stage (10 minutes)

- Project *World War II: A Visual History Interactive Timeline*. Click "enter," then click "1941" on the bottom of the page. Then click "United States Antisubmarine Campaign" in the center of the screen.
- Show the video clip and read the text aloud to the class.
    - **Teacher Tip**: Stop at the conclusion of the sentence reading, "The success of the Allied war effort depended on moving troops and supplies across vast oceans."
    - Ask students:
        - *What does this sentence suggest about the location of much of the fighting relative to the United States?*
        - *What was the only way that adequate numbers of U.S. troops, weapons, and supplies could be moved to take part in the fighting?*
        - *How did the Germans attempt to prevent that from happening?*
- Project Sketch, *German type XXI U-boat (NH 96068)*. Explain that a U-boat is a submarine, and that it can operate on the surface of the ocean, as well as underwater.
    - Ask students:
        - *Based on the film clip, can you suggest any advantages a submarine might have over a ship?*
        - *Why would these advantages make a submarine more challenging to find and fight as compared to other naval vessels?*
- Inform students that today they will be learning about the Battle of the Atlantic. As they do so, they will consider how the Allies, and the U.S. Navy in particular, sought victory in their desperate struggle against the U-boats.

Activity Two: Document Analysis (30 minutes)

- Move students into groups of two or three students.
- Distribute one Battle of the Atlantic Document Packet to each student.
- Assign students to review each document in the Battle of the Atlantic Document Packet and complete all questions.
  - Review the first set of questions associated with figure one. Determine which columns contain the information that you will need to answer each question.
    - **Teacher Tip**: You may choose to answer the first question together. Important columns include "Allied Shipping Sunk." "New Construction - Total," "Net Gains or Losses," and "German Submarines Sunk." You may wish to point out that any time there is a negative number in the "Net Gains or Losses" column, more Allied ships were sunk than built during that period of time. If there is a positive number, more Allied ships were built than were sunk.
  - Direct students to continue to figure two, carefully reading each quote and answering the associated questions. Review responses to make sure all students are on track.
  - Explain the directions for figures three through seven. In this section, students will analyze tools used to fight German submarines.
  - Circulate around the classroom, providing support or redirection as needed.

Activity Three: Drawing Conclusions (10 minutes)

- Complete the following tasks as a class:
  - Draw a horizontal line across the chalkboard to represent a scale, with the left-hand side labeled "Least Specific" and the right-hand side labeled "Most Specific."
  - Say to students, *The documents showed you that the Allies came up with many ways to find German U-boats. Some of these tools gave more specific information about the location of German U-boats than others. Which of the items that you saw in figures three through seven would give the Allies the best information about the U-boats?*
  - Review each item from figures three to seven. Ask students to vote by raising their hands where they believe each item belongs on the scale. Place each item on the scale according to the majority vote.
  - Ask students, *How do these sources help us understand how the Allies won the Battle of the Atlantic?*

Assessment

- Distribute One Battle of the Atlantic V-Mail Grading Rubric for each student.
- Assign students to take on the role of a U.S. Navy sailor who is writing a V-Mail home at the end of the war. In their V-Mail, students should explain how the Allies addressed the challenges posed by German U-boats using details from today's activity as evidence.
  - **Teacher Tip**: V-Mail was pre-made stationary used by servicemembers to write letters to family and friends during World War II. The length of the V-Mail may be adjusted at the teacher's discretion.
- The V-Mail Grading Rubric can be used to assess this assignment.

Methods for Extension:

- Students expressing more interest in the Battle of the Atlantic and World War II may want to visit the National Museum of the U.S. Navy in Washington, D.C., or read books such as *The Battle of the Atlantic*, or *Due To Enemy Action*.
- Teachers can enhance students' interest in the role of the U.S. Navy and U.S. Coast Guard in World War II by exploring these related lesson plans on ABMCEducation.org:
  - The Calculus of War: Tactics, Technology, and the Battle of the Atlantic
  - "I'll Huff and Puff and Blow Your Ships Up": The Impact of the German Wolf Pack During the Battle of the Atlantic
  - Making a Difference: Service & Sacrifice at the Battle of Midway
  - The Math of War: The Numbers Behind Minesweeping the Mediterranean
- Students interested in learning more about V-Mail may want to visit the Smithsonian National Postal Museum.

