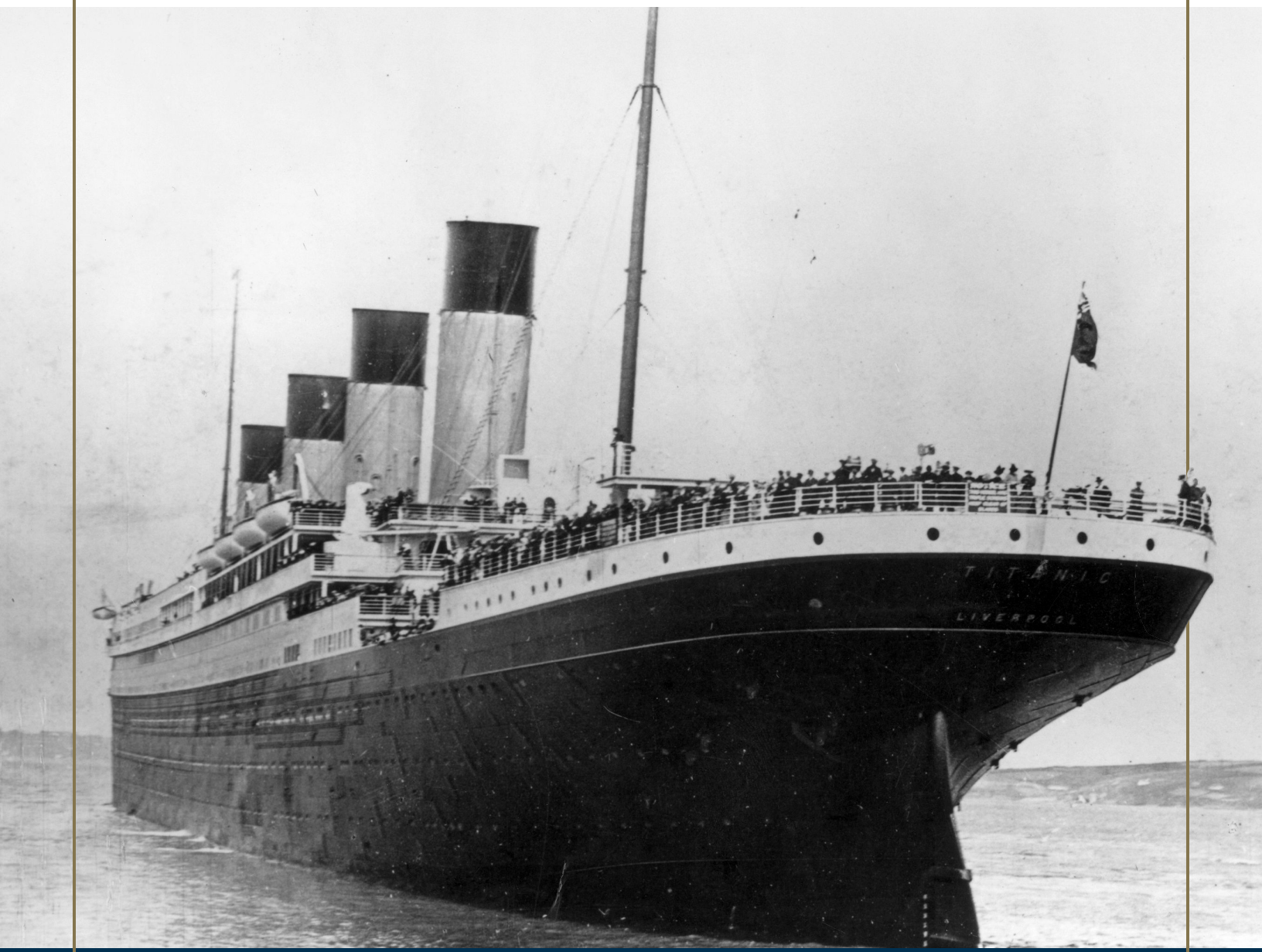
Classroom Lesson Plans **Teacher Guide** and Field Trip Overview

TITANIC

THE ARTIFACT EXHIBITION



Florida Middle School
Grades 7–8

By Teachers, For Teachers

Real Artifacts, Real Stories, Real People

TitanicLasVegas.com
TitanicOrlando.com

DiscoverTitanic.com

Encyclopedia-Titanica.org

TitanicHG.com

E/M GROUP

3045 Kingston Court, Suite I
Peachtree Corners, GA 30071
www.emgroup.com

Teacher credits:

Created by teachers, for teachers.
Content and Instructional Design:

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- Ross Mumford, Education Coordinator

Thank you to the many K-12 teachers who attended our *Titanic* Teacher Nights for your helpful feedback. We appreciate you sharing your classroom expertise.

A special thank you to the following educators for participating in our focus group.

- Zachary Barr
- Terri Pope Hellmund
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- Barbi Peters
- Albert Schutzman

Additional credits:

- Encyclopedia Titanica (www.encyclopedia-titanica.org) tells the true story of the real people who designed, built, and sailed on RMS *Titanic*, featuring a biography of every *Titanic* passenger and crew member plus research articles, deck plans, pictures, and movies to help you discover the truth about the greatest shipwreck in history.
- Titanic: Honor and Glory (www.titanichg.com) is a company of researchers attempting to bring *Titanic* back to the surface through stunning 3-D recreations and explorable virtual museums. Visit TitanicHG.com to board *Titanic* yourself and witness her construction, launching, maiden voyage, sinking, and more.

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Introduction

We invite you and your school group to see TITANIC: The Artifact Exhibition and take a trip back in time. Whether attending the Exhibition in person or online with our virtual field trip platform, experience *Titanic* like never before.

Examine real artifacts respectfully recovered from the ocean floor along with room re-creations and personal histories, each highlighting a different chapter in the compelling story of *Titanic*'s maiden voyage. Receive a replica White Star Line boarding pass detailing an actual *Titanic* passenger, touch an iceberg, and learn about artifact recovery and conservation in an unforgettable immersive experience. TITANIC: The Artifact Exhibition is a great catalyst for interdisciplinary lessons across science, technology, math, social studies, art, and English curriculums. Many students are familiar with the compelling story behind the Ship's much-anticipated voyage and tragic demise. Innovative educational resources connect this innate fascination to classroom friendly, tech-enriched lessons that will generate and inspire student interest and inquiry beyond your field trip.

Titanic Teacher Guides include activities for elementary, middle, and high school levels aligned to the state and national education standards. Each Guide has 10 separate lessons which can be adapted for any age and ability level. These lessons, which come with ready-to-copy student activity pages, informational guides, and worksheets, are designed to be used while teaching *Titanic* and can be integrated at the before, during, and after stages of your Exhibition field trip. Lessons can

be taught independently or grouped into larger units. Find additional educational materials on our website, DiscoverTitanic.com. There, you can find student readings, research, and/or reference materials as well as additional Exhibition materials to prepare for field trips.

This Teacher Guide features a variety of methods and projects for those educators who strive for differentiated instruction in their classrooms. While learning about *Titanic*, students can analyze primary sources, explore history through music, perform historical reenactments, sharpen their geography skills, and find connections to the Ship's story within their own communities and families. Lessons incorporate both collaborative and independent projects and hands-on learning strategies while reaching all skill levels and promoting real-world application. Thank you for sharing this innovative learning experience with your students. We look forward to seeing you at TITANIC: The Artifact Exhibition.

Getting Ready

Gallery Overview

Every venue for TITANIC: The Artifact Exhibition has a unique design layout. For teacher planning, the following galleries and topics are foundational to the Exhibitions.

The **Construction Gallery** focuses on the design and invention of *Titanic*. It showcases the shipyard of Harland & Wolff, who strove to be the most technologically advanced and progressive shipbuilder in the world.

The **Departure Gallery** allows students to feel what it was like to set sail on *Titanic*'s maiden voyage on April 10, 1912.

After boarding *Titanic*, students enter the **Passenger Gallery**. Brass railings and a rich carpet runner lead down an elegant hallway and past a series of numbered doors. The focal point of this gallery is the **First Class Stateroom**. This cabin contains re-creations of *Titanic* furniture along with examples of Edwardian clothing and personal belongings of first-class passengers in 1912.

The **Verandah Café Gallery** features first-class china, crystal, dinnerware, and silverware. Menus from the restaurants of *Titanic* are displayed.

In the **Passenger Gallery**, students learn individual stories and view personal artifacts recovered from the ocean floor.

The **Third Class Cabin Gallery** includes a re-creation of the simple accommodations offered to those passengers traveling in steerage. Though basic, these cabins provided much greater comfort than any other ship at that time.

By touching the frigid wall of ice in the **Iceberg Gallery**, students will discover how cold it was in the North Atlantic on the night *Titanic* sank. In -2° Celsius (28° Fahrenheit) water, there was little chance for survival. Death from hypothermia came quickly.

The **Discovery Gallery** shows how *Titanic* was found and what lies in the debris field. Students will learn about artifact recovery and conservation efforts led by RMS Titanic, Inc., who has been granted exclusive salvage rights with custodianship over the wrecksite.

The **Memorial Gallery** lists over 2,200 names of those who were traveling on board *Titanic* and denotes those who survived or were lost. Students can find the name from their boarding pass on this wall.

Preparing to Visit the Exhibition

What You Will See

Titanic was conceived in 1907 and met with disaster in 1912. The story has been told and retold, but never more poignantly and passionately than by the artifacts in this Exhibition. Painstakingly recovered from the debris field surrounding the wrecksite and artfully conserved, these three-dimensional objects represent the vessel and the 2,208 souls who journeyed with *Titanic* into history. Whether in person or on our virtual field-trip platform, explore the galleries in the Exhibition, featuring real artifacts, room re-creations and personal histories. Each highlights a different chapter in the compelling story of *Titanic*.

Explore DiscoverTitanic.com for additional *Titanic* information.

What Students Want to Know About Artifacts

Who is RMS Titanic, Inc.? What do they do?

RMS Titanic, Inc.'s purpose is to preserve the memory of *Titanic* and of all who sailed on the Ship. As an affiliate of Experiential Media Group 'EMG', LLC, the Company was granted salvage rights to the wreck of the RMS *Titanic* by a United States Federal Court order in 1994 and reconfirmed again in 1996, meaning the Company has exclusive rights to recover the artifacts from the wreckside. *Titanic*'s artifacts are used for scientific and historical research and placed on public display through TITANIC: The Artifact Exhibitions. RMS Titanic, Inc.'s mission is to preserve the legacy of *Titanic*'s maiden voyage, subsequent sinking, and the memory of her passengers and crew through care and display of our recovered artifacts, comprehensive educational programs, innovative exhibitions, research and recovery initiatives, wrecksite imaging and analysis, and ongoing *Titanic* collaborations.

Are the artifacts in the Exhibition real?

Yes. About 5,500 *Titanic* artifacts have been carefully and respectfully recovered from the ocean floor and placed on public display in TITANIC: The Artifact Exhibitions around the world. Only exhibitions with "artifacts" in the title are centered on real, recovered *Titanic* artifacts.

How are these artifacts recovered from *Titanic*?

Underwater submersibles are used to recover artifacts from the ocean floor. These machines are equipped with mechanical arms capable of scooping, grasping, and recovering the artifacts, which are then either placed in sampling or lifting baskets. The submersible crew compartment accommodates three people—a pilot, a co-pilot, and an observer—who each have a 1-foot-thick plastic porthole between themselves and the depths. The submersibles can operate and deploy a remotely operated vehicle, or ROV, with a 110-foot tether which is then sent inside the wreck to record images. It takes over two and a half hours to reach the *Titanic* wrecksite. Each dive lasts about 12 to 15 hours with an additional two hours to ascend to the surface.

How are the artifacts conserved?

The conservation process to stabilize and treat artifacts immediately begins once they are exposed to air. Artifacts are cleaned with a soft brush and placed in a foam-lined tub of water. The artifacts go to the conservation laboratory where they undergo desalination and further treatment to preserve them. Metal objects are placed in a desalination bath and undergo the first steps of electrolysis, a process that removes negative ions and salt from the artifact. Electrolysis is also used to remove salts from paper, leather, and wood. Chemical agents and fungicides are used to remove rust and fungus.

Once artifacts made of wood and leather begin to dry, they are injected with a water-soluble wax which fills artifact capillaries previously occupied by water and debris. Artifacts made of paper are freeze-dried to remove water and treated to protect against mold. At this point, conservation for exhibition is complete. All recovered artifacts are carefully maintained by trained professionals in temperature, humidity, and light-controlled environments.

Are there still dead bodies on the bottom of the ocean?

No skeletons remain at the wrecksite. Any bodies of passengers or crew that may have been carried to the seabed with the wreck were consumed by marine life like fish and crustaceans.

What is stewardship, and how does it relate to *Titanic*?

Stewardship is defined as the careful and responsible management of something entrusted to one's care. Since RMS Titanic, Inc. was entrusted with the wreck of *Titanic*, it is the Company's responsibility to respectfully oversee the historic site. RMS Titanic, Inc. works with professionals to document and preserve the Ship's legacy through artifact recovery, underwater mapping, and permanent and internationally traveling TITANIC: The Artifact Exhibitions. These real artifacts on public display are a testament to the Company's continued commitment to conservation and stewardship, ensuring *Titanic* and her passengers are always remembered.

Chaperone Responsibilities

During the Field Trip

As a chaperone, you are responsible for helping your students get the most out of this unique learning experience. To keep order, you need to stay with your assigned group of students throughout your visit. If you leave a gallery, they leave a gallery. If you are still in a gallery, they are still in a gallery. Please supervise your students in the retail area and in the restrooms as well.

The retail shop gives teachers and students the option to bring home *Titanic* souvenirs from their Exhibition visit. A variety of items and price points can be found in the gift shop. Some of the more popular items in the store within a $1-$15 range include *Titanic* pencils, models, and t-shirts, and items within a $10-$40 range are *Titanic* books, DVDs, and posters.

While your students are busy learning, discovering, questioning, and reflecting, we ask that you help us reinforce some basic rules of museum etiquette. Please:

- Keep your voices low.
- Do not gather at the entrances or exits to the galleries.
- Keep the flow of traffic open for our other patrons.
- Do not lean on walls or glass cases.
- Use a notebook or a clipboard to fill out assigned student papers or activities. Do not use walls or glass cases to write.

We know that this is a fascinating Exhibition to view, but please remember that your top priority is to monitor your students and keep them focused so that they can meet their teacher's learning expectations. We greatly appreciate your participation in making this a memorable field trip for everyone from your school.

Thank You!

Middle School Guide at a Glance

The lessons in this Middle School Teacher Guide are specifically geared toward teaching the story of *Titanic* thematically to grades 7-8, aligned to state and national standards. As you will discover through this guide, *Titanic* is interdisciplinary. The curriculum has lessons targeting engineering, chemistry, design, outreach, writing, music, history, and geography. *Titanic* has an ongoing legacy since 1907 to today, and it can become the hook for a variety of lessons across all ages.

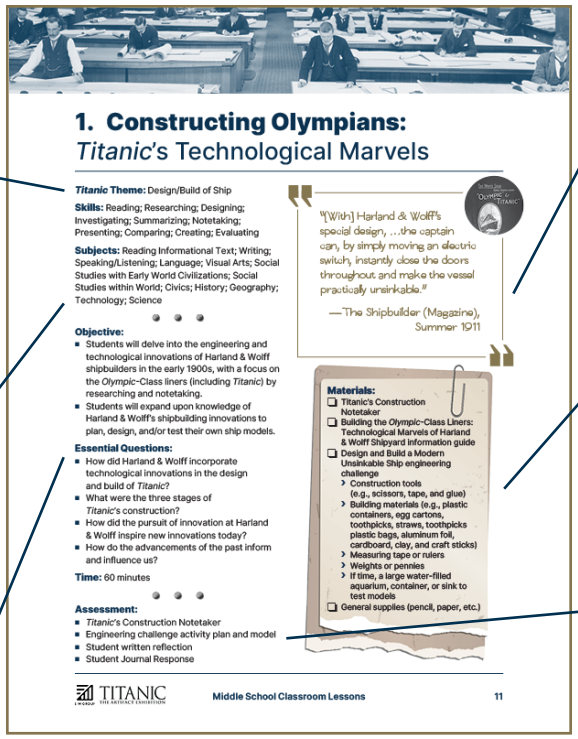
We understand classroom constraints, so this guide is built to be completely customizable. Select the lessons that best fit your needs. For example, a teacher may teach lessons 1, 4, and 7, if wanting only the basic history up to 1912. Someone wanting to focus exclusively on artifacts may choose lessons 9 and 10. Teachers who want to teach a comprehensive *Titanic* story may opt to teach all 10 lessons, which we recommend. Lessons can be simplified and extended to meet student needs. For this reason, teachers may find it helpful to consult the other level guides (Elementary School, aimed for grades 4–6, and High School, targeted for grades 9–12). All lessons are designed for modern classroom technology and conveniences, so the access and use of 1:1 student devices is implied within the guide, although not strictly required.

This Guide at a Glance is here to help you understand the different components found within each lesson plan, so you can maximize its impact in your classroom.

The lessons in this guide are designed around 10 ***Titanic* Content Themes**, consistent across all three grade levels. This presents the overall focus of the lesson and helps you choose which lessons you want for students.

At the top of each lesson are targeted **Skills** and **Subjects**, making the possibilities for cross-connections endless.

Objectives and **Essential Questions** help guide the lesson for teachers, providing the framework for teachers to customize for their students.



1. **Constructing Olympians:**
Titanic's Technological Marvels

***Titanic* Theme:** Design/Build of Ship

Skills: Reading; Researching; Designing; Investigating; Summarizing; Notetaking; Presenting; Comparing; Creating; Evaluating

Subjects: Reading Informational Text; Writing; Speaking/Listening; Language; Visual Arts; Social Studies with Early World Civilizations; Social Studies within World; Civics; History; Geography; Technology; Science

Objective:
- Students will delve into the engineering and technological innovations of Harland & Wolff shipbuilders in the early 1900s, with a focus on the *Olympic*-Class liners (including *Titanic*) by researching and notetaking.
- Students will expand upon knowledge of Harland & Wolff's shipbuilding innovations to plan, design, and/or test their own ship models.

Essential Questions:
- How did Harland & Wolff incorporate technological innovations in the design and build of *Titanic*?
- What were the three stages of *Titanic*'s construction?
- How did the pursuit of innovation at Harland & Wolff inspire new innovations today?
- How do the advancements of the past inform and influence us?

Time: 60 minutes

Assessment:
- *Titanic*'s Construction Notetaker
- Engineering challenge activity plan and model
- Student written reflection
- Student Journal Response

"[With] Harland & Wolff's special design, ...the captain can, by simply moving an electric switch, instantly close the doors throughout and make the vessel practically unsinkable."

—The Shipbuilder (Magazine), Summer 1911

Materials:
- ❑ Titanic's Construction Notetaker
- ❑ Building the *Olympic*-Class Liners: Technological Marvels of Harland & Wolff Shipyard information guide
- ❑ Design and Build a Modern Unsinkable Ship engineering challenge
  - Construction tools (e.g., scissors, tape, and glue)
  - Building materials (e.g., plastic containers, egg cartons, toothpicks, straws, toothpicks plastic bags, aluminum foil, cardboard, clay, and craft sticks)
  - Measuring tape or rulers
  - Weights or pennies
  - If time, a large water-filled aquarium, container, or sink to test models
- ❑ General supplies (pencil, paper, etc.)

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A *Titanic*-related **Quote** was specially chosen to match the *Titanic* Theme and can be integrated into the lesson per teacher discretion or used as an independent source of engagement.

To help teachers with preparations, **Time** and **Materials** are included, which can give an estimation that may vary depending on the classroom and students.

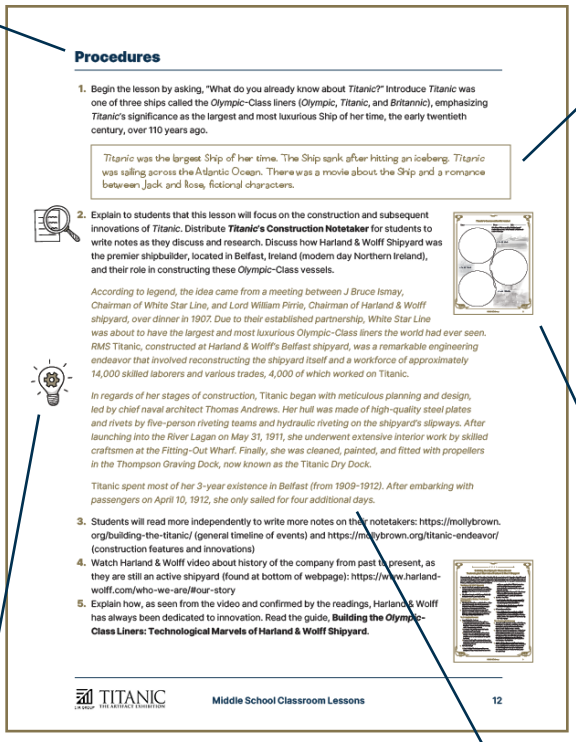
The **Assessment** section overviews the diagnostic, formative, and/or summative assessments teachers may use to evaluate student learning.

As a prescriptive curriculum, **Procedures** outline every step of the lesson with talking points, learning summaries, potential student responses, and optional extensions. Lessons are intended to be customizable, where a teacher can choose to teach sections of the plan, incorporate some of the activities, expand on others, or fully implement the entire lesson.

Icons are used to denote important sections for the teacher.

indicates steps with student assessments.

indicates steps with main ideas or content summaries.



Procedures

1. Begin the lesson by asking, "What do you already know about *Titanic*?" Introduce *Titanic* was one of three ships called the *Olympic*-Class liners (*Olympic*, *Titanic*, and *Britannic*), emphasizing *Titanic*'s significance as the largest and most luxurious Ship of her time, the early twentieth century, over 110 years ago.

   Titanic was the largest Ship of her time. The Ship sank after hitting an iceberg. *Titanic* was sailing across the Atlantic Ocean. There was a movie about the Ship and a romance between Jack and Rose, fictional characters.

2. Explain to students that this lesson will focus on the construction and subsequent innovations of *Titanic*. Distribute ***Titanic*'s Construction Notetaker** for students to write notes as they discuss and research. Discuss how Harland & Wolff Shipyard was the premier shipbuilder, located in Belfast, Ireland (modern day Northern Ireland), and their role in constructing these *Olympic*-Class vessels.

   According to legend, the idea came from a meeting between J Bruce Ismay, Chairman of White Star Line, and Lord William Pirrie, Chairman of Harland & Wolff shipyard, over dinner in 1907. Due to their established partnership, White Star Line was about to have the largest and most luxurious Olympic-Class liners the world had ever seen. RMS Titanic, *constructed at Harland & Wolff's Belfast shipyard, was a remarkable engineering endeavor that involved reconstructing the shipyard itself and a workforce of approximately 14,000 skilled laborers and various trades, 4,000 of which worked on* Titanic.

   In regards of her stages of construction, Titanic *began with meticulous planning and design, led by chief naval architect Thomas Andrews. Her hull was made of high-quality steel plates and rivets by five-person riveting teams and hydraulic riveting on the shipyard's slipways. After launching into the River Lagan on May 31, 1911, she underwent extensive interior work by skilled craftsmen at the Fitting-Out Wharf. Finally, she was cleaned, painted, and fitted with propellers in the Thompson Graving Dock, now known as the* Titanic Dry Dock.

   Titanic spent most of her 3-year existence in Belfast (from 1909-1912). After embarking with passengers on April 10, 1912, she only sailed for four additional days.

3. Students will read more independently to write more notes on their notetakers: https://mollybrown.org/building-the-titanic/ (general timeline of events) and https://mollybrown.org/titanic-endeavor/ (construction features and innovations)
4. Watch Harland & Wolff video about history of the company from past to present, as they are still an active shipyard (found at bottom of webpage): https://www.harland-wolff.com/who-we-are/#our-story
5. Explain how, as seen from the video and confirmed by the readings, Harland & Wolff has always been dedicated to innovation. Read the guide, **Building the *Olympic*-Class Liners: Technological Marvels of Harland & Wolff Shipyard**.

