



Activity: “I’ll Huff and Puff and Blow Your Ships Up”: The Impact of the German Wolf Pack During the Battle of the Atlantic



Guiding questions:

How has warfare driven the advancement of medical technology?

How did the German U-boats impact the Battle of the Atlantic?

What is the effect of neutral, negative and positive buoyancy on an object in water?

DEVELOPED BY GAYLA HAMMER

Grade Level(s): 6-8

Subject(s): Science, Social Studies, Language Arts, Mathematics

Cemetery Connection: Cambridge American Cemetery

Fallen Hero Connection: First Lieutenant Gale Bernard McGowan



Overview

Students will increase their knowledge to identify the tactics used by the German Wolf Pack and how the U-boats impacted the Battle of the Atlantic by watching primary source video clips and analyzing data. Percent circle graphs will be created to show the tonnage of merchant ships lost to U-boat attacks. Students will create a model of a submarine to understand the effect of positive and negative buoyancy in water. By analyzing primary source documents, students will understand the role of First Lieutenant Gale B. McGowan in the Atlantic Theater during World War II. This lesson is designed to create a middle-level team integration between Social Studies, Mathematics, Science, and English/Language Arts.

“The World War II lessons related to the Battle of the Atlantic and the German Wolf Pack were created to provide a hands-on, engaging method for students to learn about the war against Germany. The multi-disciplinary activities allow teams of teachers to work together or independently to increase student knowledge.”

—Gayla Hammer

Hammer teaches at Lander Middle School in Lander, Wyoming.

Historical Context

During World War II, the Atlantic Ocean was a super highway for military supplies, men, and equipment being shipped from the United States to Great Britain. The Battle of the Atlantic refers to the continuing battle between the German and Allied navies. Like a hungry wolf sensing a weak animal, the German U-boats detected ships traveling across the wide stretches of ocean without protection. Wolves hunt by searching for lone prey and calling for reinforcement to take down their next meal. German U-boats became known as the Wolf Pack by using similar tactics when trolling the Atlantic Ocean hungrily hunting for their next target. First Lieutenant Gale Bernard McGowan’s name appears on the Wall of the Missing at Cambridge American Cemetery, with many others who lost their lives in the battles that led up to the Normandy Invasion.

Objectives

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

- Identify the tactics the German Wolf Pack used during the Battle of the Atlantic;
- Analyze the impact of the German U-boats during the Battle of the Atlantic;
- Model neutral, negative, and positive buoyancy by creating a model of a submarine; and
- Understand the importance of a fallen hero during World War II.

Standards Connections

Connections to Common Core

CCSS.MATH.CONTENT.6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

CCSS.MATH.CONTENT.6.SP.B.5.C Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

CCSS.ELA-LITERACY.RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

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.

Connections to C3 Framework

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

D2.His.3.6-8. Use questions generated about individuals and groups to analyze why they, and the developments they shaped, are seen as historically significant.

D2.His.15.6-8. Evaluate the relative influence of various causes of events and developments in the past.

Documents Used ★ indicates an ABMC source

Primary Sources

Allied Merchant Ship Losses, 1939 -1943

United States Merchant Marine

<http://www.usmm.org/wsa/shiploss.html>

Battle of the Atlantic Statistics

United States Merchant Marine

<http://www.usmm.org/battleatlantic.html>

Biography of First Lieutenant Gale B. McGowan's Final Missions

McGowan Family Photographs

Courtesy of Dennis B. McGowan

Photograph, *B-24 Gerty the Gremlin*

Norfolk and Suffolk Aviation Museum

<http://www.aviationmuseum.net/446bg.htm>

Photograph, *Malone Crew*, December 27, 1944

446th Bomb Group

http://www.446bg.com/missions/mission_photos/12_44photos.htm

Purple Heart Certification, February 1945

Courtesy of Dennis B. McGowan

Secondary Sources

Battle of the Atlantic Interactive ★

American Battle Monuments Commission

http://abmc.gov/sites/default/files/interactive/interactive_files/BOTA_Web/index.html

Bill Nye the Science Guy: Buoyancy

<https://www.youtube.com/watch?v=mM1bAtIQkW4>

Cambridge American Cemetery Visitor Center Film ★

American Battle Monuments Commission

<https://www.abmc.gov/multimedia/videos/cambridge-american-cemetery-visitor-center-film>

Chart of U-Boat Losses, 1939-1945

<http://uboat.net/fates/losses/chart.htm>

Gale B. McGowan, Burial and Memorialization Record ★

American Battle Monuments Commission

http://www.abmc.gov/search-abmc-burials-and-memorializations/detail/WWII_56061#.VbDf9uKUzGc

The Strategic Bombing Campaign Interactive ★

American Battle Monuments Commission

http://www.abmc.gov/sites/default/files/interactive/interactive_files/SBC_Web/index.html

Materials

Activity One: Battle of the Atlantic / Social Studies

- Computers for each student or groups (can be completed whole class)
- Battle of the Atlantic Recording Sheet
- Class Grading Rubric - Battle of the Atlantic
- Poster-size paper for the students to record group discussion ideas
- Markers for the poster paper

Activity Two: Analyzing the Impact of the Wolfpack / Mathematics

- Computer to assess data on the American Merchant Marine at War website
- Blank paper
- Percent circles
- Wolf Pack: Destruction in the Battle of the Atlantic worksheet
- Colored pencils
- Percent Circle Graph Grading Rubric

Activity Three: Submarine Models / Science

- Eye dropper or pipette
- Water for Cartesian Diver
- Access to water (sink, tub, pitcher)
- One or two liter plastic bottle with lid
- Small plastic containers that can hold water: film canisters, 8 ounce water bottles, etc.
- Materials that can fit in containers: pennies, bolts, washers, beans, plastic cubes
- Rubber bands, tape
- Large plastic tub or sink to hold water
- Poster paper for vocabulary words and definitions
- World War II Submarine Buoyancy worksheet for each group of students
- Computer to watch *Bill Nye the Science Guy*, if students need more information about the concept of buoyancy.
- Class Grading Rubric for Submarine Models
- *Teacher Tip*: the quantity of material will vary based on class size and the teacher's desire for students to work independently or cooperatively.