Adaptations:

- Teachers may adapt the final assessment to creating comic strips or other artistic works that allow students to storyboard what they have learned.
- Teachers can adapt the lesson to older or more advanced learners by making the final assessment into a series of memos that outline the progress of the anti-submarine war in the Atlantic.
  - Memo One: Challenges Faced By the Allies
  - Memo Two: Ways the Allies Addressed the Challenges of Anti-Submarine Warfare
  - Memo Three: Importance of Success in the Battle of the Atlantic

German type XXI U-boat

Sketch, *German type XXI U-boat*, c. 1939-1945

Naval History and Heritage Command (NH 96068)

Battle of the Atlantic Vocabulary Sheet

Bearing- direction to a target

Convoy- a group of ships travelling together for protection

Cipher- a message written using a secret code

Depth Charge- an explosive device used at destroy submarines

Destroyer (DD)- a fast warship equipped with HF/DF or radar, sonar, and weapons suited for anti-submarine duty

Destroyer Escort (DE)- a smaller version of a destroyer equipped with HF/DF or radar, sonar, and weapons suited for anti-submarine duty

Escort Carrier (CVE)- a ship which carries small aircraft that can be used to search for and/or attack enemy submarines

Escort Duty- ships and aircraft that have been assigned to protect convoys from attack by U-boats

Range- distance to a target

Submerge- to be underwater

Surface- to be on top of the water

Tonnage- the cargo capacity of a merchant ship

Transmission- a signal sent from one location to another

ULTRA Intelligence- an Allied intelligence program designed to break German communication codes

U-boat- a German submarine

Vessel- a ship or boat

Battle of the Atlantic Document Packet: Figure One

Directions: Answer each of the questions below using the information provided. Reference the Vocabulary Sheet as needed.

Year	German Submarines Sunk	Allied Shipping Sunk	New Construction			Net Gains or Losses
			U.S.	British	Total	
	(Number)	(In thousands of tons)				
1939 (4 months)	9	810	101	231	332	−478
1940	22	4,407	439	780	1,219	−3,188
1941	35	4,398	1,169	815	1,984	−2,414
1942	85	8,245	5,339	1,843	7,182	−1,063
1943	237	3,611	12,384	2,201	14,585	+10,974
1944	241	1,422	11,639	1,710	13,349	+11,927
1945 (4 months)	153	458	3,551	283	3,834	+3,376
Totals	782	23,351	34,622	7,863	42,485	+19,134

Source: King, *Third Report to the Secretary of the Navy*, page 206

During which year(s) were more Allied ships sunk than were built? _____

How many total German U-boats were sunk during that same period? _____

Based on your answer to the first question, what does that answer imply about the relative success of Allied forces in stopping German U-boat attacks on convoys in the Battle of the Atlantic during that period?

_____

_____

During which year(s) were more Allied ships built than were sunk? _____

How many total German U-boats were sunk during that same period? _____

What does your answer imply about the relative success of Allied forces in stopping German U-boat attacks on convoys in the Battle of the Atlantic during that period?

_____

_____

Which year appears to mark an important shift for Allied success? _____

Make three predictions about how the Allies created this reversal.

_____

_____

_____

_____

Battle of the Atlantic Document Packet: Figure Two

"By the time the convoy was attacked, it was too late to do anything except fight. Any [change of course] to avoid an attack would have had to come sufficiently early so that the U-boats could not catch the convoy and get into attack position…" Russell, *Ultra and the Campaign Against the U-boats in World War II*, 1980, page 11	"The U-boat war has been a war of wits…There is a constant interplay of new devices and new tactics on the part of forces working against the submarines…" King, *First Report to the Secretary of the Navy*, 1946, page 82
How does Russell suggest the Allies could have protected their convoys? What did the Allies need to be able to do to accomplish this?	How does Admiral King describe the battle against German U-boats? What does he mean by this? What does Admiral King suggest is the key to defeating the U-boats?

Battle of the Atlantic Document Packet: Figure Three

Directions: Using the information provided, determine how each of the items below helped Allied forces prevent U-boat attacks on their convoys.