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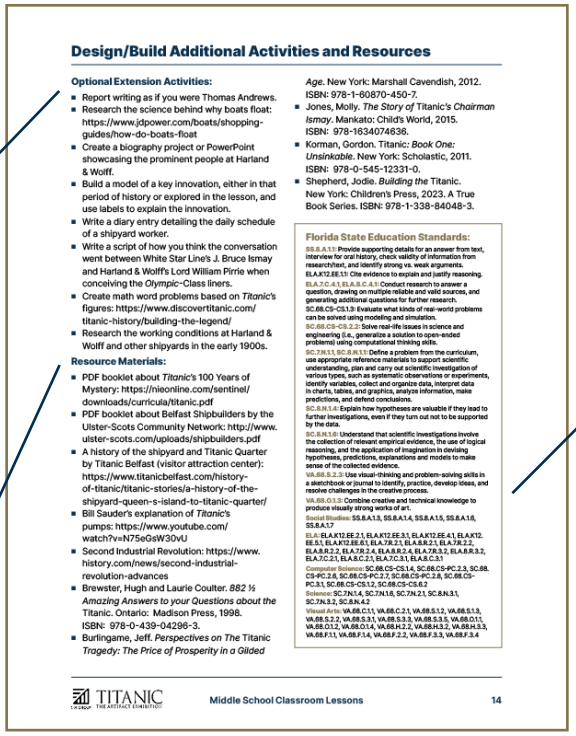
Within the lesson plan are **Potential Student Responses** in boxes and handwriting-styled font. Text is written to mimic how students might respond. This helps you predict student answers or guide toward certain concepts.

Reproducibles, Handouts, and Worksheets are indicated in bold within the procedures as well as an image icon showing the needed reproducible to help you find it within the guide. All reproducibles subsequently follow the corresponding lesson plan.

The procedures include **Main Idea or Content Summary** talking points indicated by gold font and a lightbulb icon. This helps you know what concepts or ideas you want your students to understand or take away. This section can also help you understand *Titanic* content and history taught in the lesson, so you can feel confident while teaching.

Please see the optional **Extension Activities** for related ways to extend the lesson and *Titanic* Theme or see the *Titanic* Project Ideas Page for general additional suggestions.

At the end of each lesson is a **Resource Materials** list, filled with related books, websites, videos, articles, organizations, and other informational materials to extend teacher and student research.



Design/Build Additional Activities and Resources

Optional Extension Activities:

- Report writing as if you were Thomas Andrews.
- Research the science behind why boats float: https://www.jdpower.com/boats/shopping-guides/how-do-boats-float
- Create a biography project or PowerPoint showcasing the prominent people at Harland & Wolff.
- Build a model of a key innovation, either in that period of history or explored in the lesson, and use labels to explain the innovation.
- Write a diary entry detailing the daily schedule of a shipyard worker.
- Write a script of how you think the conversation went between White Star Line's J. Bruce Ismay and Harland & Wolff's Lord William Pirrie when conceiving the *Olympic*-Class liners.
- Create math word problems based on *Titanic*'s figures: https://www.discovertitanic.com/titanic-history/building-the-legend/
- Research the working conditions at Harland & Wolff and other shipyards in the early 1900s.

Resource Materials:

- PDF booklet about *Titanic*'s 100 Years of Mystery: https://nieonline.com/sentinel/downloads/curricula/titanic.pdf
- PDF booklet about Belfast Shipbuilders by the Ulster-Scots Community Network: http://www.ulster-scots.com/uploads/shipbuilders.pdf
- A history of the shipyard and Titanic Quarter by Titanic Belfast (visitor attraction center): https://www.titanicbelfast.com/history-of-titanic/titanic-stories/a-history-of-the-shipyard-queen-s-island-to-titanic-quarter/
- Bill Sauder's explanation of *Titanic*'s pumps: https://www.youtube.com/watch?v=N75eGsW30vU
- Second Industrial Revolution: https://www.history.com/news/second-industrial-revolution-advances
- Brewster, Hugh and Laurie Coulter. *882 ½ Amazing Answers to your Questions about the* Titanic. Ontario: Madison Press, 1998. ISBN: 978-0-439-04296-3.
- Burlingame, Jeff. *Perspectives on The* Titanic *Tragedy: The Price of Prosperity in a Gilded Age*. New York: Marshall Cavendish, 2012. ISBN: 978-1-60870-450-7.
- Jones, Molly. *The Story of* Titanic's *Chairman Ismay*. Mankato: Child's World, 2015. ISBN: 978-1634074636.
- Korman, Gordon. Titanic: *Book One: Unsinkable*. New York: Scholastic, 2011. ISBN: 978-0-545-12331-0.
- Shepherd, Jodie. *Building the* Titanic. New York: Children's Press, 2023. A True Book Series. ISBN: 978-1-338-84048-3.

Florida State Education Standards:

SS.8.A.1.1: Provide supporting details for an answer from text, interview for oral history, check validity of information from research/text, and identify strong vs. weak arguments.
ELA.K12.EE.1.1: Cite evidence to explain and justify reasoning.
ELA.7.C.4.1, ELA.8.C.4.1: Conduct research to answer a question, drawing on multiple reliable and valid sources, and generating additional questions for further research.
SC.68.CS-CS.1.3: Evaluate what kinds of real-world problems can be solved using modeling and simulation.
SC.68.CS-CS.2.2: Solve real-life issues in science and engineering (i.e., generalize a solution to open-ended problems) using computational thinking skills.
SC.7.N.1.1, SC.8.N.1.1: Define a problem from the curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.8.N.1.4: Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.
SC.8.N.1.6: Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.
VA.68.S.2.3: Use visual-thinking and problem-solving skills in a sketchbook or journal to identify, practice, develop ideas, and resolve challenges in the creative process.
VA.68.O.1.3: Combine creative and technical knowledge to produce visually strong works of art.
Social Studies: SS.8.A.1.3, SS.8.A.1.4, SS.8.A.1.5, SS.8.A.1.6, SS.8.A.1.7
ELA: ELA.K12.EE.2.1, ELA.K12.EE.3.1, ELA.K12.EE.4.1, ELA.K12.EE.5.1, ELA.K12.EE.6.1, ELA.7.R.2.1, ELA.8.R.2.1, ELA.7.R.2.2, ELA.8.R.2.2, ELA.7.R.2.4, ELA.8.R.2.4, ELA.7.R.3.2, ELA.8.R.3.2, ELA.7.C.2.1, ELA.8.C.2.1, ELA.7.C.3.1, ELA.8.C.3.1
Computer Science: SC.68.CS-CS.1.4, SC.68.CS-PC.2.3, SC.68.CS-PC.2.6, SC.68.CS-PC.2.7, SC.68.CS-PC.2.8, SC.68.CS-PC.3.1, SC.68.CS-CS.1.2, SC.68.CS-CS.6.2
Science: SC.7.N.1.4, SC.7.N.1.6, SC.7.N.2.1, SC.8.N.3.1, SC.7.N.3.2, SC.8.N.4.2
Visual Arts: VA.68.C.1.1, VA.68.C.2.1, VA.68.S.1.2, VA.68.S.1.3, VA.68.S.2.2, VA.68.S.3.1, VA.68.S.3.3, VA.68.S.3.5, VA.68.O.1.1, VA.68.O.1.2, VA.68.O.1.4, VA.68.H.2.2, VA.68.H.3.2, VA.68.H.3.3, VA.68.F.1.1, VA.68.F.1.4, VA.68.F.2.2, VA.68.F.3.3, VA.68.F.3.4

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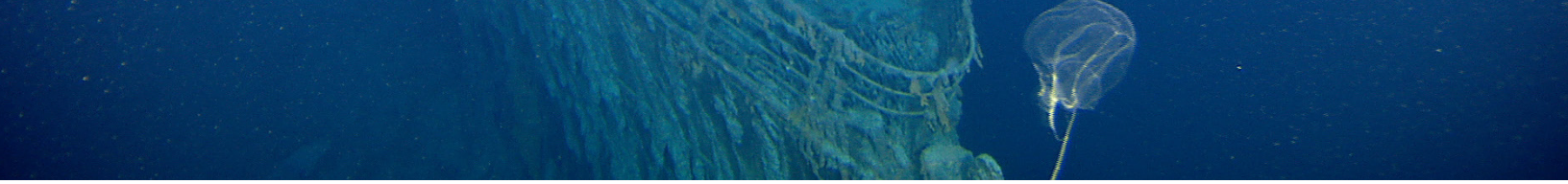
While all lessons are aligned to national standards, these lesson plans are specifically aligned to **Florida State Standards**, listing a condensed version of highlighted target skills within the lesson with an expanded version accessible online.

Don't teach in this state? Substitute your own state standards based on the categorization of summarized skills and subjects.



Classroom Lesson Plans

Middle School, Recommended Grades 7–8

1. Constructing Olympians: *Titanic*'s Technological Marvels

***Titanic* Theme:** Design/Build of Ship

Skills: Reading; Researching; Designing; Investigating; Summarizing; Notetaking; Presenting; Comparing; Creating; Evaluating

Subjects: Reading Informational Text; Writing; Speaking/Listening; Language; Visual Arts; Social Studies with Early World Civilizations; Social Studies within World; Civics; History; Geography; Technology; Science

Objectives:

- Students will delve into the engineering and technological innovations of Harland & Wolff shipbuilders in the early 1900s, with a focus on the *Olympic*-Class liners (including *Titanic*) by researching and notetaking.
- Students will expand upon knowledge of Harland & Wolff's shipbuilding innovations to plan, design, and/or test their own ship models.

Essential Questions:

- How did Harland & Wolff incorporate technological innovations in the design and build of *Titanic*?
- What were the three stages of *Titanic*'s construction?
- How did the pursuit of innovation at Harland & Wolff inspire new innovations today?
- How do the advancements of the past inform and influence us?

Time: 60 minutes

Assessment:

- *Titanic*'s Construction Notetaker
- Designing Your Model Activity
- Student Written Reflection
- Student Journal Response

> "[With] Harland & Wolff's special design, …the captain can, by simply moving an electric switch, instantly close the doors throughout and make the vessel practically unsinkable."
>
> —The Shipbuilder (Magazine), Summer 1911

Materials:

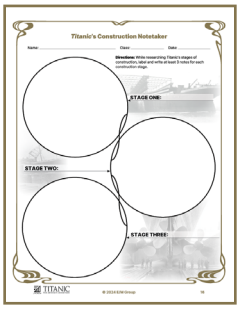
- ❑ *Titanic*'s Construction Notetaker
- ❑ Building the *Olympic*-Class Liners: Technological Marvels of Harland & Wolff Shipyard information guide
- ❑ Design and Build a Modern Unsinkable Ship engineering challenge
  - › Construction tools (e.g., scissors, tape, and glue)
  - › Building materials (e.g., plastic containers, egg cartons, toothpicks, straws, toothpicks plastic bags, aluminum foil, cardboard, clay, and craft sticks)
  - › Measuring tape or rulers
  - › Weights or pennies
  - › If time, a large water-filled aquarium, container, or sink to test models
- ❑ General supplies (pencil, paper, etc.)

Procedures

1. Begin the lesson by asking, "What do you already know about *Titanic*?" Introduce *Titanic* was one of three ships called the *Olympic*-Class liners (*Olympic*, *Titanic*, and *Britannic*), emphasizing *Titanic*'s significance as the largest and most luxurious Ship of her time, the early twentieth century, over 110 years ago.

> *Titanic* was the largest Ship of her time. She sailed in 1912. The Ship sank after hitting an iceberg. *Titanic* was sailing across the Atlantic Ocean. There was a movie about the Ship and a romance between Jack and Rose, fictional characters.

2. Explain to students that this lesson will focus on the construction and subsequent innovations of *Titanic*. Distribute ***Titanic*'s Construction Notetaker** for students to write notes as they discuss and research. Discuss how Harland & Wolff Shipyard was the premier shipbuilder, located in Belfast, Ireland (modern-day Northern Ireland), and their role in constructing these *Olympic*-Class vessels.



According to legend, the idea came from a meeting between J. Bruce Ismay, Chairman of White Star Line, and Lord William Pirrie, Chairman of Harland & Wolff Shipyard, over dinner in 1907. Due to their established partnership, White Star Line was about to have the largest and most luxurious Olympic*-Class liners the world had ever seen. RMS* Titanic*, constructed at Harland & Wolff's Belfast shipyard, was a remarkable engineering endeavor that involved reconstructing the shipyard itself and a workforce of approximately 14,000 skilled laborers and various tradesmen, 4,000 of whom worked on* Titanic.

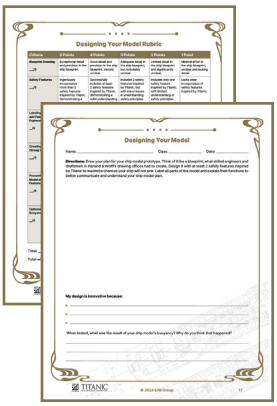
In regard of her stages of construction, Titanic *began with meticulous planning and design, led by chief naval architect Thomas Andrews. Her hull was made of high-quality steel plates held together by rivets installed by five-person riveting teams or by some hydraulic riveting machines on the shipyard's slipways. After launching into the River Lagan on May 31, 1911, she underwent extensive interior work by skilled craftsmen at the Fitting-Out Wharf. Finally, she was cleaned, painted, and fitted with propellers in the Thompson Graving Dock, now known as the* Titanic *Dry Dock.*

Titanic *spent most of her 3-year existence in Belfast (from 1909-1912). After embarking with passengers on April 10, 1912, she only sailed for four additional days.*

3. Students will read more independently to write more notes on their notetakers: https://mollybrown.org/building-the-titanic/ (general timeline of events) and https://mollybrown.org/titanic-endeavor/ (construction features and innovations)
4. Watch Harland & Wolff video about history of the company from past to present, as they are still an active shipyard (found at bottom of webpage): https://www.harland-wolff.com/who-we-are/#our-story
5. Explain how, as seen from the video and confirmed by the readings, Harland & Wolff has always been dedicated to innovation. Read the guide, **Building the *Olympic*-Class Liners: Technological Marvels of Harland & Wolff Shipyard**.

Key technological innovations include watertight compartments, advanced safety features, and the Marconi wireless telegraph system. These innovations were groundbreaking for their time, given Titanic*'s construction during the late part of the second industrial revolution of 1870 to 1914 with the expansion of electrical technology.*

6. Engage students with an engineering challenge activity: **Designing Your Model**. Use the **Rubric** for guidance.
   a. Divide students into pairs or small groups.
   b. Challenge each group to design and build an unsinkable ship prototype that incorporates innovative safety features inspired by *Titanic*.
   c. Draw a plan (diagram-like blueprint) for the ship model with drawings and labels.
   d. Create the model ship using the construction tools and building materials provided (see Materials).
   e. Have each group present their constructed unsinkable ship design to the class, explaining the safety features and engineering principles incorporated, depth and scale per teacher's discretion.
   f. If time, test the ships' buoyancy (an object's ability to float in a fluid) by placing them in a water-filled container to see if they float.
      i. Document observations and success of safety measures on the worksheet.
      ii. Test to see how much weight each ship can hold and stay afloat.



7. Have students write a reflection about their experience, such as expectations, realizations, and challenges to turn in.
8. Ask students, "What is the process and challenges faced by shipbuilders, like Harland & Wolff?" and "What is the importance of precise measurements for engineering?"

> Shipbuilders need to plan everything out before building to know people's duties, process steps, materials needed, etc. The process is to plan, build (in several stages), test, reflect, revise, and repeat. It could be challenging to communicate those plans effectively and ensure it gœs exactly as planned. It could be a challenge when things do not work according to plan. If they don't have a strategy or the supplies needed, shipbuilders will not be able to complete their project. They need expert knowledge and precise measurements or else their design may not work.

9. Discuss how modern engineering continues to be influenced by innovations from the past, such as described in the Harland & Wolff video and specifically those on *Titanic*.
   a. Optional: Extend the lesson to explore scientific principles of buoyancy (or Archimedes' principle), weight and density, pressure, water displacement, force, etc.
10. Summarize the key technological marvels of the *Olympic*-Class liners, including watertight compartments, advanced safety features, and the Marconi wireless telegraph system, emphasizing their lasting impact on ship design and safety.

11. Journal: What is the importance of engineering and innovation in history and their role in shaping the future? How did technological advancements for Harland & Wolff impact the build of *Titanic*?

Design/Build Additional Activities and Resources

Optional Extension Activities:

- Report writing as if you were Thomas Andrews.
- Research the science behind why boats float: https://www.jdpower.com/boats/shopping-guides/how-do-boats-float
- Create a biography project or PowerPoint showcasing the prominent people at Harland & Wolff.
- Build a model of a key innovation, either in that period of history or explored in the lesson, and use labels to explain the innovation.
- Write a diary entry detailing the daily schedule of a shipyard worker.
- Write a script of how you think the conversation went between White Star Line's J. Bruce Ismay and Harland & Wolff's Lord William Pirrie when conceiving the *Olympic*-Class liners.
- Create math word problems based on *Titanic*'s figures: https://www.discovertitanic.com/titanic-history/building-the-legend/
- Research the working conditions at Harland & Wolff and other shipyards in the early 1900s.

Link to Resource Materials:

- PDF booklet about *Titanic*'s 100 Years of Mystery: https://nieonline.com/sentinel/downloads/curricula/titanic.pdf
- PDF booklet about Belfast Shipbuilders by the Ulster-Scots Community Network: http://www.ulster-scots.com/uploads/shipbuilders.pdf
- A history of the shipyard and Titanic Quarter by Titanic Belfast (visitor attraction center): https://www.titanicbelfast.com/history-of-titanic/titanic-stories/a-history-of-the-shipyard-queen-s-island-to-titanic-quarter/
- Titanic Historical Society article on the quality of steel used on *Titanic*: https://titanichistoricalsociety.org/titanics-brittle-steel/
- Bill Sauder's explanation of *Titanic*'s pumps: https://www.youtube.com/watch?v=N75eGsW30vU
- Second Industrial Revolution: https://www.history.com/news/second-industrial-revolution-advances
- Brewster, Hugh and Laurie Coulter. *882 ½ Amazing Answers to your Questions about the* Titanic. Ontario: Madison Press, 1998. ISBN: 978-0-439-04296-3.
- Burlingame, Jeff. *Perspectives on The* Titanic *Tragedy: The Price of Prosperity in a Gilded Age.* New York: Marshall Cavendish, 2012. ISBN: 978-1-60870-450-7.
- Jones, Molly. *The Story of* Titanic's *Chairman Ismay*. Mankato: Child's World, 2015. ISBN: 978-1634074636.
- Korman, Gordon. Titanic: *Book One*: *Unsinkable*. New York: Scholastic, 2011. ISBN: 978-0-545-12331-0.
- Shepherd, Jodie. *Building the* Titanic. New York: Children's Press, 2023. A True Book Series. ISBN: 978-1-338-84048-3.

Florida State Education Standards:

SS.8.A.1.1: Provide supporting details for an answer from text, interview for oral history, check validity of information from research/text, and identify strong vs. weak arguments.

ELA.K12.EE.1.1: Cite evidence to explain and justify reasoning.

ELA.7.C.4.1, ELA.8.C.4.1: Conduct research to answer a question, drawing on multiple reliable and valid sources, and generating additional questions for further research.

SC.68.CS-CS.1.3: Evaluate what kinds of real-world problems can be solved using modeling and simulation.

SC.68.CS-CS.2.2: Solve real-life issues in science and engineering (i.e., generalize a solution to open-ended problems) using computational thinking skills.

SC.7.N.1.1, SC.8.N.1.1: Define a problem from the curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

SC.8.N.1.4: Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.

SC.8.N.1.6: Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.

VA.68.S.2.3: Use visual-thinking and problem-solving skills in a sketchbook or journal to identify, practice, develop ideas, and resolve challenges in the creative process.

VA.68.O.1.3: Combine creative and technical knowledge to produce visually strong works of art.

Social Studies: SS.8.A.1.3, SS.8.A.1.4, SS.8.A.1.5, SS.8.A.1.6, SS.8.A.1.7

ELA: ELA.K12.EE.2.1, ELA.K12.EE.3.1, ELA.K12.EE.4.1, ELA.K12.EE.5.1, ELA.K12.EE.6.1, ELA.7.R.2.1, ELA.8.R.2.1, ELA.7.R.2.2, ELA.8.R.2.2, ELA.7.R.2.4, ELA.8.R.2.4, ELA.7.R.3.2, ELA.8.R.3.2, ELA.7.C.2.1, ELA.8.C.2.1, ELA.7.C.3.1, ELA.8.C.3.1

Computer Science: SC.68.CS-CS.1.4, SC.68.CS-PC.2.3, SC.68.CS-PC.2.6, SC.68.CS-PC.2.7, SC.68.CS-PC.2.8, SC.68.CS-PC.3.1, SC.68.CS-CS.1.2, SC.68.CS-CS.6.2

Science: SC.7.N.1.4, SC.7.N.1.6, SC.7.N.2.1, SC.8.N.3.1, SC.7.N.3.2, SC.8.N.4.2

Visual Arts: VA.68.C.1.1, VA.68.C.2.1, VA.68.S.1.2, VA.68.S.1.3, VA.68.S.2.2, VA.68.S.3.1, VA.68.S.3.3, VA.68.S.3.5, VA.68.O.1.1, VA.68.O.1.2, VA.68.O.1.4, VA.68.H.2.2, VA.68.H.3.2, VA.68.H.3.3, VA.68.F.1.1, VA.68.F.1.4, VA.68.F.2.2, VA.68.F.3.3, VA.68.F.3.4

Building the *Olympic*-Class Liners: Technological Marvels of Harland & Wolff Shipyard

The construction of the *Olympic*-Class liners, including *Titanic*, was a testament to the engineering brilliance of Harland & Wolff shipyard in the early 1900s. These technological marvels not only provided luxurious travel, but also set new standards for safety and innovation in the world of shipbuilding. The legacy of these innovations lives on, reminding us of the achievements in this era.

The Harland & Wolff Shipyard:

- Located in Belfast, Ireland (modern-day Northern Ireland), Harland & Wolff was one of the world's leading shipyards in the early 20th century.
- The shipyard was known for its expertise in ship design, construction, and engineering.

Titanic and Her Sisters, The *Olympic*-Class Liners:

- The *Olympic*-Class liners consisted of three sister ships: RMS *Olympic*, RMS *Titanic*, and HMHS *Britannic*. These ships were among the largest and most luxurious vessels of their time.
- The idea was conceived by Harland & Wolff Chairman Lord William Pirrie and White Star Line Chairman J. Bruce Ismay in hopes to challenge their major competitor, Cunard Line.

The Construction Process:

- Harland & Wolff used state-of-the-art techniques, including the Arrol Gantry scaffolding, massive cranes, and redesigned slipways and graving docks, to build these enormous vessels.
- When the *Olympic*-Class ships were designed, no shipyard large enough existed. Harland & Wolff set to build two new slipways by combining four existing ones. They also built the largest graving dock in the world to accommodate the sheer vessel size of their *Olympic*-Class liners, called the Thompson Graving Dock.
- 14,000 skilled craftsmen and shipyard workers meticulously constructed every detail of the ships across the shipyard, from the ornate woodwork to the intricate metalwork. Up to 4,000 people worked specifically on *Titanic* over three years of construction.

Technological Marvels:

- Innovative Safety Features:
  - *Watertight Compartments:* These 16 remotely activated compartments could be sealed off to contain flooding in the event of a collision or damage, which were remotely activated.
  - *Bulkheads:* Tall, sturdy walls or bulkheads separated sections of a ship.
  - *Double Hull:* The *Olympic*-Class liners had a double-bottom hull (watertight steel body), providing a layer of protection against collisions.
  - *Pumps: Titanic* had five ballast and three bilge pumps that would transfer water between tanks and get it overboard.
- Advanced Design:
  - *Steel Welding:* The sleek, curved bow was designed to improve speed and reduce water resistance, made of 1 to 1 ½ inch steel plates and three million rivets placed by human-powered riveting teams or machine-powered hydraulic riveting.
  - *Improved Propulsion:* 29 powerful boilers drove triple screw (three propellers) allowed for sustained increased speed, up to 23 knots.
- Luxurious Amenities:
  - *Lavish Interiors:* The ships were renowned for their opulent interiors, including grand dining rooms, lounges, and luxurious cabins.
  - *Swimming Pools: Titanic* had one of the first heated swimming pools on a ship.
- Wireless Communication:
  - *Marconi Wireless Telegraph System: Titanic* was equipped with a cutting-edge wireless telegraph system for communication with other ships, a feature that played a critical role during her tragic voyage.