Activity Four: Impact of a Fallen Hero in the Battle of the Atlantic / Language Arts

- Primary Sources
 - *Biography of First Lieutenant Gale B. McGowan's Last Missions*
 - ABMC Burial and Memorialization Record for Gale B. McGowan
 - McGowan Family Photographs
 - Purple Heart Certification, February 1945
 - Photograph, *Wallace Malone Crew*, December 1944
- FLIGHT: Fallen Hero: First Lieutenant Gale Bernard McGowan
- Computer to view the *Cambridge American Cemetery Visitor Center* film
- Newspaper Article / Webpage Grading Rubric

Lesson Preparation

Activity One: Battle of the Atlantic / Social Studies

- Print one copy of the Battle of the Atlantic Recording Sheet for each student.
- Preview the *Battle of the Atlantic Interactive* video segments. Decide whether to use the segments as a whole class or have students watch individually.
- Create groups of four students.
- Create a poster with the following headings:
 - Role of the Wolf Pack;
 - Things I Want to Remember;
 - I Wonders; and
 - Important Fact Learned.
- Print one copy of Class Grading Rubric, Battle of the Atlantic. Add the names of students to the grading rubric before the lesson is taught.

Activity Two: Analyzing the Impact of the German Wolf Pack / Mathematics

- Print one copy of the Wolfpack: Destruction in the Battle of the Atlantic worksheet for each student.
- Create groups of three to four students, which can be the same groups from the previous activity.

- Gather colored pencils, blank paper, and percent circles.
- Preview the Battle of the Atlantic statistics on the U.S. Merchant Marine website.
- Preview Chart of U-Boat Losses 1939-1945 to understand the impact of the German U-boats.
- Make one copy of the Percent Circle Graph Grading Rubric for each student.

Activity Three: German U-Boat Models / Science

- Make a Cartesian Diver to demonstrate the principle of buoyancy using a plastic bottle filled with water and a pipette filled $\frac{1}{4}$ full of water which will sink or float when the density and mass changes due to compression of the bottle.
- Create a supply station with film canister with lids, plastic bottles with lids, washers, dried beans (any small, plastic container with lids, small items that can fit in containers).
- Secure plastic tubs or sinks filled with three gallons of water for students to test their models of a submarine.
- Make one copy of World War II Submarine Buoyancy worksheet for each team of students.
- Create groups of three to four students each.
- Print one Rubric, Submarine Models.
- Hang a piece of poster board for vocabulary words and definitions.

Activity Four: Impact of a Fallen Hero in the Battle of the Atlantic / Language Arts

- Preview the *Cambridge American Cemetery Visitor Center* film. Decide if students will watch the video as a whole class or individually.
- Copy the primary source documents and place them in a folder or packet for each group of students:
 - *Biography of First Lieutenant Gale B. McGowan's Last Missions*
 - Burial and Memorialization Record for Gale B. McGowan
 - McGowan Family Photographs
 - Purple Heart Certification, February 1945
 - Photograph, *Wallace Malone Crew*, December 1944
- Create groups of four students each.
- Make one copy of FLIGHT: Fallen Hero First Lieutenant Gale B. McGowan worksheet for each student.
- Make one copy of the Newspaper Article / Webpage Grading Rubric for each student.

Procedure

Activity One: Battle of the Atlantic / Social Studies (30-45 minutes)

- Distribute a copy of the Battle of the Atlantic Recording Sheet to each student.
 - Watch the *Battle of the Atlantic Interactive* video segments.
 - Instruct students to record three new facts learned from each video segment on their worksheets.
 - Provide students time to complete the 3-2-1 section of the worksheet, which is an assessment to determine students' learning, unclear information, and unanswered questions.
- Move students into "student talk" groups of four students.
 - Ask students to share their ideas of the Wolf Pack's destruction during the Battle of the Atlantic and their thoughts in the 3-2-1 section of their paper.
 - Walk around the classroom and listen to student talk and record student engagement on the grading rubric.
 - Guide students who may need help in identifying the Wolf Pack's role during the war and evaluate the students' learning, unclear information and unanswered questions.
- Instruct teams to assign one member to a poster to record one idea from their discussion for the titles:
 - Role of the Wolf Pack;
 - Things I Want to Remember;
 - I Wonders; and
 - Important Fact Learned.
- After the students have completed their recordings on the poster board, provide a few minutes for students to look for similar ideas and differences from the groups.
- Discuss the students' observations.
- Ask students to complete the paragraph on the back of the worksheet after the student talk and whole class discussion.
- Collect student papers to analyze understanding of the lesson, concepts students identified for more discussion, and questions students have on the topic.

Activity Two: Analyzing the Impact of the German Wolf Pack / Mathematics (45 minutes)

- Distribute out a copy of the Wolfpack: Destruction in the Battle of the Atlantic worksheet to each student and provide three minutes for students to look at the tables on each page.