High Frequency Direction Finder (aka HF/DF or "Huff Duff")

U-boat radio signal detected
Bearing: 053°
Range: Unknown

Source: Naval History and Heritage Command (L55-03.07.02),
National Oceanic and Atmospheric Administration
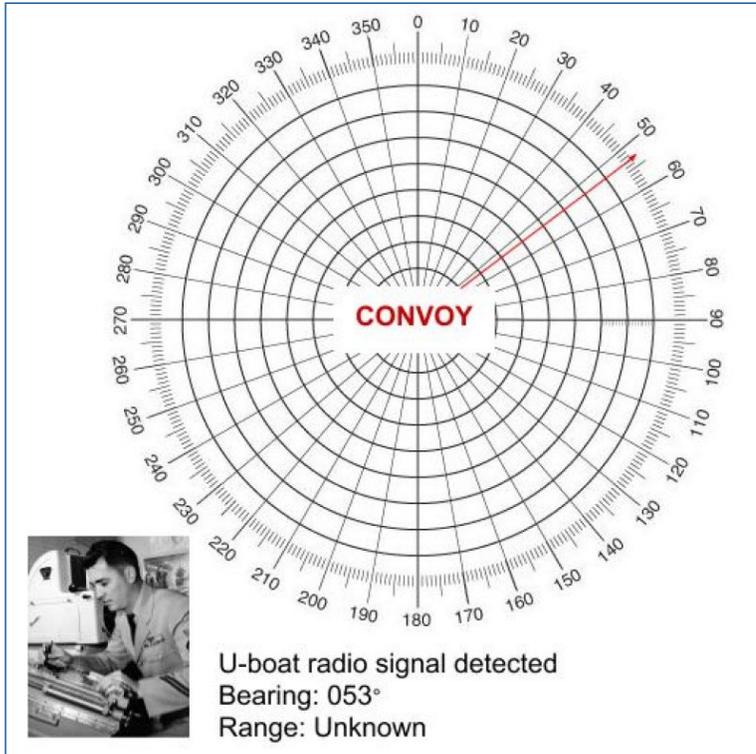
What information can be determined using "Huff Duff"?

_____

_____

_____

_____

_____

How would this tool help prevent U-boat attacks on Allied convoys?

_____

_____

_____

_____

_____

_____

_____

Rate this tool on the scale below.

| 1	2	3	4	5
Least Helpful				Most Helpful

Explanation: _____

_____

How can the information about HF/DF help us understand how the Allies won the Battle of the Atlantic?

_____

_____

_____

Battle of the Atlantic Document Packet: Figure Four

Directions: Using the information provided, determine how each of the items below helped Allied forces prevent U-boat attacks on their convoys.

Sound Navigation Ranging (aka SONAR)
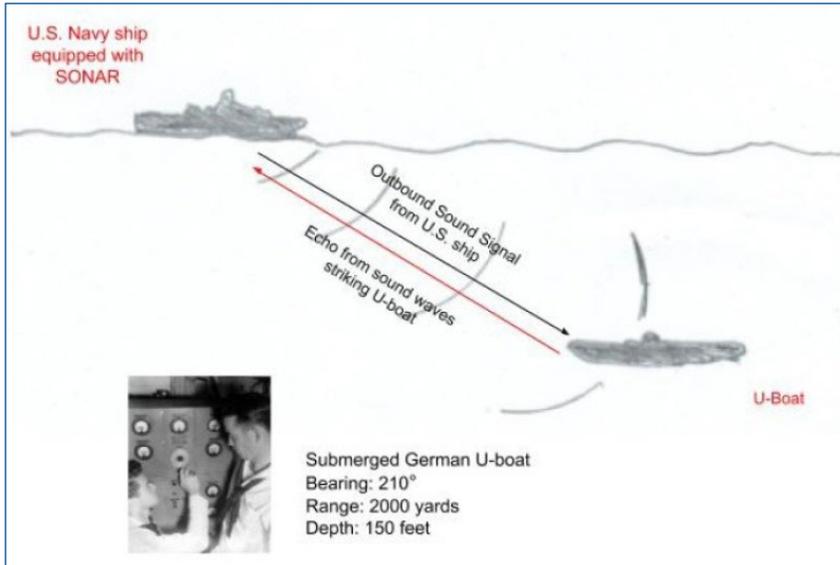
Source: Naval History and Heritage Command (L55-03.07.02),
National Oceanic and Atmospheric Administration

What information can be determined using SONAR?

_____

_____

_____

_____

_____

How would this tool help prevent U-boat attacks on Allied convoys?

_____

_____

_____

_____

_____

Rate this tool on the scale below.

1	2	3	4	5
Least Helpful				Most Helpful

Explanation: _____

_____

How can the information about SONAR help us understand how the Allies won the Battle of the Atlantic?

_____

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_____

_____

Battle of the Atlantic Document Packet: Figure Five

Directions: Using the information provided, determine how each of the items below helped Allied forces prevent U-boat attacks on their convoys.