Titanic's Construction Notetaker

Name: _____ Class: _____ Date: _____

Directions: While researching *Titanic*'s stages of construction, label and write at least 3 notes for each construction stage.

STAGE ONE:

STAGE TWO:

STAGE THREE:

Designing Your Model

Name: _____ Class: _____ Date: _____

Directions: Draw your plan for your ship model prototype. Think of it like a blueprint, what skilled engineers and draftsmen in Harland & Wolff's drawing offices had to create. Design it with at least 2 safety features inspired by *Titanic* to maximize chances your ship will not sink. Label all parts of the model and explain their functions to better communicate and understand your ship model plan.

My design is innovative because:

- _____
- _____
- _____

When tested, what was the result of your ship model's buoyancy? Why do you think that happened?

_____

_____

_____

Designing Your Model Rubric

Criteria	5 Points	4 Points	3 Points	2 Points	1 Point
Blueprint Drawing **___/5**	Exceptional detail and precision in the ship blueprint.	Good detail and precision in the ship blueprint, minorly unclear.	Adequate detail in the ship blueprint, but noticeably unclear.	Limited detail in the ship blueprint and significantly unclear.	Minimal effort in the ship blueprint, unclear and lacking detail.
Safety Features **___/5**	Ingeniously incorporates more than 2 safety features inspired by *Titanic*, demonstrating a deep understanding of safety principles.	Successfully includes at least 2 safety features inspired by *Titanic*, demonstrating a solid understanding of safety principles.	Includes 2 safety features inspired by *Titanic*, but with minor issues in understanding safety principles.	Includes only one safety feature inspired by *Titanic*, with limited understanding of safety principles.	Lacks clear incorporation of safety features inspired by *Titanic*.
Labeling and Function Explanation **__/5**	Labels all ship parts accurately and provides thorough explanations of their functions, showcasing a comprehensive understanding.	Labels most ship parts accurately and provides adequate explanations of their functions.	Labels some ship parts accurately, with explanations that lack depth or clarity.	Labels few ship parts accurately, and explanations are vague or incomplete.	Minimal effort in labeling ship parts and providing explanations.
Creating the Model (Group Work) **___/5**	Exceptional collaboration in creating the model, with each member contributing effectively and efficiently.	Good collaboration in creating the model, with most members contributing effectively.	Adequate collaboration in creating the model, but with some members not contributing effectively.	Limited collaboration in creating the model, with few members contributing effectively.	Minimal collaboration in creating the model, with no effective contributions from members.
Presenting Model and Safety Features **___/5**	Confidently presents the model to the class, explaining safety features and engineering principles with clarity and depth.	Presents the model to the class, explaining safety features and engineering principles with sufficient clarity.	Presents the model to the class, but explanations of safety features and engineering principles lack depth or clarity.	Limited presentation of the model, with vague explanations of safety features and engineering principles.	Minimal effort in presenting the model and lacks clarity in explaining safety features and engineering principles.
Optional: Testing Buoyancy **__/5**	Exceptionally detailed documentation of the investigation, including thorough observations of the ship's buoyancy and weight-bearing capacity.	Well-documented investigation, providing clear observations of the ship's buoyancy and weight-bearing capacity.	Adequate documentation of the investigation, but with some gaps in observations of the ship's buoyancy.	Limited documentation of the investigation, with vague observations of the ship's buoyancy.	Minimal effort in documenting the investigation, lacking detailed observations.

Total: _____ /25

Total with optional: _____ /30

2. Next Stop:
Mapping *Titanic*'s Ports of Call

***Titanic* Theme:** Voyage Preparation/Route

Skills: Charting; Mapping; Reading; Researching; Notetaking; Presenting

Subjects: Social Studies; Geography; History; Immigration; Edwardian Times; Reading Informational Text; Writing; Speaking/Listening

Objectives:

- Students will gain a deeper understanding of the RMS *Titanic*'s route and her ports of call, Southampton, Cherbourg, and Queenstown, by researching and listing main points on a graphic organizer and/or presenting to the class.
- Students will develop map-reading and research skills by creating a detailed map illustrating *Titanic*'s voyage.

Essential Questions:

- Where were *Titanic*'s ports of call, including before embarkation, and where was her destination?
- Why is it important to know where *Titanic* picked up passengers?
- How do *Titanic*'s ports of call impact her overall story?

Time: 45 minutes

Assessment:

- Where in the World: *Titanic*'s Port Cities Individual Maps
- Research Presentations
- Student Journal Response

"We left Cherbourg yesterday with some delay, as the *Titanic* was late. (You know the *Titanic* took us aboard within the harbour.) It is interesting how you can get from one ship to another. On the side of the *Titanic* they made an opening and used a bridge to connect the two ships. The Ship will land one more time (11 a.m. tomorrow) on the Irish coast of Queenstown. (You can look it up on the map.)"

—Margaretha Frölicher-Stehli, *Titanic* First-Class Passenger

Materials:

- ❑ Large world map
- ❑ *Titanic*'s route and port information handouts
- ❑ Where in the World: *Titanic*'s Port Cities sheets
- ❑ General supplies (pencil, paper, etc.)

Procedures

1. Discuss and review how *Titanic*'s construction took place in Belfast, Ireland (modern-day Northern Ireland) and finished on April 2, 1912, with her sea trials. Show a large world map and locate Belfast. Ask students,
   a. "Where did *Titanic* start her maiden voyage?" (*Southampton, England*)
   b. "Which cities did *Titanic* stop at?" (*Cherbourg, France, and Queenstown/Cobh, Ireland*)
   c. "What was her destination?" (*New York*)
2. Using a map, locate and highlight *Titanic*'s route between the cities. Explain that today's lesson will focus on the significance of her ports of call, the cities where she stopped to pick up passengers, crew, and cargo. Provide students with ***Titanic*'s Port Cities** handouts containing information about Southampton, Cherbourg, and Queenstown. Instruct students to read and underline or highlight key facts about each port.


Titanic's Port Cities

3. Lead a discussion on the significance of each port of call. Ask, "How does each city that *Titanic* stopped at influence the history of *Titanic*?"

> Many first-class passengers boarded in Southampton, and almost all of the crew came from the local area. Many first-class passengers boarded in Cherbourg from vacation and/or shopping in Paris, as was fashionable at the time. Many third-class passengers boarded in Queenstown, and mail was picked up here to uphold the duties of the RMS (Royal Mail Ship/Steamer) ship distinction.

4. Ask, "How does knowing about these cities add to your understanding of the *Titanic* story?"

> It shows the type of passengers they had on board and why they would have boarded *Titanic*. That the sinking would directly impact Southampton the most, given so many crew were from there. Queenstown, Ireland would be significantly impacted by the sinking, too, with many third-class people from there.

5. Ask, "What do you find interesting and/or notice when looking across these locations?"

> *Titanic* stopped at three ports on three different land masses/countries. *Titanic* spent about a week in Southampton and only a few hours in Cherbourg and Queenstown. She picked up passengers from both Southampton and Cherbourg in one day. Both Cherbourg and Queenstown ferried passengers to *Titanic*.

6. Explain why so many different types of people boarded *Titanic*.

While appealing to first and second class in luxury, Titanic *and her sister ships were mainly intended to profit from immigration, as transatlantic travel was by ship. In the early 1900s, there was a massive influx of people immigrating to the United States, mainly through Ellis Island in New York. Before people got there, ships would stop and pick up passengers at port cities across Europe. Some passengers would get off at cities along the way or wait to get off at the ship's destination.* RMS Titanic *did just that.*

7. Bring students' attention back to the map as a visual way to understand where *Titanic*'s passengers boarded. Have students locate the continent Europe and the countries England, France, and Ireland on a map. Then, have them find the continent of North America and the country United States of America. Ask, "Why are maps important to society?"

> Maps are tools for representing and understanding our world. They provide visual representations of geographical information, allowing us to navigate, plan, and communicate about locations. They are essential for GPS navigation, oceanic exploration, cartography, etc.

8. Emphasize vertical and horizontal lines on the map and explain their significance for finding the exact location.

The lines help people locate places, like countries, states, and cities, on the map. These lines are called latitude and longitude. Latitude and longitude are the coordinate systems that pinpoint exact locations. Latitude lines run horizontally and measure distances north or south of the equator. Longitude lines run vertically and measure the distances east or west of the prime meridian. The numbers indicate coordinate degrees of distance and cardinal directions, or how far away something is from the equator or prime meridian.

9. Explain how to read and interpret coordinates, for example: 48°51'N 2°19'E.

Latitude:

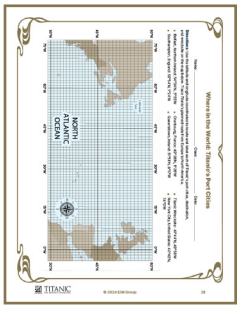
i. *The first part, "48°," represents the degrees of latitude.*
ii. *The second part, "51' N," represents the minutes of latitude and the cardinal direction (North in this case).*
iii. *So, 48°51'N indicates a location at 48 degrees and 51 minutes north of the equator.*

Longitude:

i. *The first part, "2°," represents the degrees of longitude.*
ii. *The second part, "19'E," represents the minutes of the longitude and the cardinal direction (East in this case).*
iii. *So, 2°19'E indicates a location at 2 degrees and 19 minutes east of the prime meridian.*

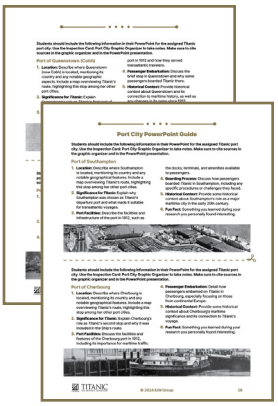
Demonstrate how to use these coordinates to discover that 48°51'N 2°19'E is Paris, France.

10. Provide students with **Where in the World: *Titanic*'s Port Cities** individual maps to plot significant *Titanic* exact locations. Students will plot the three port cities, *Titanic*'s destination, and her wrecksite using latitudinal and longitudinal coordinates. Instruct them to trace and label the *Titanic*'s route, including the ports of call.



1. Belfast, Northern Ireland (where she was built)
2. Southampton, England (first port/embarkation port)
3. Cherbourg, France (second port)
4. Queenstown, Ireland (third port)
5. Atlantic Ocean (wrecksite)
6. New York (intended final destination)

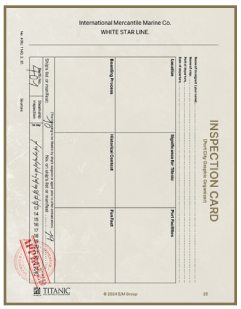
11. Students will be divided into four groups. Each will be assigned one port city to research using their devices. Students will create a PowerPoint to showcase facts and information about it. They must include a map overviewing *Titanic*'s route and ports of call, highlighting their group's port among her other stops. Remind students to use visuals, maps, and photographs to enhance the presentations and make the information engaging for the class. They need to cite sources on the graphic organizer and in the PowerPoint.



a. Provide students with **Port City PowerPoint Guide** to know what to include and **Inspection Card: Port City Graphic Organizer** to take notes.

b. Cite sources using digital citation, like https://www.bibcitation.com/, https://www.scribbr.com/citation/generator/, or https://www.mybib.com/

12. If there is enough class time, students present their research findings about one of the ports. Otherwise, presenting a different day is an option. Encourage questions and discussions after each presentation. Alternatively, PowerPoints can be submitted to the teacher for grading.



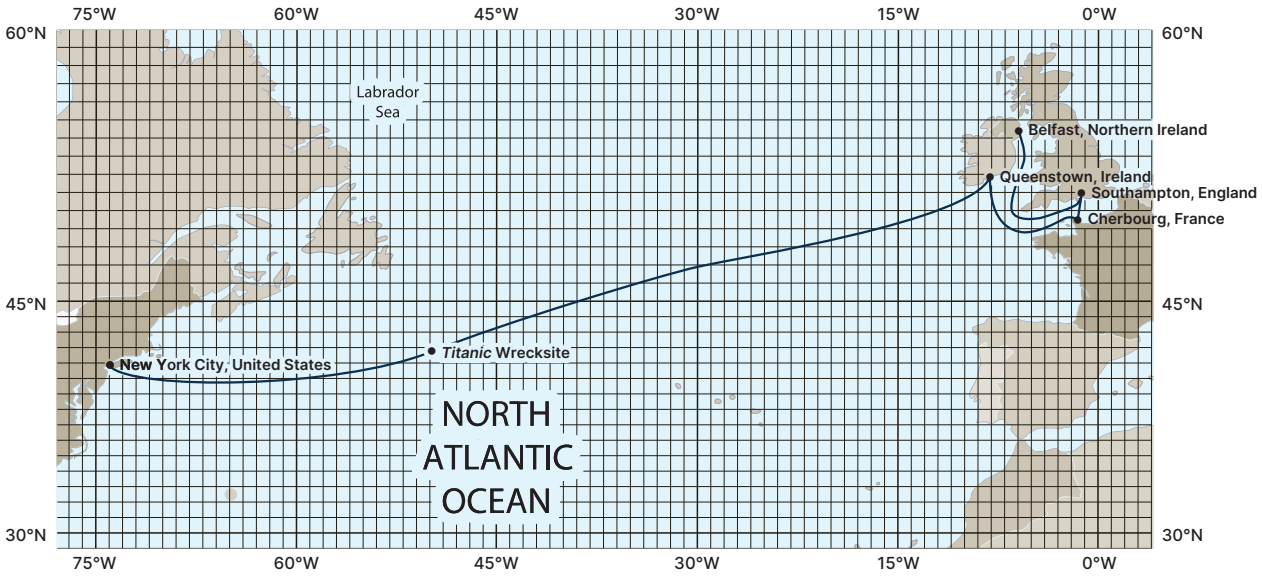
13. Ask students to reflect, "What did you learn from mapping *Titanic*'s journey?" Highlight any interesting connections between the ports and the Ship's route.

> Mapping helped me see how international the *Titanic* story is. This gave me more context for the passengers, who they were, where they came from, and why they came from those places. I now know where these events took place. I realized *Titanic*'s connection to American and world history.

14. Summarize the key points about the *Titanic*'s route and ports of call, sailing from Belfast, Northern Ireland; to Southampton, England; Cherbourg, France; and Queenstown, Ireland, before heading to the intended destination of New York City, New York. Emphasize the importance of the geography and history of each location to better understand historical events.

15. Journal: How does knowing the locations of *Titanic*'s route, ports, and final resting spot affect your understanding of the *Titanic* legend? If you could choose one location to go to, which port would you visit? Why?

Titanic's Port Cities Map Answer Key:



Preparation/Route Additional Activities and Resources

Optional Extension Activities:

- Calculate the distance between each port city in miles and kilometers.
- Plot on the map where you are located and significant places to you, in comparison to *Titanic*'s route.
- Explore the impact of ocean currents and weather conditions on *Titanic*'s route.
- Research the cultural aspects of the ports and how they influenced the Ship's passengers.
- Research immigration at the turn of the century and its influence on transatlantic/transcontinental travel.
- Compare trade and immigration into the United States from various liners or from the 1900s to 2000s.
- Select and research an individual passenger from each of the port cities.

Link to Resource Materials:

- Historical and modern-day descriptions of *Titanic*-related cities: https://www.history.com/news/titanic-today-a-transatlantic-tour
- "Titanic: Honor and Glory" video about *Titanic*'s port cities and connected cities: https://www.youtube.com/watch?v=UAf038Syekw
- Map of *Titanic*-related cities, memorials, and locations: https://titanicmap.org/
- Belfast and Harland & Wolff Shipyard History: https://www.titanicbelfast.com/history-of-titanic/titanic-stories/a-history-of-the-shipyard-queen-s-island-to-titanic-quarter/
- Brief overview of Southampton's passengers and crew as well as modern memorials: https://britishheritage.com/history/titanic-southampton
- La Cité de la Mer museum's *Titanic* artifact exhibition: https://www.citedelamer.com/en/titanic-return-cherbourg/titanic-artefacts-stories/
- Cherbourg as a port city for *Titanic*: https://cherbourg-titanic.com/en/2011/05/deroulement-de-l-escale-du-titanic-en-1912/
- Cherbourg immigration history: https://cherbourg-titanic.com/en/2011/07/les-flux-de-migrants/
- Queenstown as a port city for *Titanic*: https://www.ireland.com/en-us/magazine/built-heritage/titanic-in-cobh/
- Cobh history: https://cobhheritage.com/about/cobh-past-present/
- New York and *Titanic*: https://southstreetseaportmuseum.org/about-the-titanic-memorial-lighthouse/
- General immigration practices by White Star Line: https://thehistorypress.co.uk/article/immigration-to-the-usa-by-white-star-liner/
- Rinkol, Sheryl. Titanic *Today: A Modern View of* Titanic*'s Historic Ports*. Half Moon Bay: Titanically Speaking, 2019. ISBN: 978-1-7326903-1-8.

Florida State Education Standards:

SS.8.G.1.2: Use appropriate geographic tools and terms to identify and describe significant places and regions in American history.

SS.8.G.2.1: Identify the physical elements and the human elements that define and differentiate regions as relevant to American history.

SS.8.A.1.2: Analyze charts, graphs, maps, photographs and timelines; analyze political cartoons; determine cause and effect.

SS.8.A.1.7: View historic events through the eyes of those who were there as shown in their art, writings, music, and artifacts.

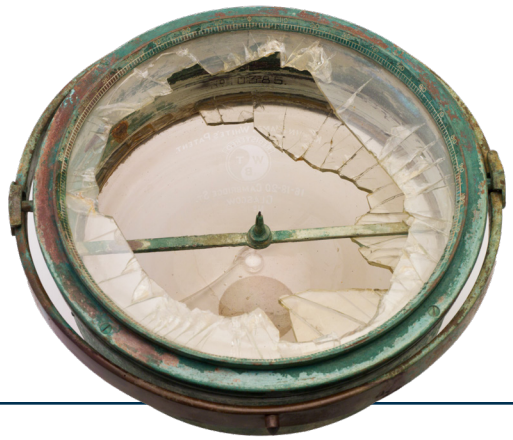
ELA.7.C.2.1, ELA.8.C.2.1: Present information orally, in a logical sequence, supporting the central idea with credible evidence.

SC.68.CS-CC.1.3: Design, develop, and publish a collaborative digital product using a variety of digital tools and media-rich resources that demonstrate and communicate concepts to inform, persuade, and/or entertain.

Social Studies: SS.8.G.1.1, SS.7.G.1.3, SS.7.G.2.3, SS.7.G.4.1, SS.8.G.4.1, SS.8.G.4.2, SS.8.G.4.4, SS.8.G.6.2, SS.8.A.1.1, SS.8.A.1.4, SS.8.A.1.6

ELA: ELA.K12.EE.1.1, ELA.K12.EE.2.1, ELA.K12.EE.3.1, ELA.K12.EE.4.1, ELA.K12.EE.5.1, ELA.K12.EE.6.1, ELA.7.R.2.1, ELA.8.R.2.1, ELA.7.R.2.2, ELA.8.R.2.2, ELA.7.R.3.2, ELA.8.R.3.2, ELA.7.R.3.3, ELA.7.C.1.4, ELA.8.C.1.4, ELA.7.C.3.1, ELA.8.C.3., ELA.7.C.4.1, ELA.8.C.4.1, ELA.7.C.5.1, ELA.8.C.5.1, ELA.7.C.5.2, ELA.8.C.5.2, ELA.7.V.1.1, ELA.8.V.1.1

Computer Science: SC.68.CS-PC.3.1, SC.68.CS-PC.4.6, SC.68.CS-CC.1.1



Titanic's Port Cities

***Titanic*'s ports played a significant role in *Titanic*'s voyage, marking key points along her historic journey. To better understand the Ship's route and the places she visited, read the information below about Southampton, Cherbourg, and Queenstown (now known as Cobh).**

Port of Southampton

Location: Southampton, England

Significance:

- Southampton served as *Titanic*'s departure port for her maiden voyage on the afternoon of April 10, 1912.
- The majority of *Titanic*'s passengers and crew boarded here, with an estimated 1,846 on board by departure.
- *Titanic* had been in Southampton since April 3, gathering supplies, provisions, and crew.
- The city was a central hub for British ocean liners during the early 20th century.
- Its location on the south coast of England made this city an ideal starting point for transatlantic voyages to the United States.

Port of Cherbourg

Location: Cherbourg-Octeville, France

Significance:

- Cherbourg was *Titanic*'s second stop on her maiden voyage, and 281 passengers embarked here on the evening of April 10, 1912.
- Mainly first-class passengers who came from seaside spa resorts boarded in Cherbourg.
- The port provided an opportunity for some passengers to board the Ship, primarily those from continental Europe.
- *Titanic* was so massive that two smaller White Star Line ships—*Nomadic* and *Traffic*—were built to ferry passengers to the Ship from the docks. They were built by the same shipyard that built *Titanic*, Harland & Wolff, in Belfast, Ireland.

Port of Queenstown (Cobh)

Location: Queenstown, Ireland (now known as Cobh, pronounced "cove")

Significance:

- Queenstown was *Titanic*'s final port of call before heading across the Atlantic on April 11, meaning it was the last time the Ship was near land.
- Amateur photographers like Kate Odell and Father Francis Browne, who disembarked at Queenstown, took some of the last photos of *Titanic* as the Ship sailed off in the distance.
- 123 mainly third-class passengers boarded via tender ships that ferried them from the docks.
- The city of Queenstown is known as an important hub for Irish emigration and maritime history.

Port of New York City

Location: New York City, New York, United States of America

Significance:

- New York City was *Titanic*'s intended destination for her maiden voyage, intending to arrive the morning of Wednesday, April 17, 1912.
- *Titanic* was supposed to dock at Pier 59 in New York Harbor to collect passengers for a return journey back across the Atlantic, stopping at the ports listed here in reverse order.
- New York City's Ellis Island was the main entrance for those arriving in the United States, welcoming over a million immigrants yearly in the early 1900s.
- Immigrants would be processed on Ellis Island, meaning they would have their personal inspection cards and health status reviewed to approve or deny entry; immigrants had to pass a medical examination before boarding *Titanic*.

Additional Facts

- Passengers boarded in Southampton and Cherbourg the same day on April 10, while at Queenstown the next on April 11.
- Each stop for passengers was brief, lasting between 95 and 120 minutes.
- *Titanic*'s route took her across the North Atlantic Ocean to her intended destination, New York City.
- Pier 54 in New York Harbor welcomed *Titanic* survivors on April 18, 1912.

International Mercantile Marine Co.
WHITE STAR LINE.

INSPECTION CARD

(Port City Graphic Organizer)

Name of immigrant (your name), ...

Name of ship, ...

Port of departure, ...

Date of departure, ...

Location	Significance for *Titanic*	Port Facilities
Boarding Process	**Historical Context**	**Fun Fact**

(The following to be filled in by ship's surgeon or agent prior to after embarkation).

Ship's list or manifest: 10 No. on ship's list or manifest 19

Berth No.	Steamship Inspection	1st day	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
401			

APPROVED

No. 401c. 1140. 2. 37.

Sources:

TITANIC THE ARTIFACT EXHIBITION
E/M GROUP

Port City PowerPoint Guide

Students should include the following information in their PowerPoint for the assigned *Titanic* port city. Use the Inspection Card: Port City Graphic Organizer to take notes. Make sure to cite sources in the graphic organizer and in the PowerPoint presentation.

Port of Southampton

1. **Location:** Describe where Southampton is located, mentioning its country and any notable geographical features. Include a map overviewing *Titanic*'s route, highlighting this stop among her other port cities.
2. **Significance for *Titanic*:** Explain why Southampton was chosen as *Titanic*'s departure port and what made it suitable for transatlantic voyages.
3. **Port Facilities:** Describe the facilities and infrastructure of the port in 1912, such as the docks, terminals, and amenities available to passengers.
4. **Boarding Process:** Discuss how passengers boarded *Titanic* in Southampton, including any specific procedures or challenges they faced.
5. **Historical Context:** Provide some historical context about Southampton's role as a major maritime city in the early 20th century.
6. **Fun Fact:** Something you learned during your research you personally found interesting.

Students should include the following information in their PowerPoint for the assigned *Titanic* port city. Use the Inspection Card: Port City Graphic Organizer to take notes. Make sure to cite sources in the graphic organizer and in the PowerPoint presentation.