- Review vocabulary as needed for students (tonnage, percent, etc.).
- Read the directions on the worksheet with the class:
 - After watching the *Battle of the Atlantic Interactive* videos, it is time to calculate the destruction of the German Wolf Pack. Look at each table of data collected after World War II. Follow the directions under the charts, answer the Question to Ponder on the last page using the tables and percent graphs, and explain how to use a percent circle, if necessary.
- Provide blank paper, colored pencils, and percent circles for each student.
 - Walk around the room and assist students with creating percent graphs.
- Move students into groups of three to four students to discuss and share percent graphs and analysis of the data from the charts. Walk around the room and listen to student discussions, guide students who may need assistance in analyzing the data.
- As a whole class, take time to discuss the main ideas from each group of students.
- Check for understanding of the graphs with the Question to Ponder on the student worksheet: If you were from an Allied country what would you do to lessen the impact of the Wolf Pack on Allied ships?
- The percent graphs can be scored using the Percent Graph Grading Rubric.

Activity Three: German U-Boat Models / Science (45 minutes)

- Introduce or review vocabulary words: density, buoyancy.
 - If students need help understanding the concept of buoyancy, watch Bill Nye the Science Guy: Buoyancy.
- Model the *Cartesian Diver* for the students by squeezing the water bottle to show the pipette sinking and release the pressure on the bottle so the pipette floats to the top of the bottle.
- Ask the class to identify what causes the pipette to descend and ascend in the bottle using scientific vocabulary.
 - *Teacher tip:* The density and the mass of the pipette changes when the bottle is squeezed causing water to enter the bottom of the pipette, which increases the mass of the pipette causing it to sink. The pressure being released from the bottle allows the extra water to leave from the pipette allowing it to float to the top of the bottle.
- Review neutral, positive and negative buoyancy, density, and mass with the class. Write the definitions for each word on a piece of poster paper to display in the room for students to use during the lab.
- Depending on the amount of materials the teacher has at the classroom supply center, students will work independently or with teams of two to three students to create a German

U-Boat which exhibits neutral, positive, and negative buoyancy. Ask the students to design their U-boat on their worksheet, including the materials used in their model.

- Walk around the classroom to monitor the groups of students, ask questions if groups need guidance, and complete the grading rubric.
- Test the students' models in a tub or sink of water. Make sure there is enough water in the largest container to float and sink their models.
- Ask the students to write the outcome of their test on their lab sheet.
- Challenge the students to create a German U-Boat using the film canister or water bottle that exhibits positive and negative buoyancy in the water, but using only one material for both properties.
 - *Teacher Tip:* students should use water, similar to how submarines dive and surface.
- Test the students' models in the tub of water.
- Discuss with the class the concept of ballast tanks and how submarines use ballast tanks to float and submerge by filling the tanks with water to dive and releasing the water to return to the surface of the water.
- Class discussion: Why was the German U-boat a successful technology used against the Allied forces during the Battle of the Atlantic?
- Collect the group's worksheets with their plans and designs.

Activity Four: Impact of a Fallen Hero in the Battle of the Atlantic / Language Arts (45-60 minutes)

- Distribute one copy of the FLIGHT: Fallen Hero First Lieutenant Gale B. McGowan worksheet to each student.
- Provide each group of four students a packet or folder containing the following primary source documents:
 - *Biography of First Lieutenant Gale B. McGowan's Last Missions*
 - ABMC Burial and Memorialization Record of Gale B. McGowan
 - McGowan Family Photographs
 - Purple Heart Certification, February 1945
 - Photograph, *Wallace Malone Crew*, December 1944
- Explain to the class the goal of the lesson requires students to analyze the primary sources and record information on a worksheet independently, so as to understand the identity and role of First Lieutenant McGowan during the Battle of the Atlantic.

- Watch the *Cambridge American Cemetery Visitor Center Film* so students understand how McGowan and other Americans are memorialized.
- Students will add more information to their worksheet based upon the content of the video.
- Groups of three to four students will meet to discuss the talking points written on their paper and identify how McGowan contributed to the Battle of the Atlantic.
- Review the elements of a newspaper article or a webpage (as preferred by the teacher).
 - Students will work cooperatively to create a newspaper article or create a webpage to include information from the primary source documents and *Cambridge American Cemetery Visitor Center Film*.
 - Edit the articles or web pages with peers and the teacher.
 - Revise the articles and print or share the final copy.
 - Share the newspaper articles in small groups or whole class.
 - Use the Newspaper Article/ Webpage Grading Rubric to assess the final product.

Assessment

- In Activity One, student learning can be assessed by collecting the Battle of the Atlantic Recording Sheet and the class can be assessed using the Class Grading Rubric for Battle of the Atlantic.
- In Activity Two, student learning can be assessed using the Wolfpack: Destruction in the Battle of the Atlantic worksheet and the Percent Circle Graph Grading Rubric.
- In Activity Three, student learning can be assessed by each group’s World War II Submarine Buoyancy worksheet, U-boat models, and the Class Grading Rubric for Submarine Models.
- In Activity Four, students learning can be assessed using the FLIGHT: Fallen Hero: 1st/Lt. Gale Bernard McGowan worksheet and the Newspaper Article / Webpage Grading Rubric.

Methods for Extension

- Battle of the Atlantic Extensions (Social Studies)
 - Students can research the methods used to counter the impact of the German Wolf Pack during World War II.
 - Students can interview members of the military who served in the Battle of the Atlantic to hear the perspective from a first-person point of view.
- Analyzing the Impact of the German Wolfpack (Mathematics)

- Students can analyze the data displayed on the table Chart of U-Boat Losses 1939-1945, and then identify the Allied and British impact on the German U-boats during World War II.
- German U-Boat Models Extensions (Science)
 - Students can create a self-propelled German U-Boat which can travel below the water and on the surface.
 - Students can create a model of a German U-Boat with buoyancy tanks.
 - Students can research and create a model of a full-sized German U-boat by drawing the outline of the craft outside on the school grounds.
 - Students can determine the volume of a German U-Boat and calculate the volume per person.
- Impact of a Fallen Hero on Germany and the Wolf Pack in the Battle of the Atlantic (Language Arts)
 - Students can research other Fallen Heroes from their town or state.
 - Students can interview people in their community who were affected by World War II to learn their stories.
 - Students can create a website with the stories, documents and photos for the World War II Fallen Heroes in their community.
- The American Battle Monuments Commission maintains U.S. military cemeteries overseas. These cemeteries are permanent memorials to the fallen, but it is important that students know the stories of those who rest here. To learn more about the stories of some of the men and women who made the ultimate sacrifice, visit www.abmceducation.org/understandingsacrifice/abmc-sites.