Radio Detection and Ranging (aka RADAR)

Surfaced U-boat detected
Bearing: 125°
Range: 18 miles

Source: *Battleship North Carolina* (1982.010.0522),
National Oceanic and Atmospheric Administration
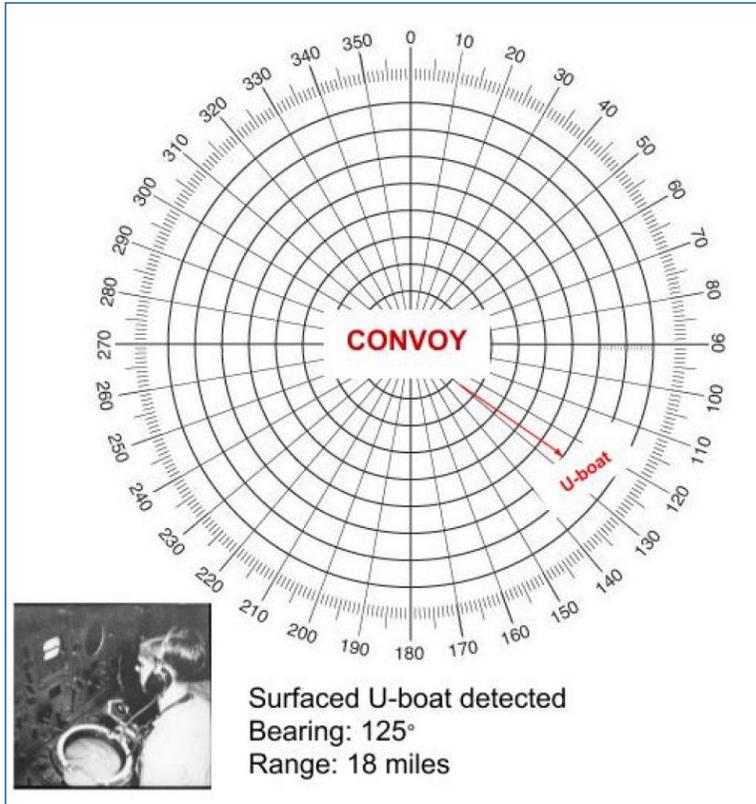
What information can be determined using RADAR?

_____

_____

_____

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_____

How would this tool help prevent U-boat attacks on Allied convoys?

_____

_____

_____

_____

_____

Rate this tool on the scale below.

1	2	3	4	5
Least Helpful				Most Helpful

Explanation: _____

_____

How can the information about RADAR help us understand how the Allies won the Battle of the Atlantic?

_____

_____

_____

_____

Battle of the Atlantic Document Packet: Figure Six

Directions: Using the information provided, determine how each of the items below helped Allied forces prevent U-boat attacks on their convoys.

Ultra Intelligence

1941-1942: "The Germans used a cipher machine called Enigma to put messages into secret form, and the British first broke the code…[and] were able to read German naval traffic (code-named 'Hydra')…But the Germans changed the Hyrda code in February of 1942 to the more complex Triton code. This act 'blinded' both British and American code breakers for most of the remainder of 1942…By the end of 1942, Allied code breakers had broken the Triton code, and the Ultra blackout ended,"

Puleo, *Due to Enemy Action*, page 28

1943-1945: "By the summer of 1943, the most significant U-boat tracking work was performed in the security of the Secret Room, whose staff maintained three wall charts - one depicting the North Atlantic, one the South Atlantic, and a third, the Indian Ocean. They recorded individual U-boat positions with color-coded pins on the wall charts, and labeled the pins with the type and tonnage of the U-boat…"

Puleo, *Due to Enemy Action*, page 31

"[High ranking naval intelligence officers] either drafted or approved the daily U-boat situation estimate, with its forecast of where submarines were going, and then transmitted it to task forces at sea…"

What information could be determined using Ultra Intelligence?

_____

_____

_____

_____

_____

_____

How would this tool help prevent U-boat attacks on Allied convoys?

_____

_____

_____

_____

_____

_____

Rate this tool on the scale below.

1	2	3	4	5

Least Helpful   Most Helpful

Explanation: _____

_____

How can the information about Ultra Intelligence help us understand how the Allies won the Battle of the Atlantic?

_____

_____

_____

Battle of the Atlantic Document Packet: Figure Seven

Directions: Using the information provided, determine how each of the items below helped Allied forces prevent U-boat attacks on their convoys.

Ships and Aircraft

A U.S. Navy dive bomber scouts ahead of a convoy of ships being escorted by U.S. Navy vessels. Ships such as destroyers (DD), destroyer escorts (DE), and escort carriers (CVE) were often used for escort duty.