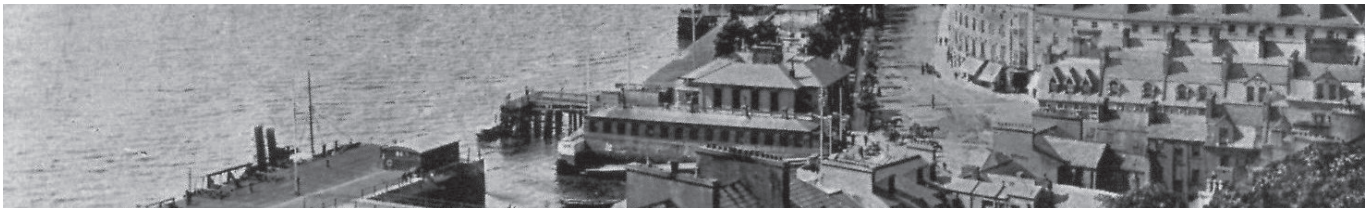
Port of Cherbourg

1. **Location:** Describe where Cherbourg is located, mentioning its country and any notable geographical features. Include a map overviewing *Titanic*'s route, highlighting this stop among her other port cities.
2. **Significance for *Titanic:*** Explain Cherbourg's role as *Titanic*'s second stop and why it was included in the Ship's route.
3. **Port Facilities:** Discuss the facilities and features of the Cherbourg port in 1912, including its importance for maritime traffic.
4. **Passenger Embarkation**: Detail how passengers embarked on *Titanic* in Cherbourg, especially focusing on those from continental Europe.
5. **Historical Context:** Provide some historical context about Cherbourg's maritime significance and its connection to *Titanic*'s voyage.
6. **Fun Fact:** Something you learned during your research you personally found interesting.

Students should include the following information in their PowerPoint for the assigned *Titanic* port city. Use the Inspection Card: Port City Graphic Organizer to take notes. Make sure to cite sources in the graphic organizer and in the PowerPoint presentation.

Port of Queenstown (Cobh)

1. **Location:** Describe where Queenstown (now Cobh) is located, mentioning its country and any notable geographic aspects. Include a map overviewing *Titanic*'s route, highlighting this stop among her other port cities.
2. **Significance for *Titanic*:** Explain Queenstown's role as *Titanic*'s final port of call and its purpose in the Ship's journey.
3. **Port Facilities:** Describe the facilities and services available at the Queenstown port in 1912 and how they served transatlantic travelers.
4. **Passenger Embarkation:** Discuss the brief stop in Queenstown and why some passengers boarded *Titanic* there.
5. **Historical Context:** Provide historical context about Queenstown and its connection to maritime history, as well as any changes in its name since 1912.
6. **Fun Fact:** Something you learned during your research you personally found interesting.



Students should include the following information in their PowerPoint for the assigned *Titanic* port city. Use the Inspection Card: Port City Graphic Organizer to take notes. Make sure to cite sources in the graphic organizer and in the PowerPoint presentation.

Port of New York City

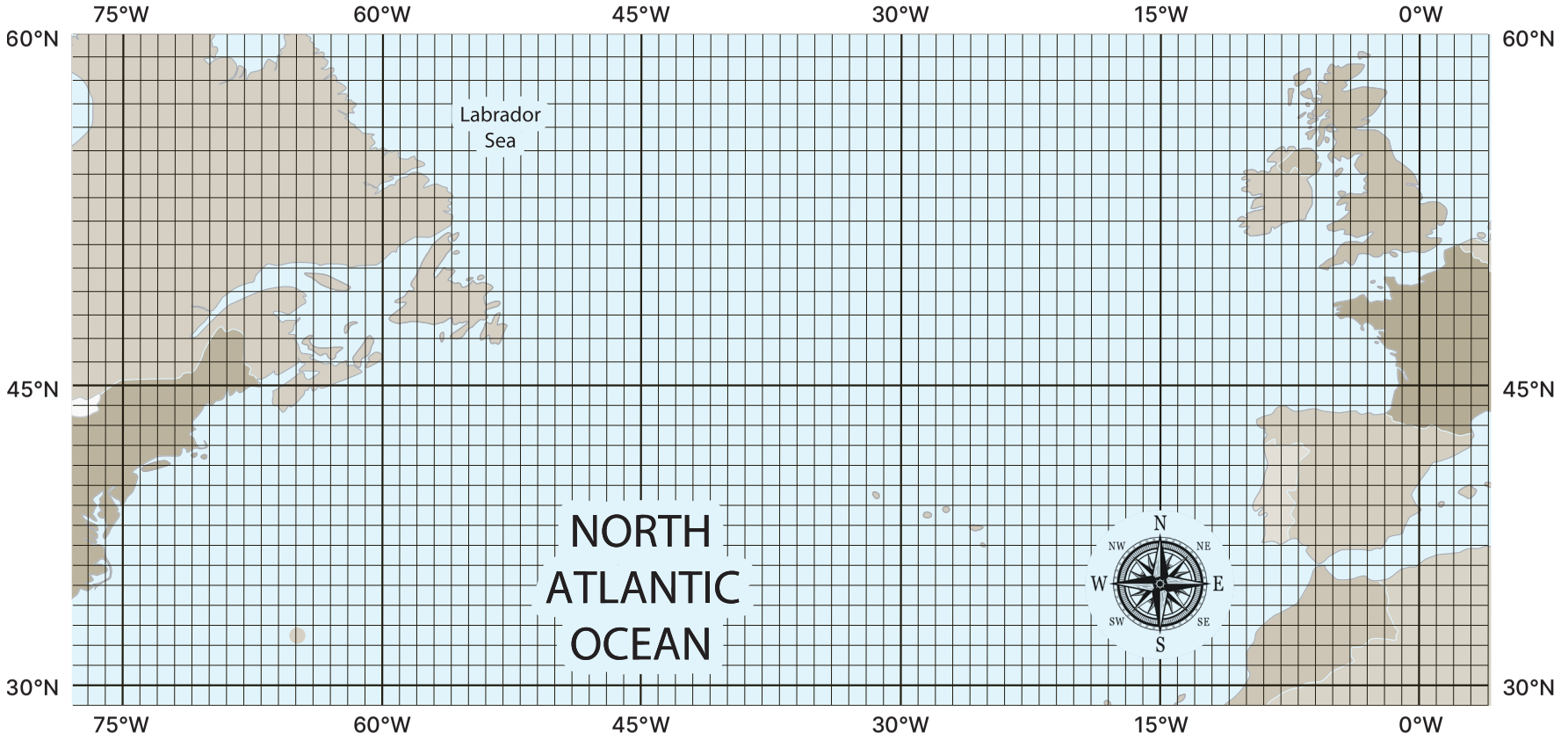
1. **Location:** Describe where New York City is located, mentioning its country and any notable geographic aspects. Include a map overviewing *Titanic*'s route, highlighting this stop among her other port cities.
2. **Significance for *Titanic*:** Explain New York City's role as *Titanic*'s intended destination and its purpose in the Ship's journey.
3. **Port Facilities**: Describe the facilities and services available at the New York City port in 1912 and how they served transatlantic travelers.
4. **Passenger Disembarkatio**n: Discuss the arrival of passengers in New York City and why some chose to sail across the Atlantic to get there.
5. **Historical Context:** Provide historical context about New York City and its connection to maritime history.
6. **Fun Fact:** Something you learned during your research you personally found interesting.

Where in the World: *Titanic*'s Port Cities

Name: _____ Class: _____ Date: _____

Directions: Use the latitude and longitude coordinates to locate and label each of *Titanic*'s port cities, destination, and wrecksite on the map below. Trace *Titanic*'s planned route from Europe to North America.

- Belfast, Northern Ireland: 54°34'N, 5°55'W
- Southampton, England: 50°54'N, 1°24'W
- Cherbourg, France: 49°38'N, 1°36'W
- Queenstown, Ireland: 51°51'N, 8°17'W
- *Titanic* Wrecksite : 41°44'N, 49°56'W
- New York City, United States: 40°42'N, 74°0'W



3. Exploring Edwardian Etiquette: Life During the Edwardian Era

***Titanic* Theme:** Edwardian Times

Skills: Citing Sources; Reading; Researching; Forming Main Points and Questions; Analysis; Creative Script Writing; Acting

Subjects: Social Studies; Reading Informational Text; Writing; Speaking/Listening; Language; Theater

Objectives:

- Students will demonstrate comprehension of Edwardian-era etiquette, expectations, and social order through reading and notetaking of primary source material.
- Students will analyze how the customs, norms, and practices during the Edwardian era influenced society by writing a script and corresponding rationale.

Essential Questions:

- How do photographs give us insight into the past?
- How have social etiquette, expectations, and norms changed over time?
- What were the social practices of the early 1900s? How did they impact passengers on *Titanic*'s voyage?

Time: 60 minutes

Assessment:

- "Social Culture: A Manual" Analysis Sheet
- Edwardian Expectations Sheet
- Script Guiding Prompts Handout
- Edwardian Etiquette Stage Script or Screenplay
- Student Journal Response

"The first few days of the voyage were glorious, and we made many friends among the passengers who were coming to this country to start their lives new in what my father had always termed the Land of Promise. …for years he had been desirous of coming to America, but it was only a month ago that we decided to leave our home…"

—Laura Cribb,
Titanic Third-Class Passenger

Materials:

- ❑ "Social Culture: A Manual" Analysis sheet
- ❑ Edwardian Expectations sheet
- ❑ Script Guiding Prompts handout
- ❑ Free WriterDuet account for each student
- ❑ Highlighters
- ❑ General supplies (pencil, paper, etc.)

Procedures:

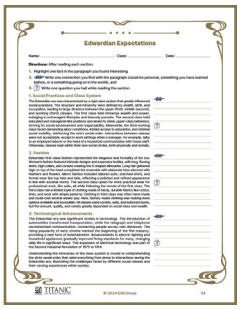
1. Invite two students to the front of the room to demonstrate how they would greet each other if they met informally in public (e.g., school, store, event, etc.). Ask students to show how they would greet each other at a formal event.
2. Tell the two that you will be coaching them on how to formally greet someone using Edwardian rules of etiquette used from the times of *Titanic*. (Optionally, tell the class that they will also practice later—this can be done in pairs.) Students have two options for an Edwardian formal greeting: bow or offer a hand.
    a. Edwardian Etiquette Rules: (Both to be done sincerely and respectfully.)
        i. Bowing: "Do not nod, but incline the body so that it may become a bow… A slight acquaintance does not receive so impressive a bow as one you have known longer… No lady will acknowledge the acquaintance of a gentleman unless he first bows… [If wearing], the hat must be lifted, unless between gentlemen, in which a friendly word in passing is sufficient. A smile should accompany every bow."
        ii. Offering a hand: "Never extend a hand to those who are not intimate friends… Gentlemen wait for a lady to extend [her] hand first, and a younger person for the older one to make the first advances… A gentleman should always rise when another offers the hand, but it is not obligatory for a lady to rise."
3. Coach students and have them demonstrate the greetings. Optionally, have all students pair up and attempt a formal greeting. Students may laugh or feel uncomfortable during these formal greetings; this is normal. Explain how, while practices seem unusual now, these were common practices of the day that were understood and practiced by the general population. Both Edwardian rules come from a 1903 etiquette book (chapter 8).

A formal greeting like this was generally reserved for those in the same class. People from different social classes rarely interacted. Keeping a clear distinction between social classes shaped everyday life and interactions over 110 years ago during the time of Titanic.

4. Define the concept of etiquette as "the set of rules or customs that control accepted behavior in particular social groups or social situations," according to the Cambridge Dictionary.
5. Explain that today's lesson will focus on the strict Edwardian etiquette and class system as well as how it affects the story of *Titanic*.

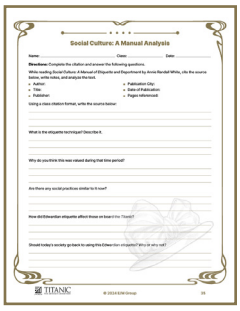
Titanic *sailed and sank in April of 1912 during the Edwardian era (1900-1919), named after King Edward VII of the United Kingdom and noted for its ideals of extravagance and excess. In the early 1900s, life was structured by a strict social class system in Western society, like in Europe and the United States, dividing people into first class, second class, and third class based on material wealth.* Titanic *was a product and reflection of her time, so she was designed and built with this class structure in mind.*

6. Distribute and have students read the **Edwardian Expectations** handout for general context and overview of expectations during the Edwardian era. Have students highlight one fact and write one connection and one question for each section on the right-hand side of the sheet. Ask students, "How did Edwardian social class impact daily life and Western culture?"


Edwardian Expectations

The Edwardian class system affected everyone's daily life, from what they did to what they wore. It affected the opportunities they could afford for themselves and their families. The great expansion of technology affected the upper class by what they could now want or buy, as well as the lower class by which job opportunities were now available to them. Everyone understood the social order and how to behave within it.

7. Explain to students that one of the best ways to understand social cultures and practices of the past is to read primary sources, documents, and ephemera—paper items like letters, advertising, etc. that were not intended to last beyond their immediate use (as they were "ephemeral")—from a particular period. Have students read one to three sections of a 1903 etiquette guide called *Social Culture: A Manual of Etiquette and Deportment* by Annie Randall White. While reading, students will complete the **Social Culture: A Manual Analysis**. Recommendations for sections are below, but teachers may choose any section(s) at their discretion.


Social Culture: A Manual Analysis

Name: _____ Class: _____ Date: _____

Directions: Complete the citation and answer the following questions.

While reading Social Culture: A Manual of Etiquette and Deportment by Annie Randall White, cite the source below, write notes, and analyze the text.

- Author:
- Title:
- Publisher:
- Publication City:
- Date of Publication:
- Pages referenced:

Using a class citation format, write the source below:

What is the etiquette technique? Describe it.

Why do you think this was valued during that time period?

Are there any social practices similar to it now?

How did Edwardian etiquette affect those on board the Titanic?

Should today's society go back to using this Edwardian etiquette? Why or why not?

TITANIC

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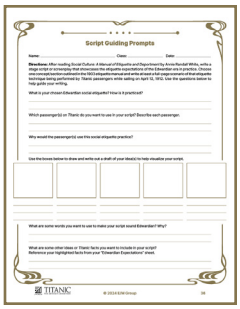
   a. Introduction; Chapter I: The Makers of Manners; and Chapter X: Etiquette of School Days (PDF pages 16-17, 28-33, 102-111) https://openworks.wooster.edu/cgi/viewcontent.cgi?article=1093&context=motherhomeheaven (Part 1), and/or
   b. Chapter XXIII: Dress—its Attractiveness and Appropriateness; Chapter XXXI: Servants, Maids and Assistants; and Chapter XXXIV: Special Suggestions (PDF pages 10-21, 100-105, 122-133) https://openworks.wooster.edu/cgi/viewcontent.cgi?article=1094&context=motherhomeheaven (Part 2)
   c. Entire source: https://openworks.wooster.edu/motherhomeheaven/92/
8. After completing the analysis sheet, ask students, "How do these Edwardian techniques you read about compare to modern etiquette rules? How do they relate?" (e.g., please/thank you, table manners, dress codes, and addressing individuals casually or formally). This may be a conversation, used for student notes, or teacher-led on the board.

There were a lot more rules over 100 years ago. Today, people are more casual in conversation, but we still use honorifics and titles to show respect, like Mr., Mrs., Dr., etc. We don't have etiquette books like this today. Sometimes, we have to dress up in suits and dresses like they did over 100 years ago, but we don't have as many outfit changes per day. These Edwardian practices evolved into the etiquette practices we have today.

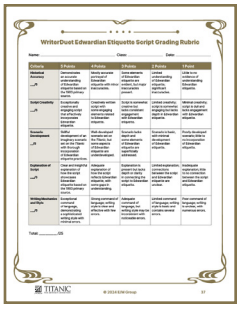
9. Ask, "How do these Edwardian social norms and etiquettes relate to *Titanic*?"

The *Titanic* was built during the Edwardian era. She was designed to physically separate first-, second-, and third-class passengers. The passengers would have known not to interact with others outside their class. *Titanic*'s passengers would have understood and used these etiquette techniques in everyday practice while on board the Ship.

10. Distribute the **Script Guiding Prompts** handout. Instruct students to write a stage script or screenplay that showcases the etiquette expectations of the Edwardian era in practice using https://www.writerduet.com/. This may be a several-day project, homework, or just a one-time, in-class workshop.


Script Guiding Prompts

a. Make sure each student has a free WriterDuet account. When they log in, it will ask if they have used the program before and if they are using it for school.
b. After a quick Tutorial video, a "Getting Started" menu will appear at the bottom of the page with a button "Formatting Guide Project." This provides a helpful teaching model overviewing parts of a script/screenplay: Scene headings and action, character, and dialogue lines.
    i. To open "Formatting Guide Project" otherwise, click "Help" at the top of the page and "Guides and Tutorials," which will redisplay the "Getting Started" menu at the bottom.


WriterDuet Edwardian Etiquette Script Grading Rubric

c. Each student will choose one concept/section outlined in the 1903 etiquette manual used in class and write at least a full-page scenario of that etiquette technique being performed by *Titanic* passengers while sailing on April 12, 1912. Use **Script Guiding Prompts** and **WriterDuet Edwardian Etiquette Script Grading Rubric** for guidance.
d. Students will write an accompanying explanation of their script, detailing which etiquette idea they used and how and why they did it.
e. Optional: Students can go through the entire writing process with revision and editing. Students can perform their script for the class as if they are on the *Titanic*.

11. Review key concepts about Edwardian etiquette, expectations, and social order of first, second, and third class. Discuss how these aspects of life during the Edwardian era shaped society and life on board the Ship and have influenced our modern etiquette.

12. Journal: How have societal norms evolved over time? What was the impact of Edwardian etiquette on the Edwardian era, and how is it relevant today? Would you have liked to have lived during Edwardian times and followed these societal norms and rules? Why or why not?

Edwardian Times Additional Activities and Resources

Optional Extension Activities:

- Have students research three question prompts on https://www.historyextra.com/period/edwardian/edwardian-era-what-when-guide-timeline/. Have students write a summary of what they learned.
- Assign roles to students (passengers, crew members, etc.) and conduct a role-play scenario set on the *Titanic*, where they must adhere to Edwardian etiquette rules. Discuss the experience of following Edwardian etiquette in a real-world context.
- Explore Edwardian era expectations and roles assigned to men and women; can extend to suffrage.
- Provide students with sample letters from the Edwardian era. In pairs, students write letters as if they were passengers on *Titanic* adhering to Edwardian etiquette. Discuss differences from 1912 and modern communication.
- Analyze primary sources, such as letters and diaries from the Edwardian era, to understand how people of that time expressed their thoughts and feelings.
- Students create their own etiquette guide for the modern student.
- Factory and assembly line work increased in the early 1900s. Research how mass production compares between the early 1900s and today.
- Research *Titanic* fashions of the era: https://fashionarchives.org/wp-content/uploads/2020/07/SUFAM_Spring2012_Titanic-Fashions.pdf

Resource Materials:

- PBS photos and descriptions of women's fashion and factory work: https://www.pbs.org/wgbh/americanexperience/features/triangle-fire-price-fashion-1910/
- Prices and wages: https://libraryguides.missouri.edu/pricesandwages/1900-1909 (1900-1909) or https://libraryguides.missouri.edu/pricesandwages/1910-1919 (1910-1919)
- Other etiquette books from the turn of the century: https://openworks.wooster.edu/motherhomeheaven/
- Colorized footage of New York in 1911: https://www.youtube.com/watch?v=hZ1OgQL9_Cw

- Evans, Grace. Titanic *Style: Dress and Fashion on the Voyage*. New York: Skyhorse Publishing, 2012. ISBN: 978-1-62087-199-7.
- *RMS* Titanic*: The True Story*. a360media. 2023. ISBN: 25274- 74254.
- Seleshanko, Kristina. *Edwardian Fashions: A Snapshot in Time from* Harper's Bazaar *1906.* New York: Dover Publications, 2019. ISBN: 978-0-486-83723-9.

Florida State Education Standards:

SS.8.A.1.5: Identify, within both primary and secondary sources, the author, audience, format, and purpose of significant historical documents.

ELA.7.R.2.1: Explain how individual text sections and/or features convey a purpose in texts.

ELA.7.R.3.2, ELA.8.R.3.2: Paraphrase content from grade-level texts.

ELA.7.C.1.2, ELA.8.C.1.2: Write personal or fictional narratives using narrative techniques, a recognizable point of view, precise words and phrases, and figurative language.

ELA.7.C.5.2: Use digital tools to produce and share writing.

TH.68.C.1.4: Create and present a design, production concept, or performance and defend artistic choices.

TH.68.H.1.4: Create a monologue or story that reflects ones understanding of an event in a culture different from ones own.

TH.68.H.2.5: Compare decorum, environments, and manners from a variety of cultures and historical periods to discover and influence historical acting styles and design choices.

Social Studies: SS.8.A.1.1, SS.8.A.1.3, SS.8.A.1.4, SS.8.A.1.6, SS.8.A.1.7

ELA: ELA.K12.EE.1.1, ELA.K12.EE.2.1, ELA.K12.EE.3.1, ELA.K12.EE.4.1, ELA.K12.EE.5.1, ELA.K12.EE.6.1, ELA.8.R.2.1, ELA.7.R.2.2, ELA.8.R.2.2, ELA.7.R.2.4, ELA.8.R.2.4, ELA.7.C.2.1, ELA.8.C.2.1, ELA.7.C.3.1, ELA.8.C.3.1, ELA.7.C.4.1, ELA.8.C.4.1, ELA.7.C.5.1, ELA.8.C.5.1, ELA.8.C.5.2, ELA.7.V.1.1, ELA.8.V.1.1

Computer Science: SC.68.CS-PC.3.1, SC.68.CS-PC.4.6, SC.68.CS-CC.1.1, SC.68.CS-CC.1.3, SC.68.CS-CP.3.3

Theater: TH.68.C.1.3, TH.68.C.1.5, TH.68.S.1.2, TH.68.O.2.4, TH.68.H.1.1, TH.68.F.1.2

Edwardian Expectations

Name: _____ Class: _____ Date: _____

Directions: After reading each section:

1. Highlight one fact in the paragraph you found interesting
2. Write one connection you find with the paragraph (could be personal, something you have learned before, or a something going on in the world), and
3. Write one question you had while reading the section.

1. Social Practices and Class System

The Edwardian era was characterized by a rigid class system that greatly influenced social practices. The structure and hierarchy were defined by wealth, birth, and occupation, leading to large divisions between the upper (first), middle (second), and working (third) classes. The first class held immense wealth and power, indulging in extravagant lifestyles and leisurely pursuits. The second class held educated and managerial-like positions and aimed to mimic upper-class behaviors, striving for social advancement and respectability. Meanwhile, the third working class faced demanding labor conditions, limited access to education, and minimal social mobility, reinforcing the strict social order. Interactions between classes were not acceptable, except in work settings when a manager, for example, talks to an employed laborer or the head of a household communicates with house staff. Otherwise, classes kept within their own social circles, both physically and socially.

2. Fashion

Edwardian first-class fashion represented the elegance and formality of the era. Women's fashion featured intricate designs and expensive textiles, with long, flowing skirts, high collars, and corsets creating the S-shaped silhouette. Long hair gathered high on top of the head completed the ensemble with elaborate hats adorned with feathers and flowers. Men's fashion included tailored suits, starched shirts, and formal wear like top hats and tails, reflecting a polished and refined appearance in line with societal norms. The second class opted for more practical wear for professional work, like suits, all while following the trends of the first class. The third class had a limited style of clothing made of hardy, durable fabrics like cotton, linen, and wool with simple patterns. Clothing in third class was often hand-made and could cost several weeks' pay. New, factory-made clothing was making more options available and accessible. All classes used corsets, suits, and buttoned boots, but the amount, quality, and variety greatly depended on social class and wealth.

3. Technological Advancements

The Edwardian era saw significant strides in technology. The introduction of automobiles transformed transportation, while the telegraph and telephone revolutionized communication, connecting people across vast distances. The rising popularity of early cinema marked the beginning of the film industry, providing a new form of entertainment. Advancements in electric lighting and household appliances gradually improved living standards for many, changing daily life in significant ways. This expansion of electrical technology was part of the Second Industrial Revolution of 1870 to 1914.