Adaptations

- Battle of the Atlantic Adaptations (Social Studies)
 - Teachers can partner students or create groups to support students with special needs or English Language Learners who may need assistance completing the worksheets.
 - Teachers can assign student partners and hand out one worksheet for each pair to complete together to assist students with special needs or English Language Learners.
- Analyzing the Impact of the German Wolfpack Adaptation (Mathematics)
 - Teachers can assign partners or teams of students to create one percent graph to assist students who have special needs or are English Language Learners.
 - Students can create percent graphs using a computer instead of a percent circle.
- German U-Boat Model Adaptations (Science)
 - Teachers can utilize videos about how submarines work for students who have special needs or are English Language Learners.
 - Teachers can hand out one worksheet for partners or teams of students to complete together.
 - Students can work with a partner or team of students to create models of German U-Boats.
- Impact of a Fallen Hero on Germany and the Wolf Pack in the Battle of the Atlantic Adaptations (Language Arts):
 - Teachers can assign partners or teams of students to complete the Fallen Hero study worksheet.
 - Students can work with a partner to read the information in the primary source documents.
 - Students can work with partners or teams to write a newspaper article about Gale B. McGowan.
 - Students can use a computer to record their story using Dragon Speaks or Croak.It or other assistive technology devices for recording their newspaper article or answers to the questions.

Battle of the Atlantic, 1939-1945



Recording Sheet

Directions

1. Battle of the Atlantic Interactive Visit http://abmc.gov/sites/default/files/interactive/interactive_files/BOTA_Web/index.html
2. Complete the following worksheet by watching the nine segments of video beginning with Major Navies 1939-20 through August 14-28 May 1945. Each segment lasts around two minutes.

Video Segments	Key Events: List three new ideas learned in each video
Major Navies 1939	
3 Sept. 1939-9 April 1940	
10 April 1940-27 March 1941	
28 March 1941-6 Dec. 1941	
7 Dec. 1941-31 July 1942	
1 Aug. 1942-21 May 1943	
22 May 1943-31 Dec. 1943	
1 Jan. 1944-19 Aug. 1944	
20 Aug. 1944-28 May 1945	

Battle of the Atlantic, 1939-1945

3-2-1 Assessment: Based upon the information from the video.

3 Things I want to remember:

2 Things I still wonder about:

1 Important fact I learned:

What was the importance of the Wolf Pack during the Battle of the Atlantic? (25 word summary)

Class Grading Rubric, Battle of the Atlantic

Group Member Name (Participants)	Lesson Goal: Worksheet and model shows student met the goal of the lesson.	Worked with Others: Listened, shared, and worked well with peers.	Focus: Stayed on task while completing worksheet and model.	Task Completion: Worksheet finished with relevant answers.	POINTS EARNED
1.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
2.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
3.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
4.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
5.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
6.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
7.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
8.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
9.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
10.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
11.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
12.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0

Grading Rubric Key

- 3: Advanced
- 2: Proficient
- 1: Basic
- 0: Emergent

Wolf Pack: Destruction in the Battle of the Atlantic

Directions

After watching the Battle of the Atlantic interactive videos on the American Battle Monuments Commission website, it is time to calculate the destruction of the German Wolf Pack.

Look at each table of data collected after World War II.

Follow the directions under the tables.

Answer the question to ponder on the last page using the tables and percent graphs.

Website

Battle of Atlantic Statistics <http://www.usmm.org/battleatlantic.html>:

Activity #1

Losses of Merchant Ships from All Causes

<http://www.usmm.org/wsa/shiploss.html>

	British		Allied		Neutral		Total	
	Number	Thousand Gross Tons	Number	Thousand Gross Tons	Number	Thousand Gross Tons	Number	Thousand Gross Tons
1939 (Sept.-Dec.)	158	498	17	90	148	347	323	935
1940	728	2,725	201	822	416	1,002	1,345	4,549
1941	892	3,047	344	1,299	183	347	1,419	4,693
1942	782	3,695	987	4,394	90	249	1,859	8,338
1943	361	1,678	388	1,886	63	82	812	3,646
Total	2,921	11,643	1,937	8,491	900	2,027	5,758	22,161

- Create a percent graph for the number of ships the British, Allied and Neutral lost based upon the total amount of ships sunk.
- Create a percent graph for the thousand gross tons the British, Allied and Neutral lost based upon the total amount of ships sunk.
- Identify the impact of the war on shipping based upon the percent circle graphs and the table over time.

Activity #2

Casualties to Personnel of British merchant Ships 1939-1945

<http://www.usmm.org/battleatlantic.html>

Year	Ships lost by U-boat	Ships lost all enemy causes	No. of Crew Lost by U-boat	No. of Crew Lost all causes
1939	50	95	260	495
1940	225	511	3,375	5,622
1941	288	568	5,632	7,838
1942	452	590	8,413	9,736
1943	203	266	3,826	4,606
1944	67	102	1,163	1,512
1945	30	45	229	323
Total	1,315	2,177	22,898	30,132

1. Based upon the information in the *Battle of the Atlantic* videos and the data in the table above, how did the German Wolf Pack impact the Battle of the Atlantic over time?