Source: Naval History and Heritage Command (80-G-464654)

Source: Naval History and Heritage Command (NH 92485)

"For our four-engine, land-based search plane, we have…a plane with a range of well over 3000 miles, heavy armament and a wealth of new navigational, radio and radar equipment, enabling it to fly long hours of reconnaissance over trackless oceans. These planes, which carry bombs and depth charges, have made impressive records against…[enemy] submarines…"

King, *First Report to the Secretary of the Navy*, page 216

Describe how the U.S. Navy protected convoys at sea.

_____

_____

_____

_____

_____

_____

_____

How would these ships and aircraft help prevent U-boat attacks on Allied convoys?

_____

_____

_____

_____

_____

_____

Rate this tool on the scale below.

1	2	3	4	5

Least Helpful   Most Helpful

Explanation: _____

_____

How can the information about ships and aircraft help us understand how the Allies won the Battle of the Atlantic?

_____

_____

_____

How Did the Allies Win the Battle of the Atlantic?

Directions: During World War II, servicemembers often wrote letters home on pre-made stationary sheets known as V-Mail. Imagine that you are a sailor on a U.S. Navy ship. You have spent the last few years performing escort duty for convoys in the Atlantic. The war has just ended and you are finally able to tell your family and friends back home about everything that you have been doing. Write a V-Mail describing how the U.S. Navy (and you) helped win the Battle of the Atlantic.

Address ONE of the following in your V-Mail:

- What were the major challenges posed by U-boats early in the war? Why did the Allies initially struggle to thwart the German attacks?
- How did the Allies overcome their initial setbacks to gain the upper hand in the Battle of the Atlantic? What tools, strategies, etc. did they use? (Hint: Use information from the documents to support your answer).
- Why was it so important that the Allies won the Battle of the Atlantic? What would it have meant if they had not been able to overcome the U-boat threat?

Your V-Mail should meet the following requirements:

Content: Address one question from the prompt by using at least three pieces of evidence drawn from three or more figures in the documents packet.

Organization: include a Salutation (e.g. Dear Bob,), be at least one paragraph in length, include an introduction, well-organized body sentences, and a conclusion. End with a complimentary close (e.g. Sincerely,)

Conventions: Be sure to proofread your work for spelling and grammar.

Print the complete address in plain letters in the panel below, and your return address in the space provided on the right. Use typewriter, dark ink, or dark pencil. Faint or small writing is not suitable for photographing.

FROM

TO:

(CENSOR'S STAMP)

SEE INSTRUCTION NO. 2

(Sender's complete address above)

HAVE YOU FILLED IN COMPLETE ADDRESS AT TOP?

REPLY BY
V····—MAIL

HAVE YOU FILLED IN COMPLETE ADDRESS AT TOP?

POST OFFICE DEPARTMENT PERMIT NO. 1

V-Mail Grading Rubric

	Advanced	Proficient	Basic	Emerging
Content	Writing clearly addresses the prompt. Provides at least three pieces of evidence from the documents to support ideas. Evidence is drawn from three or more figures in the document packet.	Writing addresses the prompt. Provides at least two pieces of evidence from the documents to support ideas. Evidence is drawn from two figures in the document packet.	Writing addresses the prompt. Provides at least one piece of evidence from the documents to support ideas. Evidence is drawn from one figure in the document packet.	Writing does not adequately address the prompt. Provides no clear evidence to support ideas. Evidence is not drawn from figures in the document packet.
Organization	V-Mail begins with an appropriate salutation. Paragraph-length V-Mail includes a clear introduction sentence, well-organized body sentences, and a concluding sentence. V-Mail ends with a complimentary close.	V-Mail begins with a salutation. Paragraph-length V-Mail includes an introduction sentence, body sentences, and a concluding sentence. V-Mail ends with a complimentary close.	V-Mail begins with a salutation. Paragraph length V-Mail is missing one of the following: an introduction sentence, adequate body sentences, or a concluding sentence. V-Mail ends with a complimentary close.	V-Mail lacks a salutation. V-Mail is not paragraph length. No clear introduction sentence, body sentences, and/or concluding sentence. V-Mail lacks a complimentary close.
Conventions	Clear control of grammar, mechanics, spelling, usage, and proper sentence formation.	Adequate control of grammar, mechanics, spelling, usage, and sentence formation.	Limited control of grammar, mechanics, spelling, usage, and sentence formation.	Minimal control of grammar, mechanics, spelling, usage, and sentence formation.