Understanding the intricacies of the class system is crucial to comprehending the strict social order that ruled everything from dress to interactions during the Edwardian era, illustrating the challenges faced by different social classes and their varying experiences within society.

Social Culture: A Manual Analysis

Name: _____ Class: _____ Date: _____

Directions: Complete the citation and answer the following questions.

While reading *Social Culture: A Manual of Etiquette* and Deportment by Annie Randall White, cite the source below, write notes, and analyze the text.

- Author:
- Title:
- Publisher:
- Publication City:
- Date of Publication:
- Pages referenced:

Using a class citation format, write the source below:

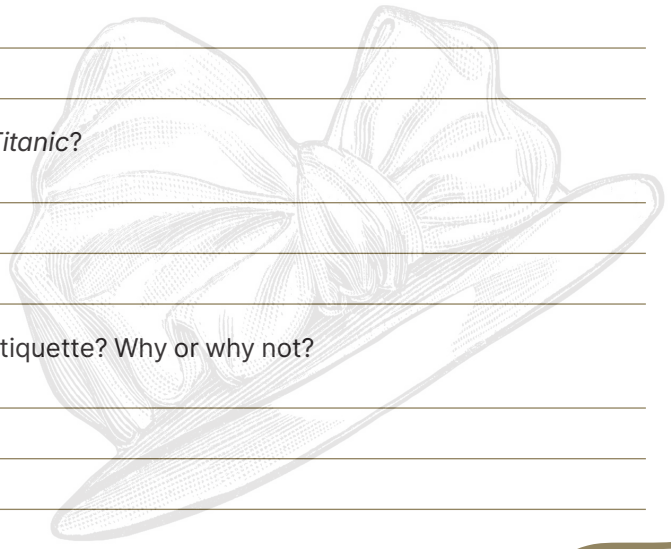
What is the etiquette technique? Describe it.

Why do you think this was valued during that time period?

Are there any social practices similar to it now?

How did Edwardian etiquette affect those on board the *Titanic*?

Should today's society go back to using this Edwardian etiquette? Why or why not?



Script Guiding Prompts

Name: _____ Class: _____ Date: _____

Directions: After reading *Social Culture: A Manual of Etiquette and Deportment* by Annie Randall White, write a stage script or screenplay that showcases the etiquette expectations of the Edwardian era in practice. Choose one concept/section outlined in the 1903 etiquette manual and write at least a full-page scenario of that etiquette technique being performed by *Titanic* passengers while sailing on April 12, 1912. Use the questions below to help guide your writing.

What is your chosen Edwardian social etiquette? How is it practiced?

Which passenger(s) on *Titanic* do you want to use in your script? Describe each passenger.

Why would the passenger(s) use this social etiquette practice?

Use the boxes below to draw and write out a draft of your idea(s) to help visualize your script.

What are some words you want to use to make your script sound Edwardian? Why?

What are some other ideas or *Titanic* facts you want to include in your script?
Reference your highlighted facts from your "Edwardian Expectations" sheet.

WriterDuet Edwardian Etiquette Script Grading Rubric

Name: _____ Class: _____ Date: _____

Criteria	5 Points	4 Points	3 Points	2 Points	1 Point
Historical Accuracy **___/5**	Demonstrates an accurate understanding of Edwardian etiquette based on the 1903 primary source.	Mostly accurate portrayal of Edwardian etiquette with minor inaccuracies.	Some elements of Edwardian etiquette are evident, but major inaccuracies present.	Limited understanding of Edwardian etiquette; significant inaccuracies.	Little to no evidence of understanding Edwardian etiquette.
Script Creativity **___/5**	Exceptionally creative and engaging script that effectively incorporates Edwardian etiquette.	Creatively written script with some engaging elements related to Edwardian etiquette.	Script is somewhat creative but lacks consistent engagement with Edwardian etiquette.	Limited creativity; script is somewhat engaging but lacks depth in Edwardian etiquette.	Minimal creativity; script is dull and lacks engagement with Edwardian etiquette.
Scenario Development **__/5**	Skillful development of an imaginary scenario set on the *Titanic* with thorough incorporation of Edwardian etiquette practices.	Well-developed scenario set on the *Titanic*, but some aspects of Edwardian etiquette are underdeveloped.	Scenario lacks depth and some elements of Edwardian etiquette are superficially addressed.	Scenario is basic, with minimal development of Edwardian etiquette.	Poorly developed scenario; little to no incorporation of Edwardian etiquette.
Explanation of Script **___/5**	Clear and insightful explanation of how the script showcases Edwardian etiquette based on the 1903 primary source.	Adequate explanation of how the script reflects Edwardian etiquette, with some gaps in understanding.	Explanation is present but lacks depth or clarity in connecting the script to Edwardian etiquette.	Limited explanation; connections between the script and Edwardian etiquette are unclear.	Inadequate explanation; little to no connection between the script and Edwardian etiquette.
Writing Mechanics and Style **___/5**	Exceptional command of language, demonstrating a sophisticated writing style with minimal errors.	Strong command of language; writing style is clear and effective with few errors.	Adequate command of language, but writing style may be inconsistent with noticeable errors.	Limited command of language; writing style is basic and contains several errors.	Poor command of language; writing is unclear, with numerous errors.

Total: _____ /25

4. A Day in the Life: Traveling On Board *Titanic*

***Titanic* Theme:** Life On Board

Skills: Letter Writing; Researching Primary Sources; Reading; Writing; Researching; Comparing

Subjects: Social Studies; Reading Informational Texts; Writing; Narrative Writing; Language; Speaking/Listening

Objectives:

- Students will examine the daily life of Edwardian passengers on board the *Titanic* by researching and discussing primary and secondary sources.
- Students will explore the composition and format of letter writing, focusing on style, word choice, and social norms of the early 1900s, by writing creative *Titanic* passenger letters.

Essential Questions:

- What was daily life like for passengers on board *Titanic*?
- What accommodations and amenities were available to passengers on *Titanic*'s voyage?
- How did class impact a passenger's experience on *Titanic*?

Time: 50 minutes

Assessment:

- Passenger Letter
- Student Journal Response

"They say we may get into New York Tuesday night, but we are really due early Wednesday morning, shall write as soon as we get there. This letter won't leave the Ship but will remain and come back to England where she is due again on the 26th. … I must close now with all our fondest love to all of you."

—Esther Hart, *Titanic* Second-Class Passenger

Materials:

- ❑ Whiteboard and markers
- ❑ *Titanic* Activities Guide for Passengers handout
- ❑ Pictures of accommodations and amenities on *Titanic*
- ❑ *Titanic* Letter Example
- ❑ General supplies (pencil, paper, etc.)

Procedures:

1. Write the word "luxury" on the board and ask the class, "What does this word mean?"

> Luxury means something fancy. It's having nice and/or expensive things. Something you can't normally afford and get only on occasion. Luxury is a thing that costs a lot of money. It means high class and high wealth.

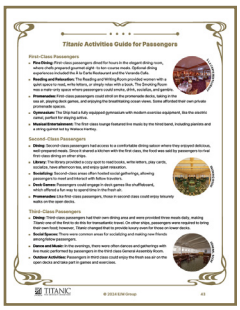
2. Define "luxury" as "a condition of abundance or great ease and comfort" and "an indulgence in something that provides pleasure, satisfaction, or ease," according to the Merriam-Webster Dictionary.
3. Explain that this word practically became synonymous with *Titanic* to help differentiate it from other competing steamship lines.

According to legend, Titanic *was conceived jointly by J. Bruce Ismay of White Star Line and Lord William Pirrie of Harland & Wolff over dinner in 1907. J. Bruce Ismay wanted the White Star Line Ship* Titanic *and her sister ships,* Olympic *and* Britannic*, to be synonymous with the word "luxury," and Harland & Wolff could build it as such. Since White Star Line ships could not compete for speed, they would provide a heightened experience for their passengers. With that,* Titanic *could not only capitalize on the increased immigration of the turn of the century but also attract highly wealthy passengers.*

4. Review how *Titanic* was a product of her time and designed to embody the values of the Edwardian era, including the strict social class hierarchy. Ask students, "What were the three classes of *Titanic* and Edwardian society?" (first class, second class, and third class).
5. Show pictures and illustrations of *Titanic*'s interior to provide context. Discuss what students observe in the photographs. Remind students that most photographs of her interiors are of her older sister ship, *Olympic*, as very few professional photographs were taken of *Titanic*. Another source for renderings comes from Titanic: Honor and Glory, which has built virtual 3-D re-creations of the Ship.

Each type of accommodation and amenity used different design styles, depending on class, to heighten the passenger experience. One distinct feature was the use of white walls in first class, wood paneling in second, and painted metal walls in third. Also, the number of decorative details used decreases as you descend between the classes. Note that accommodations were improved across all classes when compared to other steamships of the era. However, Titanic *is recognized for her opulence in the first-class areas.*

6. Distribute and read ***Titanic* Activities Guide for Passengers** handout. Divide students into groups based on social class. (Teacher may use boarding passes from the Exhibition or randomly group students.) Each group will discuss the daily routines and activities of their Edwardian passengers on *Titanic*, highlighting activities such as meals, promenades, social gatherings, and any amenities that are or are not available to them. Discuss how passengers from different classes might have spent their days differently.


Titanic Activities Guide for Passengers

First-Class Passengers

Second-Class Passengers

Third-Class Passengers

Activities and routines would be very different according to class. The more money and social status you had, the more amenities you could afford (and expect). Passengers had to occupy themselves with social or individual activities, but social norms dictated how those activities were done and with whom.

7. Ask students, "Why do you think certain types of amenities (services or facilities available to passengers) were chosen for different classes?"

> The Ship was divided into sections, and a passenger's class gave them access to different amenities depending on that class and what someone could afford. The upper classes had higher expectations and could afford and were used to having access to greater amenities. *Titanic* was built to meet the desires of the upper class while elevating the experience for all classes.

8. Explain that students will be writing passenger letters to describe what a passenger might experience while on board *Titanic*. To understand the parts of a letter and how to write like an Edwardian passenger, students will use the ***Titanic* Letter Example**, a fictional letter written from the perspective of real first-class passenger Susan Ryerson. Below are additional recommended primary sources and documents written during the particular time period that can also be used to better understand the Edwardian experience, mindset, and style of writing.

   a. Primary source *Titanic* passenger letters sent before and after the disaster: https://diaryfile.com/category/letters/letters-from-historical-events/letters-from-disasters/titanic-letters/
   b. Primary source letters written by a wealthy, well-educated gentleman between 1890s-1910s (use dropdown menu to see all sets): https://www.arthursletters.com/edwardian-era-letters-home.html

9. Give an overview of the structure and parts of a letter, including Date, Greeting, Body, Closing, and Signature. Summarize key aspects of the letter by asking, "What do you notice about the structure of the letter (how the letter was written) and its content (what passengers talked about)?"

Students might notice a different, more formal writing style with elevated vocabulary or longer sentence structures. There's a greeting, closing, signature, and information about life prior to boarding, on board, and interactions with passengers. If reading the primary source material, they might notice the branded letterhead, White Star Line, which is found on all onboard stationery. These can all be used as inspiration for their own letters.

10. Remind students that they will write a letter about their time on board *Titanic* as if they were passengers. The letter will need to be at least three paragraphs long and written in first-person, overviewing:
    1. Their passenger's experiences on board with a day's itinerary
    2. The people they've met, and
    3. Their reaction to the Ship
        a. Teachers may use boarding passes from the Exhibition or randomly assign students a class/passenger to use. May also use the website below in "Resources."

b. Once finished, students can pair-share letters for revising feedback, especially regarding the tone of the letter and accuracy of details for that Edwardian social class.

11. To summarize the lesson, lead a class discussion on the differences and similarities between students' modern daily routines and the routines of *Titanic* passengers. Ask, "Compare the accommodations and amenities provided to passengers on board *Titanic*. How do our modern expectations of luxury compare to the ones of 1912?"

> The types and quality of a passenger's accommodations and amenities depended on social class. We have generalities in common, like listening to music, reading in libraries, going out to eat with friends, etc. However, the context and specifics for those activities are different, like formal dining experiences nightly, not listening to a live orchestra regularly, no access to modern technology or conveniences, and simple games for entertainment like cards and dice, etc. Today, we see luxury having a lot of nice, fancy things, which are both similar and different from 1912.

12. Journal: What are at least two ways the class of ticket purchased affected a passenger's experience on *Titanic*? If given the chance to travel on *Titanic*, explain why you would or would not have wanted to go and what affected your decision.

First Class

Second Class

Third Class

Life On Board Additional Activities and Resources

Optional Extension Activities:

- Research popular activities during the Edwardian era, such as afternoon tea, reading, or card games.
- Bring the passenger letter to a final draft with revising and editing. Age final draft by tea-staining paper.
- Choose lessons from The National Archives: Life aboard the *Titanic*: https://www.nationalarchives.gov.uk/education/resources/life-aboard-titanic/
- Write a short reflection where students analyze the differences between their modern lives and the daily routines of Edwardian *Titanic* passengers.
- Create a daily schedule for a *Titanic* passenger, considering their assigned class (first, second, or third class). If you received your boarding pass card from the Exhibition, use that assigned passenger and class.
- Provide students with copies of *Titanic* deck plans or display them on a screen if available. In pairs or small groups, students examine the deck plans and identify various areas on the Ship, such as dining rooms, lounges, and recreation spaces. Students discuss differences between first-, second-, and third-class areas.

Resource Materials:

- Generate a *Titanic* Ticket of a real passenger to save, print, and use for class (if boarding passes not available): https://www.encyclopedia-titanica.org/titanic-tickets/#google_vignette
- *Titanic*'s accommodations and amenities: https://www.encyclopedia-titanica.org/passenger-accommodation.html
- Brief overview of *Titanic* passengers and discussion questions: https://reagan.blogs.archives.gov/2020/05/29/the-titanic-and-the-passengers-who-boarded-it-research-and-assignment-guide/
- Parts of a letter reference for teacher use: http://www.jcsp.ie/resources/c/1390/31/Letter%20Writing%20Workbook.pdf
- Titanic: Honor and Glory Virtual Tour of the Ship: https://www.youtube.com/watch?v=UOCSs8JYU5o
- TikTok Raf_Avila, Dining on *Titanic*: https://www.tiktok.com/@raf_avila/video/6933732622464027909?lang=en
- TikTok Raf_Avila, Electric Bath: https://www.tiktok.com/@raf_avila/video/7036957684976962821?lang=en
- TikTok KJFish, Turkish Bath: https://www.tiktok.com/@kjfish/video/6829799703140470021?lang=en
- Behe, George. *On Board RMS* Titanic: *Memories of the Maiden Voyage*. Cheltenham: The History Press, 2017. ISBN: 978-0-7509-8268-9.
- Korman, Gordon. Titanic: *Book Two: Collision Course*. New York: Scholastic, 2011. ISBN: 978-0-545-12332-7.
- *RMS* Titanic: *The True Story*. a360media. 2023. ISBN: 25274- 74254.
- Seleshanko, Kristina. *Edwardian Fashions: A Snapshot in Time from Harper's Bazaar 1906*. New York: Dover Publications, 2019. ISBN: 978-0-486-83723-9.

Florida State Education Standards:

SS.8.A.1.7: View historic events through the eyes of those who were there as shown in their art, writings, music, and artifacts.

ELA.K12.EE.6.1: Use appropriate voice and tone when speaking or writing.

ELA.7.C.1.2, ELA.8.C.1.2: Write personal or fictional narratives using narrative techniques, a recognizable point of view, precise words and phrases, and figurative language.

ELA.7.V.1.1, ELA.8.V.1.1: Integrate academic vocabulary appropriate to grade level in speaking and writing.

HE.68.R.2.2: Demonstrate responsible decision-making that considers multiple perspectives.

Social Studies: SS.8.A.1.1, SS.8.A.1.4, SS.8.A.1.5,SS.8.A.1.6

ELA: ELA.K12.EE.1.1, ELA.K12.EE.2.1, ELA.K12.EE.3.1, ELA.K12.EE.4.1, ELA.K12.EE.5.1, ELA.7.R.2.1, ELA.8.R.2.1, ELA.7.R.2.2, ELA.8.R.2.2, ELA.7.R.2.4, ELA.8.R.2.4, ELA.7.R.3.2, ELA.8.R.3.2, ELA.7.R.3.3, ELA.7.C.1.5, ELA.8.C.1.5, ELA.7.C.3.1, ELA.8.C.3.1, ELA.7.C.4.1, ELA.8.C.4.1, ELA.7.C.5.1, ELA.8.C.5.1, ELA.7.C.5.2, ELA.8.C.5.2

Computer Science: SC.68.CS-PC.3.1, SC.68.CS-CC.1.1, SC.68.CS-CP.3.3

Titanic Activities Guide for Passengers

First-Class Passengers


À LA CARTE RESTAURANT

- **Fine Dining:** First-class passengers dined for hours in the elegant dining room, where chefs prepared gourmet eight- to ten-course meals. Optional dining experiences included the À la Carte Restaurant and the Veranda Cafe.
- **Reading and Relaxation:** The Reading and Writing Room provided women with a quiet space to read, write letters, or simply relax with a book. The Smoking Room was a male-only space where passengers could smoke, drink, socialize, and gamble.
- **Promenades:** First-class passengers could stroll on the promenade decks, taking in the sea air, playing deck games, and enjoying the breathtaking ocean views. Some afforded their own private promenade spaces.
- **Gymnasium:** The Ship had a fully equipped gymnasium with modern exercise equipment, like the electric camel, perfect for staying active.
- **Musical Entertainment:** The first-class lounge featured live music by the hired band, including pianists and a string quintet led by Wallace Hartley.

Second-Class Passengers

- **Dining:** Second-class passengers had access to a comfortable dining saloon where they enjoyed delicious, well-prepared meals. Since it shared a kitchen with the first class, the food was said by passengers to rival first-class dining on other ships.


SMOKING ROOM

- **Library:** The library provided a cozy spot to read books, write letters, play cards, socialize, have afternoon tea, and enjoy quiet relaxation.
- **Socializing:** Second-class areas often hosted social gatherings, allowing passengers to meet and interact with fellow travelers.
- **Deck Games:** Passengers could engage in deck games like shuffleboard, which offered a fun way to spend time in the fresh air.
- **Promenades:** Like first-class passengers, those in second class could enjoy leisurely walks on the open decks.

Third-Class Passengers

- **Dining:** Third-class passengers had their own dining area and were provided three meals daily, making *Titanic* one of the first to do this for transatlantic travel. On other ships, passengers were required to bring their own food; however, *Titanic* changed that to provide luxury even for those on lower decks.


GENERAL ROOM

- **Social Spaces:** There were common areas for socializing and making new friends among fellow passengers.
- **Dance and Music:** In the evenings, there were often dances and gatherings with live music performed by passengers in the third class General Assembly Room.
- **Outdoor Activities:** Passengers in third class could enjoy the fresh sea air on the open decks and take part in games and exercises.

Titanic Letter Example

Below is a fictional letter written from the perspective of first-class passenger Susan Ryerson.

On board R·M·S· "TITANIC."

April 12, 1912 — **Date**

Dearest friend, — **Greeting**

I hope this letter finds you in good health and high spirits. I am writing to you from on board the magnificent R.M.S. *Titanic*. It is truly the most luxurious and largest Ship I have ever seen! The accommodations are splendid. Our cabin is in the Old Dutch style, with its dark oak paneling and poster bed. The governess, Grace, and I share this suite. The staff on board are most attentive to our every need. I feel as though I am living in a dream, surrounded by opulence and the finest company.

The voyage thus far has been nothing short of wonderful. The weather has been fair, and the sea calm has made our journey all the more pleasant. Each day is filled with activities and delightful conversations with fellow passengers. I have strolled the decks and even rode one of the new electric camels in the gym. I have met some fascinating individuals, like Madeline Astor, who is a few years younger than me but married to someone much older than her. He may be the richest man on board *Titanic*, but I want to marry someone closer in age.

The dining experience is particularly remarkable. Over 10 courses tonight, including filet mignon, chicken, duck, lamb, and sirloin beef. I got so full that I simply pushed the food around my plate until it was taken away. And the dining hall is a sight to behold, adorned with crystal chandeliers, gilded dishes, polished silverware, and fine linens. So much sunlight pours into the room that everything sparkles.

I long for the day when we are reunited, but until then, I shall endeavor to make the most of this extraordinary experience. Please give my fondest regards to your family. I think of you all often and hold you close in my heart.

Body

Yours affectionately, — **Closing**

Susan Ryerson — **Signature**

5. "Unsinkable Molly": The Margaret "Molly" Brown Story

***Titanic* Theme:** Passenger Highlight

Skills: Reading Informational Texts; Researching; Notetaking; Writing; Creative Designing; Project Planning; Discussing; Potential School/ Community Outreach

Subjects: Social Studies; English; History; Economics; Art; Visual Arts; Leadership; Outreach; Service; Philanthropy; Advocacy

Objectives:

- Students will examine Margaret "Molly" Brown and her advocacy, service, and philanthropy efforts by researching and finding connections between the *Titanic* disaster and greater society.
- Students will implement strategic planning by designing an advocacy, service, and/or philanthropy project to address a cause or need in their local community.

Essential Questions:

- How did Margaret Brown's leadership and work aid those impacted by the *Titanic* tragedy?
- What lessons can we take from a passenger's advocacy, service, and philanthropic efforts post-sinking 100 years later?
- How can we recognize and address needs in our local communities?

Time: 45 minutes

Assessment:

- "The Unsinkable Molly" Note-Catcher
- Connection Questions Worksheet
- Philanthropy Project Planning Worksheet
- Philanthropy Brochure
- Student Journal Response

> "Money can't make man or woman…It isn't who you are, nor what you have, but what you are that counts."
>
> —Margaret Brown, *Titanic* First-Class Passenger

Materials:

- ❑ "The Unsinkable Molly" Note-Catcher
- ❑ Connection Questions Worksheet
- ❑ Scissors and glue
- ❑ Community Project Planning Worksheet
- ❑ Art supplies for project activity (poster boards, markers, etc.)
- ❑ General supplies (pencil, paper, etc.)

Procedures:

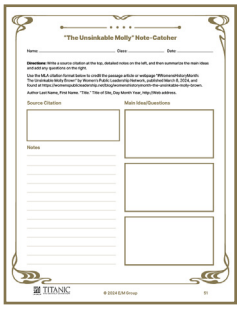
1. Ask, "Have you heard of *Titanic*'s 'Unsinkable Molly Brown?'" Explain that you will show a short video about Margaret "Molly" Brown, and you want students to pick out and remember two facts that stand out to them about her life, work, and *Titanic* experience: https://youtube.com/shorts/L0gFg7L2Mzw?si=bEvcwyo8ZNEBMmw0
2. Ask students, "What did you find interesting about Margaret 'Molly' Brown?"

   She was featured in James Cameron's movie. Margaret Brown got the name "Unsinkable" for her actions. She helped load lifeboats and rowed. She formed a committee to help passengers. There was a musical made about her.

3. Remind students that *Titanic* is also the story of 2,208 lives, meaning so many stories and connections can be discovered and examined deeper. Explain that today, they will focus on one passenger's life, Margaret Brown, popularly referred to as "Molly Brown," and explore her contributions after the sinking through advocacy, service, and philanthropy.
4. Ask students, "What are advocacy, service, and philanthropy? What are their roles in society?"

   Advocacy is speaking up for others, a cause, or an issue. Service is the act of giving time, talent, and energy to help others or a cause. Philanthropy is raising money or resources to help others or a cause. All play an important role in society by helping with social issues and providing support to vulnerable communities. Making donations, promoting a cause, and leading service projects create positive change in communities and provide aid to those in need, contributing to a better society.

5. Explain to students that they will now research Margaret Brown's life, highlighting her service, philanthropic efforts, and contributions to society. Pass out the **"The Unsinkable Molly" Note-Catcher** for students to take notes while researching, using the resources below. Resources may be divided among students for pair-sharing afterward. Encourage them to find specific examples of advocacy, service, and philanthropy and how they affected the community.