Question to Ponder:

If you were from an Allied country what would you do to lessen the impact of the Wolf Pack on the Allied ships?

Percent Circle Graph Grading Rubric

	Accomplished	Developing	Beginning
Overall Visual Appeal	Color is used in a meaningful way on the document. Graph is constructed neatly.	Circle graph uses color but not in a meaningful way. Document is not as neat or clear as it could be.	Circle graph lacks color. Messy construction and the graph is difficult to read.
Labels and Title	Title is appropriate to the topic of the graph. All labels are appropriate to the sectors of the circle. Title and all labels are neatly written and placed appropriately on the document.	Titles and labels are used on the percent circle, but some may be missing.	Title and labels are inappropriate, messy, placed incorrectly or missing.
Numerical Accuracy	Percents are correct in every sector of the circle graph.	Percents are correct in most sectors of the circle graph.	Percents are incorrect or missing in most sectors of the circle graph.
Geometric Accuracy	The circle of the circle graph is drawn correctly. The size of each sector of the circle graph is appropriate to the percent of the circle that it represents.	The circle of the circle graph is drawn correctly. The sizes of most sectors of the circle graph are appropriate to the percent of the circle they represent.	The circle of the circle graph is not drawn correctly. The sizes of most sectors of the circle graph are not appropriate to the percent of the circle they represent.

World War II Submarine Buoyancy

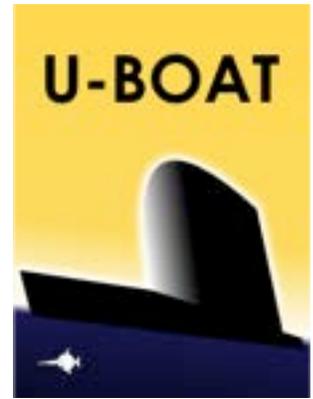
Vocabulary Review

density:

neutral buoyancy:

negative buoyancy:

positive buoyancy:



Model Submarine:

Draw, create and design a model submarine with the materials at the "Supply Station" to show neutral, negative and positive buoyancy.

Submarine	Submarine Design and Plan
Neutral Buoyancy	Draw the design: What was the outcome of the test? Materials Used:

Class Grading Rubric, Submarine Models

Group Member Name (Participants)	Lesson Goal: Worksheet and model shows student met the goal of the lesson.	Worked with Others: Listened, shared, and worked well with peers.	Focus: Stayed on task while completing worksheet and model.	Task Completion: Worksheet finished with relevant answers.	POINTS EARNED
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4.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
5.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
6.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
7.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
8.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
9.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
10.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
11.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0
12.	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0	3 2 1 0

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FLIGHT: Fallen Hero: First Lieutenant Gale Bernard McGowan

Directions:

- Read and analyze the primary source documents in the group packet.
- Complete the worksheet based upon the information in the packet.
- Watch: Cambridge American Cemetery Visitor Center Film
<https://www.abmc.gov/multimedia/videos/cambridge-american-cemetery-visitor-center-film>
- Add information to the worksheet after watching the Cambridge American Cemetery Visitor Center Film.
- **FLIGHT:** Use the following words to analyze the primary source documents in the student folders.

F ormulate a synopsis of First Lieutenant Gale B. McGowan's occupation during World War II.	
L earn the connection between the American Battle Monuments Commission and McGowan.	
I dentify what happened to McGowan on December 27, 1944.	
G uess how McGowan impacted Germany during the Battle of the Atlantic based upon the documents.	
H ear the voice of the people who knew Gale B. McGowan and write words/phrases to describe his character.	
T alk: List the key ideas you want to share about McGowan during the group discussion.	

Share your notes with the people in your group.

Newspaper Article / Webpage: Write a newspaper article or create a website about Gale B. McGowan.

Include:

- key facts from the documents in the packet
- a quote
- dates
- the facts from the FLIGHT form



Newspaper/Webpage Article Rubric

	Advanced	Proficient	Basic	Emerging
Historically Accurate Information	The article provides information from the primary source documents. The five W's are addressed with descriptive language. A captivating title is given to the article.	The article contains all 5 W's: who, what, where, when, and why/how. The facts are complete and correct. Simple is given to the article.	The article tells 3 of the following: who, what, when, where or why/how. The facts are mostly correct. Title has nothing to do with the article.	The article does not tell who, what, when, where or why/how. The facts are incomplete or wrong. No title is given to the article.
Reporting Format	The article begins with an exciting lead, followed by a purposeful argument with supporting details. The article is free of opinions and interesting to read.	The article contains an interesting/ exciting lead. The article is free of opinions and has a headline.	The article contains a lead but it is not interesting. The article contains an opinion.	The article is more like a short story and not journalistic. Does not contain a headline.
Writing Mechanics	Writing is descriptive, providing detailed information. An extensive vocabulary is used to keep the reader interested and informed. The article contains no grammar errors.	The article is clear and concise. The article contains only one or two spelling errors. The article contains only one or two grammatical errors.	The article contains few sentences that are unclear to the reader. The article contains few spelling errors. The article contains few grammatical errors.	The article is vague and unclear. The article contains many spelling errors. The article contains many grammatical errors.
Editing	The article is formatted clearly and concisely, with little room for improvement.	The article was completely edited and improvements were made.	The article shows some improvements and edits.	The article was neither edited nor improved.