"The Unsinkable Molly" Note-Catcher

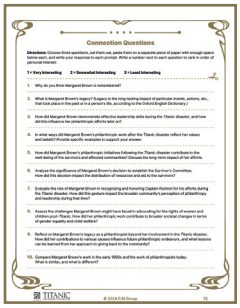
   a. Brief overview biography of Margaret "Molly" Brown with major life events: https://womenspublicleadership.net/blog/womenshistorymonth-the-unsinkable-molly-brown

   Margaret "Molly" Brown, from her early years in Missouri to her time in Colorado, led a life of philanthropy, advocacy, and social equality. Marrying mining engineer J.J. Brown, they struck gold and became millionaires, enabling Margaret to pursue philanthropic efforts and world travel. Surviving the Titanic *disaster, she displayed courage and compassion, aiding fellow passengers and raising funds for survivors. Later, she advocated for mining workers' rights, women's suffrage, and other labor rights. Margaret was a trailblazer and progressive leader for social change, leaving a legacy in American society.*

b. Summary of Margaret Brown's advocacy, service, and philanthropic work after the *Titanic* tragedy: **Margaret Brown: A *Titanic* Survivor**

Margaret Brown was returning to the USA from Europe in response to her grandchild's illness. During the Titanic *disaster, she helped load lifeboats and rowed, encouraging other women to join. She used her language skills to help survivors on* Carpathia*. Her strong leadership and compassionate actions included establishing the Survivor's Committee to raise funds to support those who had lost everything. She also honored Captain Rostron of the* Carpathia *for his role in the rescue by presenting him with a silver loving cup and gold medals to his crew. Margaret helped with memorials and honoring those who perished. She was not known as "Molly" Brown during her lifetime.*

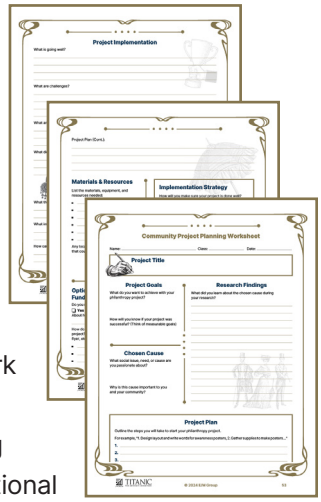
c. Optional: an in-depth biography of Margaret Brown: https://mollybrown.org/about-us/about-molly-brown/, or an 8-minute video explaining Margaret Brown's philanthropy and activism outside of *Titanic*: https://www.youtube.com/watch?v=lEeJa4sDs20



6. Pair students into groups of two. Using their notes, students will work together to answer questions on the **Connection Questions Worksheet**. Follow the directions and paste questions inside a notebook or on a separate piece of paper. Students may also ask each other the questions they wrote on the Note-Catcher or save them for the larger class discussion.
7. As a whole class, discuss Margaret Brown's advocacy, service, and philanthropic work, especially during and after the *Titanic* disaster. Ask, "How would you describe Margaret Brown's leadership and contributions to society?"

> Margaret Brown was assertive, persistent, and dedicated. She consistently advocated for and helped others throughout her life. For *Titanic*, she immediately began helping people in every way she could, from loading lifeboats to raising money, interpreting, and honoring those who died. She helped fight for better living conditions for miners and supported the rights of women and children.

8. Explain that, just like Margaret Brown, students will design an advocacy, service, and/or philanthropy project. Margaret Brown's actions after the disaster helped many distressed people in need. Ask, "What could you do to help others right now in your community?" As a class, generate ideas for potential philanthropy projects.
   a. Example projects include raising awareness of an issue, reducing littering, longer lunch times, more after-school activities, rentable bikes, food drives to reduce food insecurity, raising money for homelessness shelters, additional building accessibility points, community gardens, clothing drives, new school playgrounds, water bottles for every student, book drives for a local school library, etc.



9. Pass out the **Community Project Planning Worksheet**. Students will then design a project proposal for how they can get involved in advocacy, service, and/or philanthropic activities in their communities. Per teacher discretion, students may work independently, in pairs, or in small groups to create a community project. Encourage students to fill out each section of the worksheet thoughtfully and thoroughly, guiding them through the process of planning and implementing their project. (There is an optional page for students who want to either implement their project proposal or plan further.)

10. Ask students, "How does planning a community project help you understand Margaret Brown's work 100 years ago?" Students will write their responses at the bottom of their planning sheets. Per teacher discretion, students may share their responses with the class.

> She had to know her community and its needs to know how to help. She had to put a lot of work into her projects. She did a lot of advocacy, service, and philanthropy, which meant she had to plan and strategize a lot to accomplish those goals. It takes hard work and planning to accomplish projects that help the community, so that tells us about her tireless and dedicated personal character.

11. For homework, students will then create an eye-catching poster or brochure outlining and explaining their project proposal to present to the class. Posters and brochures can be designed with physical paper or with technology, using brochure templates in Microsoft Word and Google Docs.

12. Summarize the key points of the lesson, emphasizing Margaret Brown as a pioneering advocate and philanthropist who helped other survivors and families after the *Titanic* disaster, as well as the importance of philanthropy in making a positive difference in the world.

a. As Margaret Brown said to the *Rocky Mountain News* on May 1, 1914: "It makes no difference to me where I go. I am ready to go anywhere I am needed."

13. Journal: What is the significance of the story of Margaret "Molly" Brown and her connection to *Titanic*? How did efforts like hers impact the world, people, and community needs?

Passenger Highlight Additional Activities and Resources

Optional Extension Activities:

- Invite a local historian or guest speaker to share more insights about Margaret "Molly" Brown and her philanthropy.
- Organize a class visit or virtual tour to the Molly Brown House.
- Students create posters that highlight Molly Brown's philanthropic work. They should include images, quotes, and key information from their research. Groups present their posters to the class, explaining Molly Brown's philanthropic contributions and why they found them significant.
- Create an award that recognizes someone's philanthropic efforts and meaningfully present it.
- Students create a PowerPoint presentation to promote their philanthropy project. Students then vote and select a winning project.
- Students implement and carry out the project.
- Students may carry out their projects and record their efforts.

Link to Resource Materials:

- Historical overview of Margaret Brown's life: https://historicmissourians.shsmo.org/brown-margaret/ and https://www.cogreatwomen.org/project/margaret-molly-tobin-brown/
- Quotes from Margaret Brown: https://mollybrown.org/getting-to-know-the-browns-in-their-own-words/ and https://mollybrownhouse.wixsite.com/volunteer/molly-brown-quotes
- Youth philanthropy overview and lessons: https://www.learningtogive.org/resources/youth-philanthropy
- How to establish a youth philanthropy from the Youth Philanthropy Initiative of Indiana: https://www.inphilanthropy.org/sites/default/files/resources/Establishing%20a%20YP%20Program.pdf
- Lohse, Joyce B. *Unsinkable: The Molly Brown Story. A Now You Know Bio*. Palmer Lake: Filter Press, 2006. ISBN: 978-0-86541-081-7.
- Pierce, Nicola. Titanic*: True Stories of Her Passengers, Crew, and Legacy*. Dublin, O'Brien Press, 2018. ISBN: 978-1-84717-947-0.

Florida State Education Standards:

SS.7.CG.2.10: Explain the process for citizens to address a state or local problem by researching public policy alternatives, identifying appropriate government agencies to address the issue and determining a course of action.

HE.68.R.3.2: Explain and develop ways to apply leadership skills in the school and the community.

HE.68.R.3.3: Identify the importance of volunteerism in positively affecting the community and nation.

HE.68.R.4.1: Analyze possible solutions to a problem to determine the best outcome for oneself and others.

SP.PK12.US.3.1b: Apply skills and strategies to solve personal, school, community, and work problems.

VA.68.F.3.3: Collaborate with peers to complete an art task and develop leadership skills.

Social Studies: SS.8.A.1.1, SS.8.A.1.3, SS.8.A.1.4, SS.8.A.1.5, SS.8.A.1.6, SS.8.A.1.7, SS.8.G.6.2

ELA: ELA.K12.EE.1.1, ELA.K12.EE.2.1, ELA.K12.EE.3.1, ELA.K12.EE.4.1, ELA.K12.EE.5.1, ELA.K12.EE.6.1, ELA.7.R.2.1, ELA.8.R.2.1, ELA.7.R.2.2, ELA.8.R.2.2, ELA.7.R.2.4, ELA.8.R.2.4, ELA.7.R.3.2, ELA.8.R.3.2, ELA.7.C.3.1, ELA.8.C.3.1, ELA.7.C.4.1, ELA.8.C.4.1, ELA.7.C.5.1, ELA.8.C.5.1, ELA.7.C.5.2, ELA.8.C.5.2, ELA.7.V.1.1, ELA.8.V.1.1, ELA.7.R.3.3

Computer Science: SC.68.CS-PC.3.1, SC.68.CS-CC.1.1, SC.68.CS-CP.3.1

Health: HE.8.CH.3.1

Math: MA.7.NSO.2.3

Special Skills: SP.PK12.US.9.2a

Gifted: G.K12.5.1.2h, G.K12.6.3.3c, G.K12.6.3.3d

Visual Arts: VA.68.C.1.1, VA.68.C.2.1, VA.68.S.1.2, VA.68.S.1.3, VA.68.S.2.2, VA.68.S.2.3, VA.68.S.3.1, VA.68.S.3.3, VA.68.O.1.4, VA.68.H.2.2, VA.68.H.3.2, VA.68.H.3.3, VA.68.F.1.4, VA.68.F.3.4

Margaret Brown: A *Titanic* Survivor

This passage comes from a larger article, originally titled "Margaret Brown (ref: #43)", which was published on August 22, 2017 by Encyclopedia Titanica at https://www.encyclopedia-titanica.org/titanic-survivor/molly-brown.html.

By the time Margaret Tobin Brown boarded *Titanic* at Cherbourg, France, she had already made a significant impact in the world. She and her daughter Helen, who was a student at the Sorbonne, had been travelling throughout Europe and were staying with the John Jacob Astor party in Cairo, Egypt when Margaret received word that her first grandchild, Lawrence Palmer Brown Jr., was ill. She decided to leave for New York immediately and booked passage on the earliest Ship: *Titanic*. At the last minute, Helen decided to stay behind in London. Due to her quick decision, very few people, including family, knew that Margaret was on board the *Titanic*.

After the Ship struck the iceberg, Margaret helped load others into lifeboats and eventually was forced to board Lifeboat Six. She and the other women in Lifeboat Six worked together to row, keep spirits up, and dispel the gloom that was broadcast by...Robert Hichens. However, Margaret's most significant work occurred on *Carpathia*, where she assisted *Titanic* survivors, and afterwards in New York. By the time the *Carpathia* reached New York harbor, Margaret had helped establish the Survivor's Committee, been elected as chair, and raised almost $10,000 for destitute survivors. Margaret's language skills in French, German, and Russian were an asset, and she remained on *Carpathia* until all *Titanic* survivors had met with friends, family, or medical/emergency assistance. In a letter to her daughter shortly after the *Titanic* sinking, she wrote:

> "After being brined, salted, and pickled in mid ocean I am now high and dry… I have had flowers, letters, telegrams—people until I am befuddled. They are petitioning Congress to give me a medal… If I must call a specialist to examine my head it is due to the title of Heroine of the *Titanic*."

Her sense of humor prevailed; to her attorney in Denver she wired:

> "Thanks for the kind thoughts. Water was fine and swimming good. Neptune was exceedingly kind to me and I am now high and dry."

On May 29, 1912, as chair of the Survivor's Committee Margaret presented a silver loving cup to Captain Rostron of the *Carpathia* and a medal to each *Carpathia* crew member. In later years Margaret helped erect the *Titanic* memorial that stands in Washington, D.C.; visited the cemetery in Halifax, Nova Scotia, to place wreaths on the graves of victims; and continued to serve on the Survivor's Committee. She was particularly upset that, as a woman, she was not allowed to testify at the *Titanic* hearings. In response, she wrote her own version of the event which was published in newspapers in Denver, New York, and Paris.

The myth of "Molly" Brown has very little to do with the real-life of Margaret Tobin Brown, although it speaks to her spirit. Margaret was never known as "Molly Brown" during her lifetime: the name was an invention, but dates to well before the famous musical and film "The Unsinkable Molly Brown."

“The Unsinkable Molly” Note-Catcher

Name: _____ Class: _____ Date: _____

Directions: Write a source citation at the top, detailed notes on the left, and then summarize the main ideas and add any questions on the right.

Use the MLA citation format below to credit the passage article or webpage “#WomensHistoryMonth: The Unsinkable Molly Brown” by Women’s Public Leadership Network, published March 8, 2024, and found at https://womenspublicleadership.net/blog/womenshistorymonth-the-unsinkable-molly-brown.

Author Last Name, First Name. “Title.” Title of Site, Day Month Year, http://Web address.

Source Citation

Notes

Main Idea/Questions

Connection Questions

Directions: Choose three questions, cut them out, paste them on a separate piece of paper with enough space below each, and write your response to each prompt. Write a number next to each question to rank in order of personal interest:

1 = Very Interesting **2 = Somewhat Interesting** **3 = Least Interesting**

1. Why do you think Margaret Brown is remembered?

2. What is Margaret Brown's legacy? (Legacy is the long-lasting impact of particular events, actions, etc., that took place in the past or in a person's life, according to the Oxford English Dictionary.)

3. How did Margaret Brown demonstrate effective leadership skills during the *Titanic* disaster, and how did this influence her philanthropic efforts later on?

4. In what ways did Margaret Brown's philanthropic work after the *Titanic* disaster reflect her values and beliefs? Provide specific examples to support your answer.

5. How did Margaret Brown's philanthropic initiatives following the *Titanic* disaster contribute to the well-being of the survivors and affected communities? Discuss the long-term impact of her efforts.

6. Analyze the significance of Margaret Brown's decision to establish the Survivor's Committee. How did this decision impact the distribution of resources and aid to the survivors?

7. Evaluate the role of Margaret Brown in recognizing and honoring Captain Rostron for his efforts during the *Titanic* disaster. How did this gesture impact the broader community's perception of philanthropy and leadership during that time?

8. Assess the challenges Margaret Brown might have faced in advocating for the rights of women and children post-*Titanic*. How did her philanthropic work contribute to broader societal changes in terms of gender equality and child welfare?

9. Reflect on Margaret Brown's legacy as a philanthropist beyond her involvement in the *Titanic* disaster. How did her contributions to various causes influence future philanthropic endeavors, and what lessons can be learned from her approach to giving back to the community?

10. Compare Margaret Brown's work in the early 1900s and the work of philanthropists today. What is similar, and what is different?

Community Project Planning Worksheet

Name: _____ Class: _____ Date: _____

Project Title

Project Goals

What do you want to achieve with your philanthropy project?

How will you know if your project was successful? (Think of measurable goals)

Chosen Cause

What social issue, need, or cause are you passionate about?

Why is this cause important to you and your community?

Research Findings

What did you learn about the chosen cause during your research?

Project Plan

Outline the steps you will take to start your philanthropy project.

For example, "1. Design layout and write words for awareness posters, 2. Gather supplies to make posters..."

1. _____
2. _____
3. _____

Project Plan (Cont.):

Materials & Resources

List the materials, equipment, and resources needed:

-
-
-
-
-
-

Any local organizations or businesses that could support or help you?

Optional: Fundraising Plan

Do you need money for your project?

❑ **Yes** ❑ **No**

About how much money is needed?

How do you plan to raise funds for your project? (Written ask, verbal ask, booth, flyer, etc.)

-
-
-

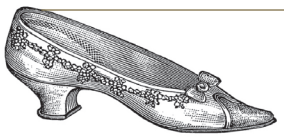
Implementation Strategy

How will you make sure your project is done well?

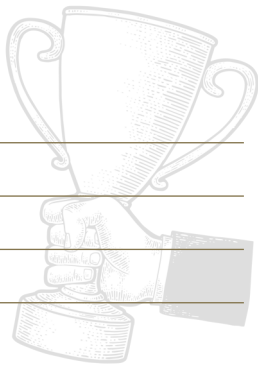
Connection to Margaret Brown

How does planning a philanthropy project help you better understand the work of Margaret Brown?

What does it take to plan out a successful philanthropy, like the ones after the *Titanic* tragedy?



Project Implementation



What is going well?

What are challenges?

What are things you planned well?

What did you not plan for?

Reflection and Improvement

What the one key lesson you learned from implementing this project?

What impact do you believe your project had?

How can you improve for your next philanthropy project?

6. Dots and Dashes:
Marconi Operators Phillips and Bride

***Titanic* Theme:** Working on *Titanic*

Skills: Decoding; Researching; Reading Informational Texts; Writing; Interpreting Wavelengths/Graphs

Subjects: Science; Graphing; History; Communications; Social Studies; Math; Language

Objectives:
- Students will explore why the Marconi operators were early 20th century technological explorers by researching and comparing sources about the men and the newly developed radio technology on board *Titanic*.
- Students will learn the basics and importance of electromagnetic radio waves within the context of *Titanic*'s distress calls by drawing and labeling a model.

Essential Questions:
- How did *Titanic*'s Marconi wireless operators, Harold Bride and Jack Phillips, use radio waves to communicate with other ships?
- What was the role of Harold Bride and Jack Phillips during the *Titanic* disaster?
- How does the use of radio waves on *Titanic* connect with the basics of some modern technology today?

Time: 60 minutes (potentially two sessions)

Assessment:
- Telegraph Note-Packet
- Student Journal Response

"Send S.O.S. It's the new call, and it may be your last chance to send it."

— Harold Bride,
Titanic Wireless Operator

Materials:
- ❑ Magazine: *RMS* Titanic: *The True Story*. a360media. 2023. ISBN: 25274- 74254. Pg 53.
- ❑ Telegraph Note-Packet
- ❑ Coloring utensils (crayons, markers, colored pencils, etc.)
- ❑ General supplies (pencil, paper, etc.)

Procedures:

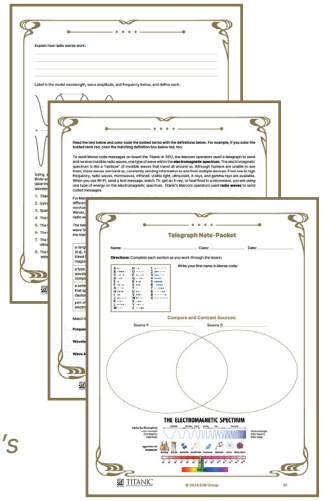
1. Explain that you will play a one-minute audio clip, and students will listen for sound patterns and think about what they could mean: https://youtu.be/snkwsU98QIQ?si=fg6uGXoKdJ1siLMi
2. Ask students, "What is this sound? What could it mean? What was it used for?"

> There were longer and shorter sounds. There was a series of short sounds and long sounds that were sometimes put together and sometimes mixed. It is some kind of encoded message used to communicate with others. It is Morse code.

3. Explain that the specific coded message is connected to *Titanic*, as the audio clip was a simulation, or re-creation, of *Titanic*'s final intelligible Morse code distress message (not an actual recording of the one sent on April 15, 1912, before the sinking).

Morse code is a system of dots and dashes (representing short and long sounds) used to communicate across distances, which Titanic*'s wireless operators used to communicate with other ships. Morse code was the way ships like the RMS* Titanic *communicated with each other in the early 1900s through the newly developed wireless Marconi Telegraph system used by Marconi wireless operators.*

4. Hand students the **Telegraph Note-Packet**. Have students write, or encode, their first name using Morse code. Students may share their new encoded name with the class or another student.
5. Reinforce that the series of dots and dashes, with corresponding short and long sounds, is called Morse code and used by wireless operators on *Titanic*.



Morse code is another language, and these Marconi operators had to work fast to interpret and communicate effectively and efficiently with other ships, especially for Titanic *on the night of April 14, 1912, when she struck an iceberg. Due to their use of radio waves at the time, with a "plain spark" transmitter and Twin "T" antenna, a ship's Morse code message could disrupt and interfere with another's signals. So, being able to communicate and understand messages quickly was important.*

Morse code is a digital signal, so it is very reliable, as noise can easily be removed to get a clear message. Analog signals, like telephone calls, are less reliable because the sound can have external interference or noise that is difficult to remove.

Harold Bride and Jack Phillips were Titanic*'s two Marconi telegraph operators. If Guglielmo Marconi, the inventor of the Marconi telegraph, is considered the grandfather of mobile phones, then these men were the technological explorers and IT people of their era.*

6. Tell the class that they will learn about *Titanic*'s two wireless operators, the Marconi Telegraph, and the scientific principles behind wireless communication.
7. Using their Telegraph Note-Packet, students compare and contrast the secondary source **Bride and Phillips: The Marconi Operators** handout and primary source of Bride's April 19, 1912 *New York Times* interview at https://www.encyclopedia-titanica.org/statement-harold-bride.html.

Similarities: *focus on Harold Bride's and Jack Phillips' experiences; emphasizes use of Morse code and the Marconi wireless telegraph technology; the crucial role of sending distress signals (both CQD and SOS); iceberg warnings; the bravery, dedication, and duty of the Marconi operators.*

Differences: *written in different narrative styles (website has a primary source of Bride's firsthand account, and handout is a broader secondary source in the third person); the handout briefly mentions Bride's survival while the website provides more details; the handout provides more historical context while the website details specifically the night of the sinking.*

8. Explain that the class will learn more about the basic scientific principles behind wireless communication to better understand their story and work. Have students read the next section in the packet, which includes scientific definitions, and match the vocabulary word (in **bold underline**) to their definitions using color coding and line matching.
   a. While reading, ask students to reference the electromagnetic spectrum diagram in their packet to see what they notice about radio waves. (***Radio waves*** *have the longest wavelength, lowest energy, and lowest frequency.)*
9. Use the packet to review and label the waves. May use colors to differentiate.
   a. **Wavelength** (the distance between one wave peak and the next)
   b. **Wave Amplitude** (the height of the wave from lowest to highest peak)
   c. **Frequency** (the number of waves [in hertz (Hz)], or cycles per second, propagating away from its source. The longer the wavelength, the lower the frequencies. The shorter the wavelength, the higher the frequency. They are inversely proportional to each other and have a causational relationship.)
   d. Optional: Have students explore these correlations and observe radio waves at work using an online lab: https://phet.colorado.edu/sims/cheerpj/radio-waves/latest/radio-waves.html?simulation=radio-waves
10. Connect these principles back to the Marconi wireless operators on *Titanic*. As a class, draw and label a model outlining how wireless telegraph messages were sent on April 14–15, 1912, from *Titanic* to *Carpathia*, the rescue ship, using the Telegraph Note-Packet. Use the steps in the packet to guide students as you draw the model. Explain as you add the sections.
11. Review *Titanic*'s wireless operators Harold Bride and Jack Phillips, the Marconi Telegraph, and the scientific principles behind wireless communication, connecting it all to the modern day.

We still use wireless radio waves today, with radio and TV programs, cell phones, Wi-Fi routers, and GPS, helping us send and receive information without physical connections. Guglielmo Marconi's invention of the telegraph allows students to text their friends, use GPS to navigate home, and see the latest TikTok videos. Titanic*'s Harold Bride and Jack Phillips worked tirelessly until the last moment, using Morse code and the Marconi wireless telegraph to signal nearby ships for help. Electromagnetic radio waves, measured by their wavelength and frequency, allowed people both of the past and the present to communicate over large distances.*

12. Play the beginning video of *Titanic*'s final intelligible Morse code distress message.
13. Share that the Marconi operators were early 20th century technological explorers. Ask, "Now, with the abundance of modern technology, how can you see yourself as a 21st century technological explorer? What potential careers could you explore?"

I could pursue a career in tech, study STEM disciplines in college, or attend a trade school. In the world of *Titanic*, there are oceanographers mapping to understand the ocean; artifact conservators discovering new ways to preserve historical artifacts from the ocean floor; engineers building new submersibles and remote-operated vehicles to explore the ocean depths and places not seen before; *Titanic* video game programmers reconstructing the historic Ship; marketing professionals reaching new audiences; and so much more.

14. Journal: How did Bride and Phillips assist in the rescue of *Titanic* passengers? What are some of the technologies we use today that rely on radio waves? How could those technologies be used to help society?