Biography of First Lieutenant Gale B. McGowan's Last Missions



After primary, basic, and advanced pilot school training, McGowan was transferred to Hammer Field, Fresno, California, then on 30 January 1944, he was assigned to the 399th Bomb Group, AAB, March Field, California. On 18 Feb 1944, to the 470th Bomb Group (H) B-24 Liberator bomber flight training, Tonopah, Nevada, where he joined Crew #329 with pilot 2/Lt. Daniel Bingham. At the end of May 1944, after their B-24 bomber training at Tonopah, the crew was to report to Hamilton Field, California 16 June 1944, for eventual assignment in the Pacific Theater of Operations, but the Pacific assignment was changed and the crew was transferred to Camp Myles Standish, Massachusetts, and then sent by ship to England and the European Theater of Operations (ETO). On July 3, 1944 the crew (among about 2,000 Army personnel) sailed from Boston Harbor on the *USAT Brazil* (a former cruise ship). After two days as sea, the *USAT Brazil* joined with a large convoy of Navy destroyers, battle ships, a hospital ship, cargo ships and other transport ships. The first stop was Port of Glasgow, Scotland, on July 9, and after about 10 days (some of the time spent in Ireland) the crew went on to England and were permanently assigned 3 Aug 1944, to the 8th Air Force, 2nd Air Division, 446th Bomber Group and the 707th Bomber Squadron and stationed at base Station 125, near the village of Flixton, Suffolk, England, approximately 2 miles from Bungay.

The first flight by co-pilot McGowan was 8 Aug 44. The first combat mission he flew with the Bingham crew all together was 15 Aug 44. Sgt. Tom Egan (waist gunner) kept a notebook of his missions and in it he wrote:

Aug 14, 1944. Our first mission- We were assigned to bomb Dijon, France. My notes say the trip was rather long, but easy because of no enemy fighters and light flak.

Aug 15 – (Airfield N. Germany) Today because everyone was rather inexperienced we couldn't find our assigned group. So we joined another group and dropped bombs with them. (Light flak).

Aug 16 – Madgeburg, Germany (target oil) target only 50 miles from Berlin (flak very heavy). Saw one bomber go down. Lost two planes I didn't see.

Aug 24 – Brunswick, Germany (target assembly plant). Today the plane on our left wing was hit and went down in flames (heavy flak).

Aug 25 – Rostock, Germany (target Heinkel plant). Heavy flak – today we picked up some flak.

Aug 26 – Today we started for Berlin. Got as far as Norway when we were recalled. Everyone very happy because we never saw such bad weather as we encountered today.

Sept. 12 – Kiel, Germany (target oil). Heavy flak today. We thought we had it over the target. We lost the right outboard engine (Co-pilot side). The inboard engine on the same side was blowing oil all over the place. Our intercom system between pilot and us went out, so we opened the rear door and put on our parachutes getting ready to bail out. As we were waiting, the intercom system came back on and the pilot was telling us to not bail out. We looked out again and the inboard engine had stopped blowing oil. Of course with one engine out the group went ahead and we flew back by ourselves on three engines. We never got an answer as to what caused the engine to blow oil and then stop.

Skipping over some of the Egan mission entries (Sept. 22, 26, Oct. 3, 5, 7, 25, 26, Nov 11, 25) here are a few more examples of some interesting mission entries in Egan's notebook:

Sept 30 – Hamm, Germany (Didn't do a very good job the last time so went back to hit the same target).

Oct. 17- Cologne, Germany. (Target marshalling yard). Heavy flak expected, but rather light. Approximately 1,000 bombers have hit this target for the third straight day.

Nov 4 – Hanover, Germany (target oil). Getting to be a rough place (Heavy flak).

Nov 26 – Bielefeld, Germany (target 300 FT viaduct). Saw no fighters (German Luftwaffe), but was informed we lost 18 bombers due to enemy fighters in this general area.

Nov 29 – Bielfeld, Germany (target viaduct). Missed the target the other day – so back again today – told by G-2 to expect at least 300 (enemy) fighters, but we saw none.

Dec 2 – Bingen, Germany (target marshalling yard). Before reaching target we ran into solid clouds and couldn't see a thing. The formation broke up and everyone flew back on their own.

Dec 10 – Bingen, Germany (target marshalling yard). Dropped out of formation due to engine trouble and came back on our own. So we flew over Brussels and saw where the Germans opened the dam and flooded the whole country side.

Dec 27 – Today we lost our Co-pilot. He ditched in the Channel only three were rescued...

From (one of) the crew members that survived, I was told the last time he saw Co-pilot McGowan, he was putting something up against the windows for protection just before they hit the water. To my knowledge, no one remembers seeing him get out.

(Note: The surviving pilot, Lt. Malone, said Lt. McGowan had a bag with a blanket and was putting blankets up to protect from flying broken glass and he might have gotten tangled up in the blankets after the crash.)

Thomas Egan (from Warwick, Rhode Island) flew with Gale McGowan on about 22 missions. Sgt. Egan was a waist gunner on the Bingham crew (1/Lt. McGowan's original crew) and 1/Lt. McGowan were sitting together waiting to see if they would be scheduled to fly on 27 Dec 1944. They and other members of their crew were on standby as replacements that day as they had been on many previous missions. At that time most of the crew had flown approximately 22 combat missions together, while their co-pilot, 1/Lt. McGowan, had flown about 33 missions. 1/Lt. McGowan had volunteered for extra missions in order to complete his required 35 missions. December 1944, was a time of the major German offensive known as the Battle of the Bulge and there were plenty of opportunities for replacement co-pilots and other position crew members to fly extra missions. Egan said, "On the morning of 27 December, we were once again scheduled to standby. That morning I remember very clearly because I've told the story many times through the years. Lt. McGowan and I were sitting together. He was rather tired and said he hoped that he wouldn't be called to fly that day. As things went, once again a co-pilot was needed [as a replacement on 2/Lt. Wallace Malone's crew] and Lt. McGowan had to go."