Telegraph Note-Packet Answer Key: (Answers in red)

Write your first name in Morse code: Answers may vary. Compare and Contrast Sources:

Source 1: Bride and Phillips: The Marconi Operators handout	Similarities:	Source 2: Bride's April 19, 1912 New York Times interview
• The handout is a broader secondary source written in third person perspective. • The handout briefly mentions Bride's survival. • The handout provides more historical context of *Titanic*'s voyage and the sinking, outside of what Bride experienced in the moment.	• Both focus on Harold Bride's and Jack Phillips' experiences. • Both emphasize use of Morse code and the Marconi wireless telegraph technology. • Both express the crucial role of sending distress signals (both CQD and SOS). • Both discuss iceberg warnings, as well as the bravery, dedication, and duty of the Marconi operators.	• This interview is a primary source of Bride's firsthand account and written in first-person. • The interview provides more details to Bride's survival and how he navigated it. • The interview specifically focuses on Bride's experiences only on the night of the sinking.

Color code the bolded terms:

Electromagnetic spectrum	a range of all types of invisible radiation and waves (e.g., radio waves, microwaves, and light) that travel through space, produced from electrical and magnetic forces
Radio waves	a type of electromagnetic wave with the longest wave length, lowest energy, and lowest frequency compared to other types of waves
Morse code	a series of dots and dashes that represent letters that spell a message. When sounded, these dots and dashes have different tones and durations
Shortwave radio bands	a higher-frequency electromagnetic wave that bounces off the Earth's ionosphere, enabling long-distance communication
Ionosphere	a layer of electrically charged atoms in the Earth's atmosphere
Transmitter	part of a wireless system that creates and produces electromagnetic waves to carry messages or signals
Antenna	part of a wireless system that receives electromagnetic waves from other devices

Match the definitions:

Frequency — the number of waves [in hertz (Hz)], or cycles per second, propagating away from its source. The longer the wavelength, the lower the frequencies. The shorter the wavelength, the higher the frequency. They are inversely proportional to each other.

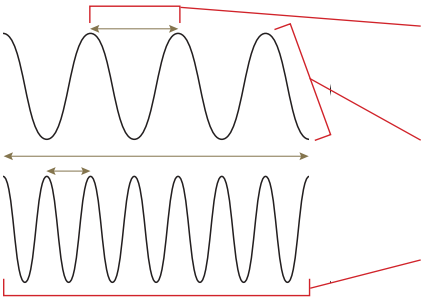
Wavelength — the distance between one wave peak and the next

Wave Amplitude — the height of the wave from lowest to highest peak

Explain how radio waves work:

Radio waves are a type of electromagnetic wave that travels through the air and are used to send information, like Morse code messages. A transmitter, like a telegraph key, creates and codes the electric radio wave, which is sent out and travels through the air, bouncing off the Ionosphere. A receiver's antenna will capture the radio wave, and a machine will translate the message into sound or data we can understand. For Morse code, it's a series of short and long sounds, or dots and dashes. This allows wireless communication over great distances.

Label in the model wavelength, wave amplitude, and frequency below, and define each:

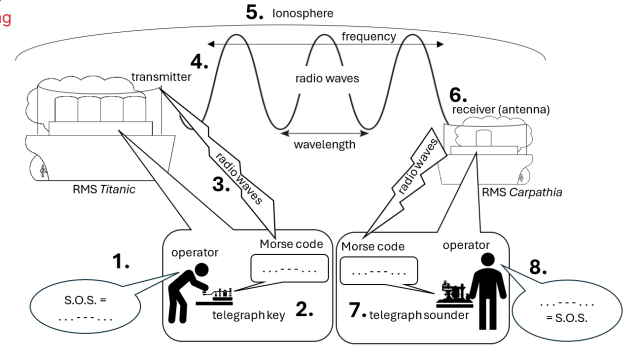


Wavelength is the distance between each wave peak

Wave Amplitude is the height of a wave from lowest to highest peak

Frequency the number of waves in hertz

Draw a model using these steps to show how the Marconi operators sent distress Morse code messages from *Titanic* to *Carpathia*, the rescue ship.



Working on *Titanic* Additional Activities and Resources

Optional Extension Activities:

- Use https://morsecodes.io/ or the packet to practice coding and decoding messages either individually or in pairs. Replay *Titanic*'s final intelligible distress message (https://youtu.be/snkwsU98QIQ?si=fg6uGXoKdJ1siLMi) to see if students can decode it.
- Acquire radio kits for the students to create working radios with signals and transmissions: https://www.teachengineering.org/activities/view/duk_amradio_tech_act or https://www.education.com/science-fair/article/build-basic-radio/
- Research Marconi and communication during *Titanic*'s sinking: https://www.sciencemuseum.org.uk/objects-and-stories/titanic-marconi-and-wireless-telegraph
- Research radio waves throughout our galaxy with NASA's Radio JOVE Project: https://radiojove.gsfc.nasa.gov/
- Visually explore the universe in a range of wavelengths from gamma rays to the longest radio waves: https://chromoscope.net/
- Watch the analysis of *Titanic*'s radio signals by Professor Fred Archibald (VE1FA) and the Amateur Radio Society: https://www.youtube.com/watch?app=desktop&v=JUcD2YwuqtQ

Resource Materials:

- NASA's The Electromagnetic Spectrum Video Series and Companion Book: https://science.nasa.gov/ems/
- Chatham Marconi Maritime Center and STEM lesson plans: https://www.chathammarconi.org/
- Maritime Museum of the Atlantic: https://maritimemuseum.novascotia.ca/fr/node/584
- BBC article about Jack Phillips: https://www.bbc.com/news/uk-england-surrey-17562408
- *The Atlantic* article about Marconi telegraph messages sent between April 14 and 15: https://www.theatlantic.com/technology/archive/2012/04/the-technology-that-allowed-the-titanic-survivors-to-survive/255848/
- BBC article on the Marconi wireless operators' version of the *Titanic* disaster: https://www.bbc.com/news/magazine-17631595
- History of Guglielmo Marconi's life and work: https://www.history.com/topics/inventions/guglielmo-marconi and https://www.fi.edu/en/news/case-files-guglielmo-marconi and https://www.leonardo.com/en/focus-detail/-/detail/guglielmo-elettra-marconi-radio
- A 2004 resource by the University of Oxford on Marconi and *Titanic*: https://www.mhs.ox.ac.uk/marconi/exhibition/
- Academic explanation of waves, wavelengths, and sound waves: https://pressbooks.bccampus.ca/kpupsyc1100/chapter/waves-and-wavelengths/
- Dougherty, Terri. *The* Titanic*'s Crew: Working Aboard the Great Ship*. Mankato: Capstone, 2015. ISBN: 978-1-4914-0420-1.
- Pierce, Nicola. Titanic: *True Stories of Her Passengers, Crew, and Legacy*. Dublin, O'Brien Press, 2018. ISBN: 978-1-84717-947-0.

Florida State Education Standards:

SS.8.A.1.3: Analyze current events relevant to American History topics through a variety of electronic and print media resources.

SS.8.A.1.6: Compare interpretations of key events and issues throughout American History.

ELA.7.C.4.1, ELA.8.C.4.1: Conduct research to answer a question, drawing on multiple reliable and valid sources, and generating additional questions for further research.

ELA.7.R.3.3: Compare and contrast how authors with differing perspectives address the same or related topics or themes.

SC.68.CS-CP.3.1: Select appropriate tools and technology resources to accomplish a variety of tasks and solve problems.

SC.7.P.10.3: Recognize that light waves, sound waves, and other waves move at different speeds in different materials.

SC.8.N.3.1: Select models useful in relating the results of their own investigations.

Social Studies: SS.8.A.1.1, SS.8.A.1.4, SS.8.A.1.5

ELA: ELA.K12.EE.1.1, ELA.K12.EE.2.1, ELA.K12.EE.3.1, ELA.K12.EE.4.1, ELA.K12.EE.5.1, ELA.K12.EE.6.1, ELA.7.R.2.1, ELA.8.R.2.1, ELA.7.R.2.2, ELA.8.R.2.2, ELA.7.R.2.4, ELA.8.R.2.4, ELA.7.R.3.2, ELA.8.R.3.2, ELA.7.C.5.1, ELA.8.C.5.1, ELA.7.V.1.1, ELA.8.V.1.1

Computer Science: SC.68.CS-PC.2.6, SC.68.CS-PC.3.1, SC.68.CS-CC.1.1

Science: SC.7.P.11.2, SC.7.N.3.2

Visual Arts: VA.68.S.2.2, VA.68.O.1.4, VA.68.H.2.2

Telegraph Note-Packet

Name: _____ Class: _____ Date: _____

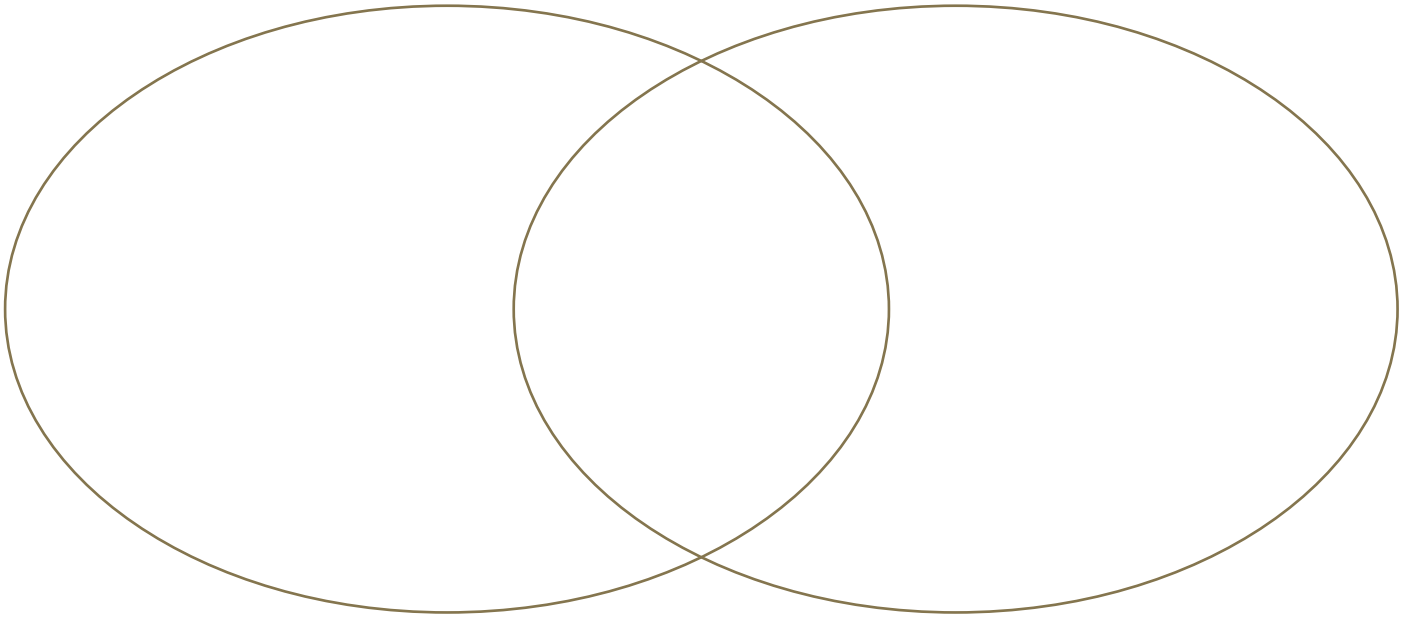
Directions: Complete each section as you work through the lesson.

A •–	N –•	1 •– – – –
B –•••	O – – –	2 ••– – –
C –•–•	P •– –•	3 •••– –
D –••	Q – –•–	4 ••••–
E •	R •–•	5 •••••
F ••–•	S •••	6 –••••
G – –•	T –	7 – –•••
H ••••	U ••–	8 – – –••
I ••	V •••–	9 – – – –•
J •– – –	W •– –	0 – – – – –
K –•–	X –••–	
L •–••	Y –•– –	
M – –	Z – –••	

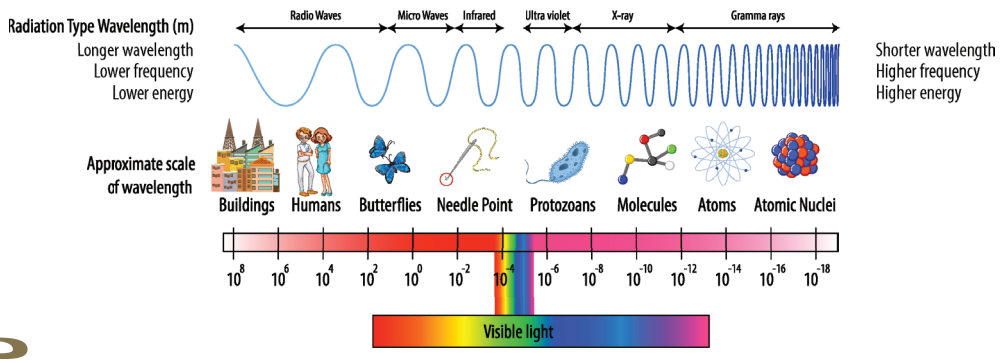
Write your first name in Morse code:

Compare and Contrast Sources:

Source 1: _____ Source 2: _____



THE ELECTROMAGNETIC SPECTRUM



Read the text below and color code the bolded terms with the definitions below. For example, if you color the bolded term red, color the matching definition box below red, too.

To send Morse code messages on board the *Titanic* in 1912, the Marconi operators used a telegraph to send and receive invisible radio waves, one type of wave within the **electromagnetic spectrum**. The electromagnetic spectrum is like a "rainbow" of invisible waves that travel all around us. Although humans are unable to see them, these waves surround us, constantly sending information to and from multiple devices. From low to high frequency, radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma rays are available. When you use Wi-Fi, send a text message, watch TV, get an X-ray, or heat food in a microwave, you are using one type of energy on the electromagnetic spectrum. *Titanic*'s Marconi operators used **radio waves** to send coded messages.

For Marconi's purposes, these electromagnetic radio waves take the **Morse code** dots and dashes (representing different tones and durations) and convert them into higher-frequency, **shortwave radio bands** and eventually mechanical vibrations that make sound. Radio waves can be refracted or reflected from the Earth's **ionosphere**. Waves, once directed to the sky at an angle, can be reflected to Earth and at great distances, meaning shortwave radio waves communicate over long distances.

The telegraph's **transmitter** encoded and sent out the message, and the **antenna** received the encoded radio wave from other devices. Marconi operators would physically tap on a switch called a telegraph key, turning the transmitter off and on and producing the pulses of radio waves.

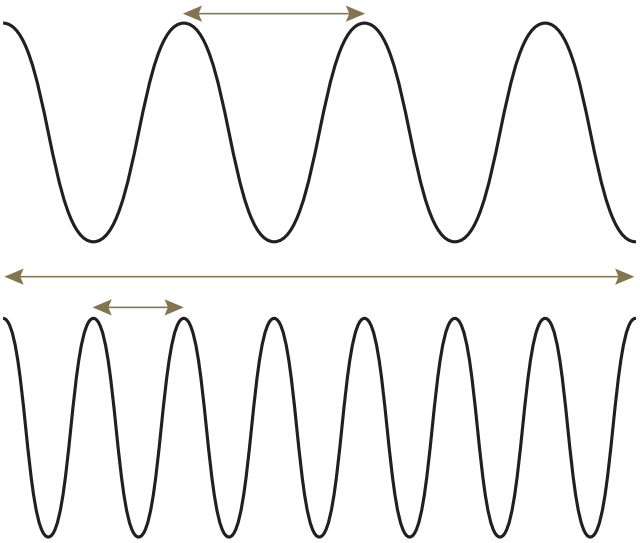
a range of all types of invisible radiation and waves (e.g., radio waves, microwaves, and light) that travel through space, produced from electrical and magnetic forces	a higher-frequency electromagnetic wave that bounces off the Earth's ionosphere, enabling long-distance communication
a type of electromagnetic wave with the longest wavelength, lowest energy, and lowest frequency compared to other types of waves	a layer of electrically charged atoms in the Earth's atmosphere
a series of dots and dashes that represent letters that spell a message. When sounded, these dots and dashes have different tones and durations	part of a wireless system that creates and produces electromagnetic waves to carry messages or signals
part of a wireless system that receives electromagnetic waves from other devices	

Match the definitions below to the correct vocabulary word:

Frequency	the distance between one wave peak and the next
Wavelength	the height of the wave from lowest to highest peak
Wave Amplitude	the number of waves [in hertz (Hz)], or cycles per second, propagating away from its source. The longer the wavelength, the lower the frequencies. The shorter the wavelength, the higher the frequency. They are inversely proportional to each other.

Explain how radio waves work:

Label in the model wavelength, wave amplitude, and frequency below, and define each:



Using a blank piece of paper, draw a model using these steps to show how the Marconi operators, Bride and Phillips, sent distress Morse code messages from *Titanic* to *Carpathia*, the rescue ship. Include and label the transmitter, receiver (antenna), Ionosphere, telegraph key, RMS *Titanic*, RMS *Carpathia*, radio waves, wavelength, frequency, operators, and Morse code.

1. *Titanic* operators code lettered messages into Morse code, like "SOS" as "...---...".
2. Using the telegraph key, tap out series of dots and dashes to send signal.
3. Spark transmitter converts taps into electromagnetic radio waves.
4. The radio waves are sent out through *Titanic*'s Twin "T" aerials and out toward the *Carpathia*.
5. The radio waves will reflect off the ionosphere and travel the curvature of earth's surface.
6. The *Carpathia*'s antenna received the coded signal.
7. The *Carpathia*'s telegraph receiver, called a sounder, converts the radio waves into mechanical vibrations that make sounds.
8. The *Carpathia*'s Marconi operators decode sounds as Morse code and then interpret them into lettered message.

Bride and Phillips: The Marconi Operators

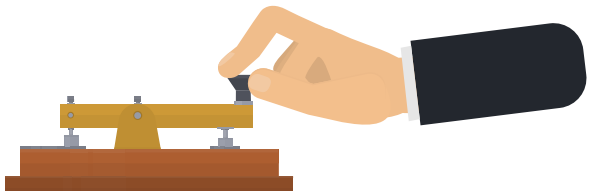
Harold Bride (junior assistant operator) and Jack Phillips (senior operator) were the Marconi wireless telegraph operators on board *Titanic*, responsible for transmitting messages to and from the Ship. Both were young, Phillips at 25 and Bride at 22, working for Marconi's Wireless Telegraph Co. Ltd. Given the new technology, these operators— who were employed by many different shipping lines (companies)—often were young and had trained together. Their duties included sending and receiving passenger messages and maintaining communication with other ships and land stations. This popular service kept both Bride and Phillips very busy while sailing across the Atlantic Ocean.

Bride and Phillips used Morse code, a system of dots and dashes representing letters and numbers, to send messages through the Marconi wireless telegraph. This new technology was patented in 1896 by Guglielmo Marconi, known as the father of radio and grandfather of mobile phones. Morse code allowed them to communicate quickly and efficiently despite the limitations of early wireless technology.

Using the telegraph key, they tapped out specific sequences of short and long signals to send coded messages. These were sent through electromagnetic shortwave radio frequencies. They would listen for incoming signals, decoding the dots and dashes into readable text. By carefully interpreting and transmitting these signals, they delivered crucial communication between *Titanic* and nearby ships. On April 14, 1912, Bride and Phillips received six iceberg warnings throughout the day and requested immediate assistance after *Titanic* struck an iceberg.

After hitting the iceberg at 11:40 p.m., Bride and Phillips immediately began sending distress signals to alert nearby vessels to the dire situation. They transmitted the original distress call "CQD" (Seeking You—Distress) and the newly introduced "SOS" signal, which just recently had become the international standard for distress. Despite the rapidly deteriorating conditions, they tirelessly continued their work, trying to ensure that help would arrive. *Titanic* sent her last message to the steamship *Virginian* at 2:17 a.m. on April 15, 1912: "CQ." (Notice signal was not completed due to the sinking.)

As the Ship sank, Bride managed to survive by clinging to an overturned lifeboat until he was rescued. Tragically, Phillips perished in the sinking. Both are remembered for their immense courage and dedication in *Titanic*'s final moments. Their unwavering commitment to their duty in the face of adversity serves as a testament to their bravery and selflessness during the *Titanic* disaster.



7. Hard-A-Starboard: *Titanic*'s Fatal Collision

***Titanic* Theme:** Collision/Sinking

Skills: Math Calculations; Chronological Ordering; Problem Solving; Reading; Discussion

Subjects: Math; Reading; Researching; Social Studies; History; Leadership; Telling Time; Writing; Speaking/Listening

Objectives:

- Students will learn about *Titanic*'s collision with an iceberg, understanding the causes and consequences by calculating data for mathematical interpretations.
- Students will analyze the events that led to *Titanic* becoming one of the greatest maritime disasters by evaluating her April 14–15 timeline and organizing it into chronological order.

Essential Questions:

- What were the events that led to *Titanic*'s collision with an iceberg? What were the consequences?
- How did leadership and problem-solving skills impact *Titanic*'s final moments on April 14–15, 1912?
- What aspects of the *Titanic* story greatly impacted the survival rate and severity of the tragedy?

Time: 45 minutes

Assessment:

- Assessing *Titanic* Collision and Fate Worksheet
- Overlooked Safety Measures Response
- Survival Rate Sheet Conclusion(s)
- Student Journal Response

"There was only a slight slope to the deck for about half an hour, but by the time they were launching the small boats the Ship had begun to go down by the head rapidly. Still we had no idea that there was any danger of her sinking.... The crew and the men passengers all behaved as if everything would turn out all right and we women thought it would."

—Marie Jerwan,
Titanic Second-Class Passenger

Materials:

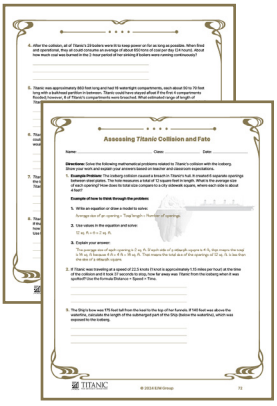
- ❑ The book *A Night to Remember* by Walter Lord
- ❑ Assessing *Titanic* Collision and Fate Worksheet
- ❑ Survival Rate sheet
- ❑ A Timeline of the Sinking of *Titanic* sheet
- ❑ Scissors and glue
- ❑ General supplies (pencil, paper, etc.)

Procedures

1. Begin by reading chapter one of ***A Night to Remember*** **by Walter Lord**, a documentary-style nonfiction book on the *Titanic* disaster collected from interviews with survivors. Ask students to imagine they were in this moment. This narrative will set the lesson.

Immediately after striking the iceberg, the leaders of the Ship, Captain Edward J. Smith and Thomas Andrews (chief designer), assessed the situation and damage. They also created a plan of action to respond depending on the severity.

2. Explain that the students will act just like Thomas Andrews to use mathematical calculations to better understand *Titanic*'s situation at the time of the collision. Distribute **Assessing *Titanic* Collision and Fate** worksheets with problems involving calculations and ask students to solve them individually or in pairs.



3. Engage students in a group discussion to analyze the mathematical calculations they performed. Ask, "What new information about *Titanic* and the disaster did you learn from completing the worksheet? How does that affect your understanding?"

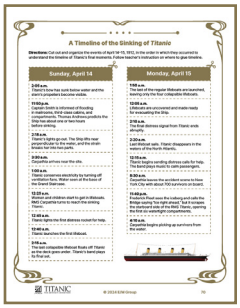
> The Ship's speed was 22.5 knots. A knot is 1.15 miles per hour. *Titanic* had 35 feet of her hull under the water. Passenger capacity on the Ship was 3,510, but had only enough for 1,178 in the lifeboats. *Carpathia* had to travel 58 miles. Knowing this gave me a better understanding of the situation people on board *Titanic* were facing, especially leadership and how they would have needed to gather information to make a full assessment.

4. Connect student work and observations to the work of Thomas Andrews sounding, or inspecting, the Ship.

Thomas Andrews determined the Ship would sink, calculated from inspection data provided by the crew. He estimated that Titanic *would stay afloat for about an hour and a half, and Captain Smith ordered the lifeboats filled, distress signals sent, and distress rockets fired. Determining* Titanic's *fate set off a course of events that ended with 1,496 lives lost and 712 souls saved.*

5. Explain that students will learn about the events of April 14–15, 1912, and aspects—some unforeseen and overlooked—that added to the severity of the tragedy and the large loss of life. (Severity means how extreme and harsh the circumstances and results were.)