Egan remarked that 1/Lt. Gale B. McGowan was affectionately referred to as "the old man" by his crew. McGowan was a few months over 26 years old and the other members of his regular crew were 23 and younger with the exception of the ball turret gunner, Clarence Lidke (from Idalia, Colorado), who was "old" also (25 years old at the time).

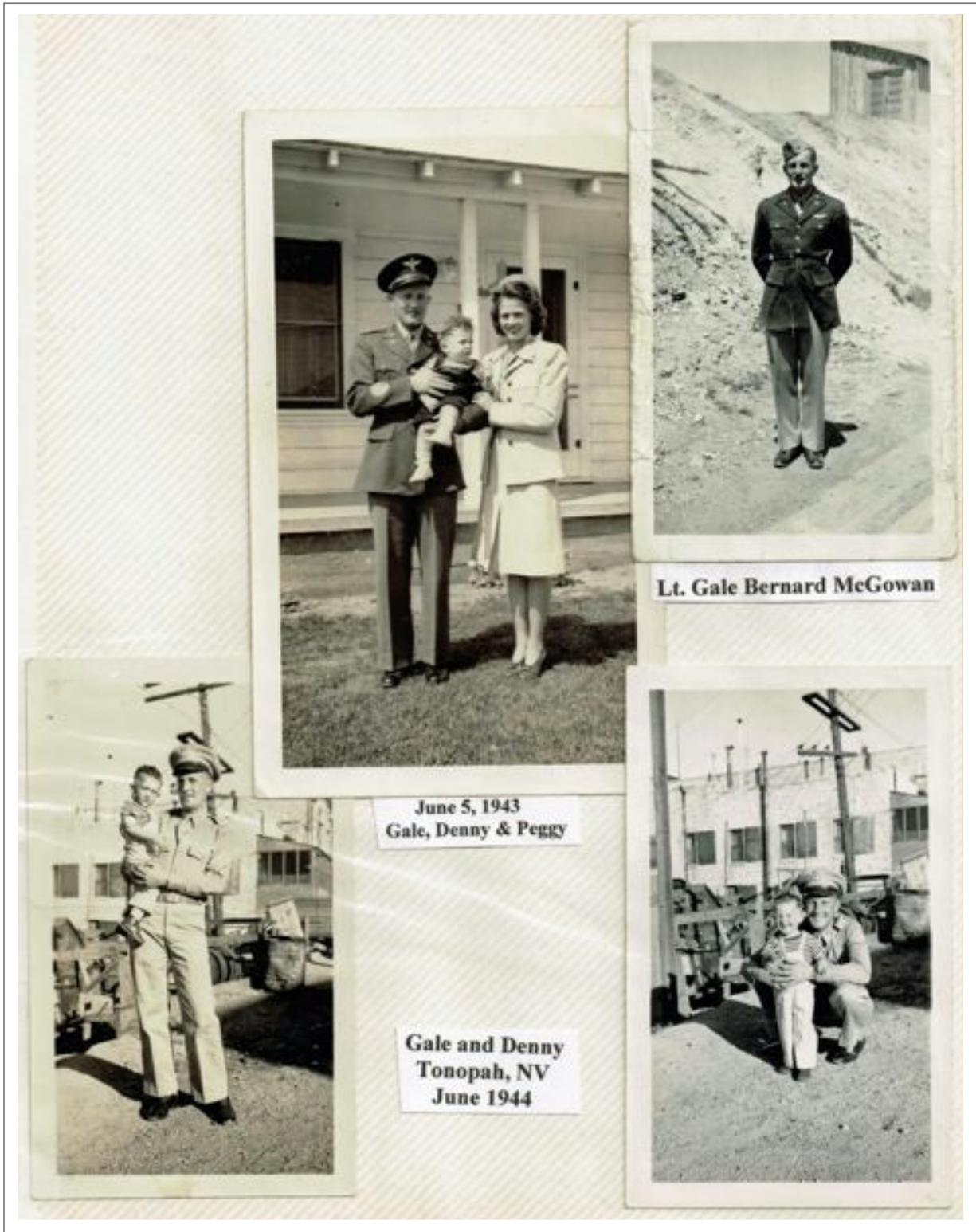
Dan Bingham remembered that the crew started out flying their missions on a B-24 called "Gerty the Gremlin" and flew most of their missions on "Gerty" until it was pulled from rotation. Tom Egan and Clarence Lidke both said the crew's next B-24 was named by Lt. James

Cunningham (the crew's navigator). Cunningham named the new B-25 "KYHOOYA" in remembrance of a fraternity he belonged to while attending college.

Attempting to complete his 35 missions so he could return to the States, 1/Lt McGowan had been volunteering for extra missions. Also, replacement co-pilots were sorely needed during the Battle of the Bulge German breakout during December 1944. On the morning of 27 December, McGowan was selected to be Co-pilot on the 2/Lt. Wallace R. Malone crew. Malone's regular co-pilot, 2/Lt. Hulet Mack, was ill and so McGowan was the assigned as his replacement. 1/Lt. McGowan was flying his 33rd or 34th combat mission with the 446th Bomb Group, on December 27, 1944, when the B-24 Liberator bomber he was co-piloting lost power in two engines due to mechanical failure and ditched in the freezing waters of the English Channel near Dover. McGowan and six others were at first declared Missing in Action (MIA) and then, upon confirmation, he and the others were declared Killed in Action (KIA): the pilot, 2/Lt. Wallace Malone; the bombardier, 2/Lt. Jack Heuser; and the ball turret gunner, S/Sgt. Thomas Strohaker.

McGowan Family Photos

Family Photos of Gale, Peggy and their son, Dennis McGowan. Courtesy of Dennis McGowan



Gale B. McGowan, First Lieutenant
Photograph
Courtesy of Dennis McGowan



Co-Pilot Gale B McGowan flew on B-24 Liberators
on missions to France and Germany in 1944.
Courtesy of Dennis McGowan



Memorial marker First Lieutenant Gale
B. McGowan at Fort Logan National
Cemetery in Denver, Colorago Courtesy
of Dennis McGowan



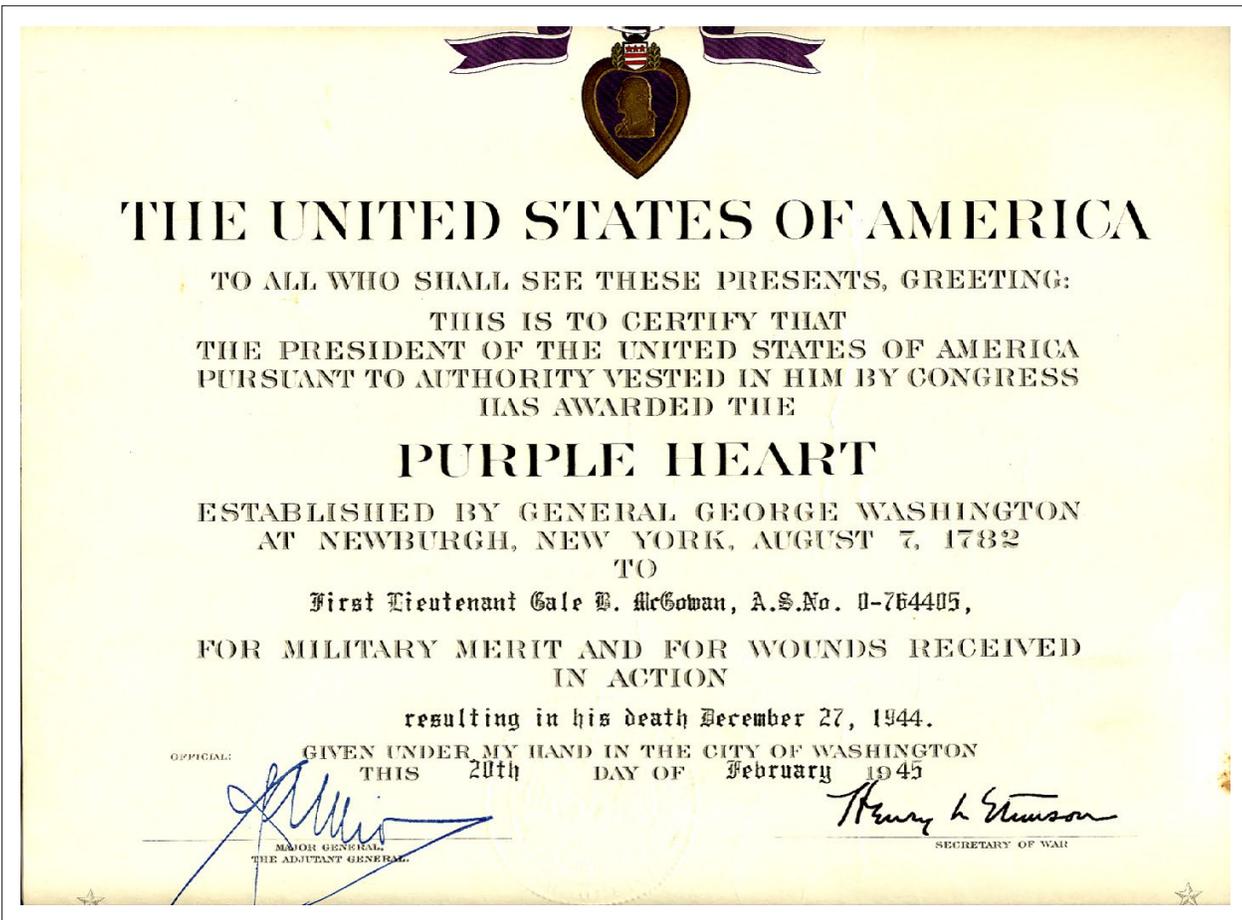
McGowan's military career before becoming a
co-pilot. Courtesy of Dennis McGowan



Purple Heart awarded to McGowan Family on February 20, 1945.
Courtesy of Dennis McGowan



Purple Heart Certification



Photograph of the Wallace Malone Crew, taken prior to December 27, 1944.



Standing: Second Lieutenant Wallace Malone; Second Lieutenant Hulet Mack (not on the 27 Dec mission)*; Second Lieutenant Jack Heuser; Flight Officer James Sheets.

Kneeling: Technical Sergeant Frank Jakubiak; Technical Sergeant Kieran Culliton; Staff Sergeant Thomas Strohaker; Sergeant Albert Eibel; Staff Sergeant Harry Stricklan and Sergeant Robert Steeves.

*First Lieutenant Gale McGowan was the replacement copilot on Malone's plane the day they ditched in the North Sea (27 Dec 44).

The Three Survivors:

Second Lieutenant Wallace Ray Malone,
Second Lieutenant Jack. H. Hauser,
Staff Sergeant Thomas A. Strohaker

The Lost:

First Lieutenant Gale B. McGowan,
Flight Officer James E. Sheets,
Technical Sergeant Frank A. Jakubiak,
Technical Sergeant Kieran P. Culliton,
Sergeant Robert L. Steeves,
Sergeant Albert R. Eibel,
Staff Sergeant Harry F. Stricklan