6. Divide students into groups. Hand each group a sheet of **A Timeline of the Sinking of *Titanic***. Students need to cut out each box, read, and organize events into chronological or sequential order. Per teacher discretion, boxes can be glued in order onto notebook, paper, or string of yarn. After a few minutes, review the order of correct events and ask, "What do you notice about the times/actions? How does this impact the night's events, and how could people respond to the situation?"



I noticed the quick succession of events, the time between certain events like the incident and loading of the lifeboats, the late hour, the time between sinking and rescue, and how it connects to other lessons.

The quick succession of events did not leave a lot of time to study or fully understand the situation. Communication and coordination would make it hard to reach all passengers and crew. You had to act quickly to respond to the situation. You would need to learn where water is coming from, what the obstacles are, and create an action plan for the 2,208 people on board. The late hour meant people were asleep and might not have been in a state of mind to comprehend the situation.

7. Explain that while *Titanic*'s design exceeded the safety standards of 1912, many things had to align that led to *Titanic* becoming one of the greatest maritime disasters. Explain some of the unforeseen context that led to the collision, as also read in *A Night to Remember*:

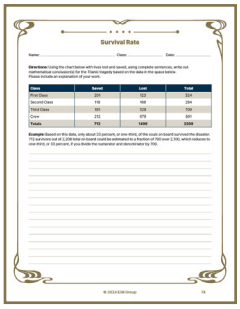
The North Atlantic Ocean, while at 28° Fahrenheit, was calm with no waves or wind on the night of April 14, 1912. The sea surface was smooth and blended with the sky, which made it more challenging to spot icebergs since water wouldn't break upon it. Since there was no moon, it made it more challenging with the decreased visibility due to no major light source. Captain Smith retired to his cabin for the evening, leaving First Officer Murdoch in charge of the Bridge and Quartermaster Robert Hichens at the wheel.


What Was Overlooked?

8. Distribute one prompt from the **What Was Overlooked?** sheet to each group, after dividing them prior to the lesson. Have each group discuss the significance of that aspect and how it might have impacted the tragedy. Have a spokesperson from each group share the text and the group's thoughts. Then, have students write a response to the question, "How did these factors—including the unforeseen and overlooked—impact the severity of the tragedy?"

Many factors contributed to the disaster's severity. Students might say how people were taken by surprise, as an iceberg collision leading to a fatal sinking was completely unexpected. All factors directly impacted and amounted to the great loss of life. It impacts us today because of new sea safety measures.

9. Hand out the **Survival Rate** sheet. Discuss the number of lives lost and saved. Explain students will have to come up with mathematical conclusions about the severity of the disaster using this data, with total number of conclusions per teacher's discretion. The worksheet has a blank space at the top for the teacher to fill in with the number of conclusions wanted. This assignment may be used for in-class work, exit ticket, or homework.


Survival Rate

For example, only about 33 percent, or one-third, of the souls on board survived the disaster. 712 survivors out of 2,208 total on board could be estimated to be a fraction of 700 over 2,100, which reduces down to one-third, or 33 percent if you divide the numerator and denominator by 700.

10. Summarize the lesson by saying that despite these oversights and unforeseen factors, which contributed to the severity of the tragedy and the great loss of life of 1,496 souls, 712 people still survived the disaster. Problem-solving skills and instances of bravery are often commemorated in *Titanic* memorials, highlighting those who worked hard to save lives despite many challenges. Ask, "How would you evaluate the crew's effort and response to the tragedy?"

> **Positives:** crew efforts were valid, prompted passengers into boats, assessed damage accurately, and worked till the end through the problems they encountered.
> **Negatives:** crew efforts were not effective because lifeboats left half full, division of families/delayed boarding, and low survival rate of third-class passengers.

11. Journal: Looking at the timeline and numbers, if you could change one thing (event or response) about what happened that evening on April 14–15, 1912, what would it be? Why? How would that affect the outcome?

Captain Smith

Thomas Andrews

William Murdoch

Robert Hichens

Assessing *Titanic* Collision and Fate Answer Key:

1. 2 sq. ft; the size of the openings is less than the size of a sidewalk square.
2. 0.232 miles away from the iceberg (approximately 1,213 feet or a quarter of a mile)
3. 35 feet
4. 650/24=27.08, Round to the nearest whole number, 27×2=54, 54 tons of coal
5. 300 to 420 feet; 6/16=0.375, About 38% of the compartments were damaged
6. 16 more full-sized lifeboats
7. 1,302 more passengers
8. Approximately 2 hours and 58 minutes

Collision/Sinking Additional Activities and Resources

Optional Extension Activities:

- Use the Survival Rate data to design a physical representation of those statistics.
- Watch a documentary about *Titanic*'s sinking for a more in-depth exploration.
- Research how and why safety regulations for ships have improved since the tragedy.
- Write an essay that compares two different first-hand accounts of the sinking.
- Create a *Titanic* diagram or model, indicating important features and areas of the Ship affected during the sinking.
- Develop artwork that reflects the emotions experienced during the tragedy.
- Research the role of the crew—stewards, stewardesses, officers, musicians, chefs, stokers, etc.—during the sinking and create a graphic novel telling one of their experiences.
- Watch different *Titanic*-based movies that depict the *Titanic* sinking and analyze how Captain Smith, Thomas Andrews, and other commanding officers are portrayed.

Link to Resource Materials:

- Historical documents or eyewitness accounts related to the collision.
  - Washington Dodge's eyewitness account of the tragedy with listed discussion questions: https://www.gilderlehrman.org/history-resources/spotlight-primary-source/eyewitness-account-sinking-Titanic-1912
  - Primary Source list of books, newspapers, and documents: https://www.slrc.info/resources/guides/history/sinking-of-the-Titanic/
- Video of survivor Eva Hart describing the night: https://www.encyclopedia-Titanica.org/Titanic-victim/thomas-andrews.html
- Thomas Andrews biography with supporting documents: https://www.belfast-titanic.com/pages/index.asp?title=Thomas_Andrews or https://www.aquietsea.org/pdfs/THOMAS%20ANDREWS%20NAVAL%20ARCHITECT.pdf
- Image of an iceberg and ice field taken in 1912 by passenger on the *Carpathia*: https://americanhistory.si.edu/collections/search/object/nmah_1416178
- Lord, Walter. *A Night to Remember*. New York: Bantam Books, 1956. ISBN: 9780805077643.
- Carson, Mary Kay. *What Sank the World's Biggest Ship? And Other Questions about the* Titanic. New York: Sterling, 2012. ISBN: 978-1-4027-8733-1.
- Hopkinson, Deborah. Titanic: *Voices from the Disaster*. New York:, Scholastic, 2012. ISBN: 978-0-545-11674-9.
- Korman, Gordon. Titanic: *Book Three: S.O.S.* New York: Scholastic, 2011. ISBN: 978-0-545-12333-4.

Florida State Education Standards:

SS.8.A.1.1: Provide supporting details for an answer from text, interview for oral history, check validity of information from research/text, and identify strong vs. weak arguments.**ELA.K12.EE.4.1:** Use appropriate collaborative techniques and active listening skills when engaging in discussions in a variety of situations.

MA.7.NSO.1.2: Rewrite rational numbers in different but equivalent forms including fractions, mixed numbers, repeating decimals and percentages to solve mathematical and real-world problems.

MA.8.NSO.1.7: Solve multi-step mathematical and real-world problems involving the order of operations with rational numbers including exponents and radicals.

MA.7.NSO.2.1: Solve mathematical problems using multi-step order of operations with rational numbers including grouping symbols, whole-number exponents and absolute value.

MA.7.AR.3.1: Apply previous understanding of percentages and ratios to solve multi-step real-world percent problems.

Social Studies: SS.8.A.1.3, SS.8.A.1.4, SS.8.A.1.5, SS.8.A.1.6, SS.8.A.1.7

ELA: ELA.K12.EE.1.1, ELA.K12.EE.2.1, ELA.K12.EE.3.1, ELA.K12.EE.5.1, ELA.K12.EE.6.1, ELA.7.R.2.1, ELA.8.R.2.1, ELA.7.R.2.2, ELA.8.R.2.2, ELA.7.R.2.4, ELA.8.R.2.4, ELA.7.R.3.2, ELA.8.R.3.2, ELA.7.R.3.3, ELA.7.C.3.1, ELA.8.C.3.1, ELA.7.C.4.1, ELA.8.C.4.1

Math: MA.8.NSO.1.5: MA.8.NSO.1.6, MA.7.NSO.2.2, MA.7.NSO.2.3, MA.8.AR.2.1, MA.7.AR.2.2, MA.8.AR.2.2, MA.7.AR.3.2, MA.7.AR.3.3

A Timeline of the Sinking of *Titanic*

Directions: Cut out and organize the events of April 14–15, 1912, in the order in which they occurred to understand the timeline of *Titanic*'s final moments. Follow teacher's instruction on where to glue timeline.

Sunday, April 14

2:05 a.m.
Titanic's bow has sunk below water and the stern's propellers become visible.

11:50 p.m.
Captain Smith is informed of flooding in mailrooms, third-class cabins, and compartments. Thomas Andrews predicts the Ship has about one or two hours before sinking.

2:18 a.m.
Titanic's lights go out. The Ship lifts near perpendicular to the water, and the strain breaks her into two parts.

3:30 a.m.
Carpathia arrives near the site.

1:00 a.m.
Titanic conserves electricity by turning off ventilation fans. Water seen at the base of the Grand Staircase.

12:25 a.m.
Women and children start to get in lifeboats. RMS *Carpathia* turns to reach the sinking *Titanic*.

12:45 a.m.
Titanic lights the first distress rocket for help.

12:40 a.m.
Titanic launches the first lifeboat.

2:15 a.m.
The last collapsible lifeboat floats off *Titanic* as the deck goes under. *Titanic*'s band plays its final set.

Monday, April 15

1:50 a.m.
The last of the regular lifeboats are launched, leaving only the four collapsible lifeboats.

12:05 a.m.
Lifeboats are uncovered and made ready for evacuating the Ship.

2:10 a.m.
The final distress signal from *Titanic* ends abruptly.

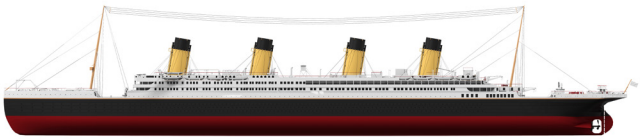
2:20 a.m.
Last lifeboat sails. *Titanic* disappears in the waters of the North Atlantic.

12:15 a.m.
Titanic begins sending distress calls for help. The band plays music to calm passengers.

8:30 a.m.
Carpathia leaves the accident scene to New York City with about 700 survivors on board.

11:40 p.m.
Frederick Fleet sees the iceberg and calls the Bridge saying "Ice right ahead," but it scrapes the starboard side of the RMS *Titanic*, opening the first six watertight compartments.

4:10 a.m.
Carpathia begins picking up survivors from the water.



What Was Overlooked?

Directions: For student discussion, divide these prompts and distribute them to different groups. Per teacher discretion, some groups may have multiple prompts.

Ice warnings: *Titanic* received six warnings on the day of April 14. At 5:50 p.m. that day, Captain Smith changed *Titanic*'s course slightly south but maintained the Ship's speed. There is doubt whether all the ice warnings received made it to the bridge and to the captain's attention.

Insufficient Number of Lifeboats: The Ship was only equipped with 20 lifeboats to carry about 1,178 people, lower than the 2,208 on board. Regulations of the time were out of date, with the size of the ships being built and mandating that *Titanic* only have 16 lifeboats based on ship tonnage.

Lack of Lifeboat Drills: A drill was planned for and cancelled on Sunday, April 14, by Captain Smith to not interfere with the onboard Sunday church service. Therefore, neither crew nor passengers received formal training on how to evacuate, load, operate, or lower lifeboats while on the actual vessel.

Lack of Communicated Urgency: There was a general belief that *Titanic* was unsinkable, thanks to the publication *The Shipbuilder* (a popular maritime engineering magazine of the time). This, coupled with the desire not to cause panic, led to many passengers underestimating the severity of the situation. Many thought it was just a drill and opted to return to their cabins or just go back to sleep. Accurate information also took time to circulate around the Ship, especially reaching the lowest and farther cabins of third class.

Marconi Operators: The new Marconi wireless telegraph system was cutting-edge, allowing communication between ships across large distances via Morse code. Because it was new also meant there were minimal regulations. For example, it was not mandated that the Marconi telegraph be operated at all hours. So, the ship Californian did not respond to *Titanic*'s distress calls because its operator turned off their machine and went to bed before 11:40 p.m. when *Titanic* struck an iceberg.

Women and Children First or Only: During the evacuation of the Ship, Captain Smith gave the order of "Women and children first" to fill the lifeboats, a common practice in that time period. However, due to the haste of the situation and the lack of a lifeboat drill, each side of the Ship had a different interpretation. Officer Murdoch on the Starboard side thought it meant women and children first and then men, while Officer Lightoller on the Port side understood it as women and children only. This meant many lifeboats were lowered with empty seats if there were no women and children around to board.

Bulkhead Design: When *Titanic* was designed, it exceeded the safety standards of the era. This included bulkheads, wall dividers placed throughout the Ship to create 16 "watertight" compartments. *Titanic* would stay afloat if three or four of the compartments were breached and filled with water. However, the bulkheads were not tall enough to seal off the compartment entirely, allowing for a staff passageway. This meant that when *Titanic*'s compartments began to fill with water after striking an iceberg, water would fill a compartment and spill over into the next one and so forth.

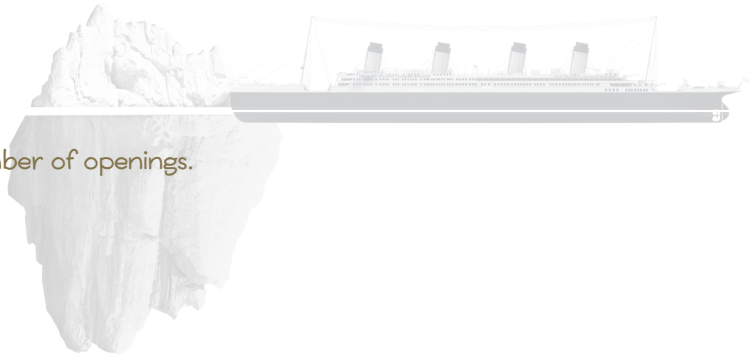
Assessing *Titanic* Collision and Fate

Name: _____ Class: _____ Date: _____

Directions: Solve the following mathematical problems related to *Titanic*'s collision with the iceberg. Show your work and explain your answers based on teacher and classroom expectations.

1. **Example Problem:** The iceberg collision caused a breach in *Titanic*'s hull. It created 6 separate openings between steel plates. The hole measures a total of 12 square feet in length. What is the average size of each opening? How does its total size compare to a city sidewalk square, where each side is about 4 feet?

   Example of how to think through the problem:

   1. Write an equation or draw a model to solve:

      Average size of an opening = Total length ÷ Number of openings.

   2. Use values in the equation and solve:

      12 sq. ft ÷ 6 = 2 sq. ft.

   3. Explain your answer:

      The average size of each opening is 2 sq. ft. If each side of a sidewalk square is 4 ft, that means the total is 16 sq. ft because 4 ft × 4 ft = 16 sq. ft. That means the total size of the openings of 12 sq. ft. is less than the size of a sidewalk square.

2. If *Titanic* was traveling at a speed of 22.5 knots (1 knot is approximately 1.15 miles per hour) at the time of the collision and it took 37 seconds to stop, how far away was *Titanic* from the iceberg when it was spotted? Use the formula Distance = Speed × Time.

   _____

   _____

   _____

3. The Ship's bow was 175 feet tall from the keel to the top of her funnels. If 140 feet was above the waterline, calculate the length of the submerged part of the Ship (below the waterline), which was exposed to the iceberg.

   _____

   _____

   _____

4. After the collision, all of *Titanic*'s 29 boilers were lit to keep power on for as long as possible. When fired and operational, they all could consume an average of about 650 tons of coal per day (24 hours). About how much coal was burned in the 2-hour period of her sinking if boilers were running continuously?

5. *Titanic* was approximately 883 feet long and had 16 watertight compartments, each about 50 to 70 feet long with a bulkhead partition in between. *Titanic* could have stayed afloat if the first 4 compartments flooded; however, 6 of *Titanic*'s compartments were breached. What estimated range of length of *Titanic* was damaged? What percent of *Titanic*'s total compartments were damaged during the collision?

6. *Titanic* was carrying 2,208 passengers and crew members when she hit the iceberg. Lifeboats on board could accommodate 1,178 people. If full-sized lifeboats could seat 65 people, how many more lifeboats would be needed to accommodate everyone on the Ship?

7. *Titanic* had a maximum passenger capacity of 3,510. If 2,208 people were on board when she hit the iceberg, how many more passengers could have been on the Ship at the time of the tragedy if *Titanic* had been fully booked at her maximum capacity?

8. *Titanic*'s distress call reached the nearest ship, the RMS *Carpathia*, which was 58 miles away. If the *Carpathia* traveled at an average speed of 17 knots (1 knot is approximately 1.15 miles per hour), how long did it take for the *Carpathia* to reach *Titanic*'s location, if the ship kept consistent speed? Use the formula Distance = Speed × Time.

Survival Rate

Name: _____ Class: _____ Date: _____

Directions: Using the chart below with lives lost and saved, using complete sentences, write out _____ mathematical conclusion(s) for the *Titanic* tragedy based on the data in the space below. Please include an explanation of your work.

Class	Saved	Lost	Total
First Class	201	123	324
Second Class	118	166	284
Third Class	181	528	709
Crew	212	679	891
Totals	**712**	**1496**	**2208**

Example: Based on this data, only about 33 percent, or one-third, of the souls on board survived the disaster. 712 survivors out of 2,208 total on board could be estimated to a fraction of 700 over 2,100, which reduces to one-third, or 33 percent, if you divide the numerator and denominator by 700.

8. We Remember:
Titanic in Musical Memoriam

***Titanic* Theme:** Worldwide Impact

Skills: Reading; Researching; 3-D Creation; Drawing; Notetaking; Musical Composition; Writing; Rationalizing; Musical Technology; Empathy; Musical Interpretation; Musical Evaluation

Subjects: Music; English; Technology; Social Studies; Geography; Art; Speaking/Listening; Language

Objectives:

- Students will explore the concept of and historical significance of commemorating the *Titanic* disaster by creating a memorial 3-D art prism.
- Students will examine the ways people pay tribute to the *Titanic* tragedy—memorials, plaques, monuments, and music—by composing their own commemoration song.

Essential Questions:

- How do we commemorate and remember those affected by the *Titanic* tragedy?
- What memorials have been created to pay tribute to those impacted by *Titanic*'s sinking?
- How can we use music as a memorial to commemorate and honor others?

Time: 50 minutes

Assessment:

- Memorial Note-Prism
- Your *Titanic* Commemorative Music Sheet
- Student Commemorative Song and Rubric
- Student Journal Response

"...we had a grand time on the *Titanic*. We got very good diet and we had a very jolly time dancing and singing. We had every kind of an instrument on board to amuse us, but all the amusement sank in the deep."

—Daniel Buckley,
Titanic Third-Class Passenger

Materials:

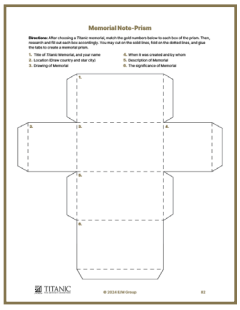
- ❑ Online music-making platforms (e.g., GarageBand, BandLab, or online MIDI sequencers)
- ❑ Headphones or speakers
- ❑ Memorial Note-Prism
- ❑ Your *Titanic* Commemorative Music sheet
- ❑ General supplies (pencil, paper, etc.)

Procedures:

1. Introduce the concept of memorials and their role in commemorating or honoring significant events and individuals. Explain that memorials can be structures, monuments, or creative projects designed to honor and commemorate individuals, groups, or events that hold historical, cultural, or personal significance. Ask students, "What memorials and tributes are you familiar with? What do you believe is the significance of that memorial?"

> Memorials help us remember those who are no longer with us. They act as physical reminders, making the past tangible and often providing a space for reflection and remembrance.

2. Explain that the *Titanic* tragedy is one such event that has been memorialized all around the world since 1912. Hand out **Memorial Note-Prism**. Students will choose one *Titanic* memorial—sculpture, monument, plaque, or object dedicated to the tragedy—to research and fill out each box on the sheet: title of *Titanic* memorial, location, a drawing, creation date, maker, and a description and significance of the memorial. Students may use websites, articles, and videos about these memorials. Two websites below could be used as a starting point:


Memorial Note-Prism

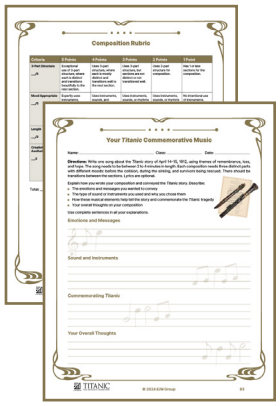
   a. Example: The *Titanic* Memorial in Washington, D.C., on May 26, 1931, by Gertrude Vanderbilt Whitney and John Horrigan, featuring a statue of a man with outstretched arms to honor the men who gave up their seats to women and children on the lifeboats.
   b. Extensive interactive map of *Titanic* Memorials: http://www.paullee.com/titanic/titanicgeo/index.php
   c. Interactive map of some *Titanic* Memorials and in-depth details of each: https://www.titanic.memorial/map
3. Students will cut out, fold, and glue their note-prism, turning it into a 3-D commemorative display. Display prisms in the room and have students go around the room, observing other's memorials in a gallery walk.
4. Discuss thoughts and observations by prompting, "See if you can find a *Titanic* memorial you did not encounter in your notes. What did you learn about this 'new to you' *Titanic* memorial?" and "Which *Titanic* memorial did you notice the most on the prisms? Why do you think that is?"

> Locations for memorials are all around the world, in countries I did not expect. The tragedy had a global impact since memorials are found all over the world. Memorials come in a variety of sizes, shapes, and dedications, showing the types of connections people have to the survivors and victims. Some memorials are dedicated to specific groups or people, while others are general to the whole tragedy.

5. Reinforce that these types of memorials serve as a tangible reminder of the past and can focus our attention on specific purposes or smaller groups within the larger context. For example, the *Titanic* Musician's Memorial in Southampton, England, unveiled on April 19, 1913, specifically honors the hired musicians on board *Titanic*, who stayed at their post and played to calm others during the sinking.

6. Explain that memorials are not only physical structures; they can also be creative literary and musical works, like poems and songs. Many authors and composers have commemorated the tragic events of April 14–15 through creative works that leave a strong emotional impact, different from the physical monuments. Music, specifically, can convey meaningful storytelling.
7. Explain that composer Adam Young wrote an album score called "RMS *Titanic*" in 2016. Have the students listen to 30–45 seconds of each song below. Ask students to describe the music's mood, energy, and their emotional reaction after each piece. Ask, "What musical elements, like instruments, rhythm, and tempo, caused those emotions or thoughts?"
    a. "RMS *Titanic*" on Soundcloud: https://soundcloud.com/adamyoungmusic/sets/adam-young-scores-march-2016
        i. First 30 seconds of "Boarding" (*fast tempo, strings and piano, bouncy rhythm, shows joy and excitement to board* Titanic)
        ii. First 30 seconds of "Sinking" (*fast tempo, brass and percussion, pounding rhythm, dynamics with big swells of sound, shows fear and darkness of the moment*)
        iii. Last 45 seconds of "Survivors" (*slow tempo, strings and piano, longer sustained notes, shows perseverance and hope*)

8. Students will also commemorate *Titanic* through music with a song-writing project by composing a tribute song about the sinking of *Titanic* and her passengers. Students should consider combining storytelling, using their new knowledge of various memorials, plaques, and monuments already dedicated to the tragedy found around the world. Distribute the Your ***Titanic*** **Commemorative Music** sheet for student directions.
    a. Students will compose one song about the *Titanic* story of April 14–15, 1912, using themes of remembrance, loss, and hope. The song needs to be between two to four minutes in length. It must have three distinct parts (before the collision, during the sinking, and survivors being rescued), each with a different mood as heard in the Adam Young example. There should be transitions between the sections. Lyrics are optional. Encourage student creativity and exploration. See **Composition Rubric**.
    b. For more examples, you may read and listen to other compositions dedicated to the *Titanic* disaster: https://www.classical-music.com/features/articles/seven-pieces-music-inspired-Titanic/

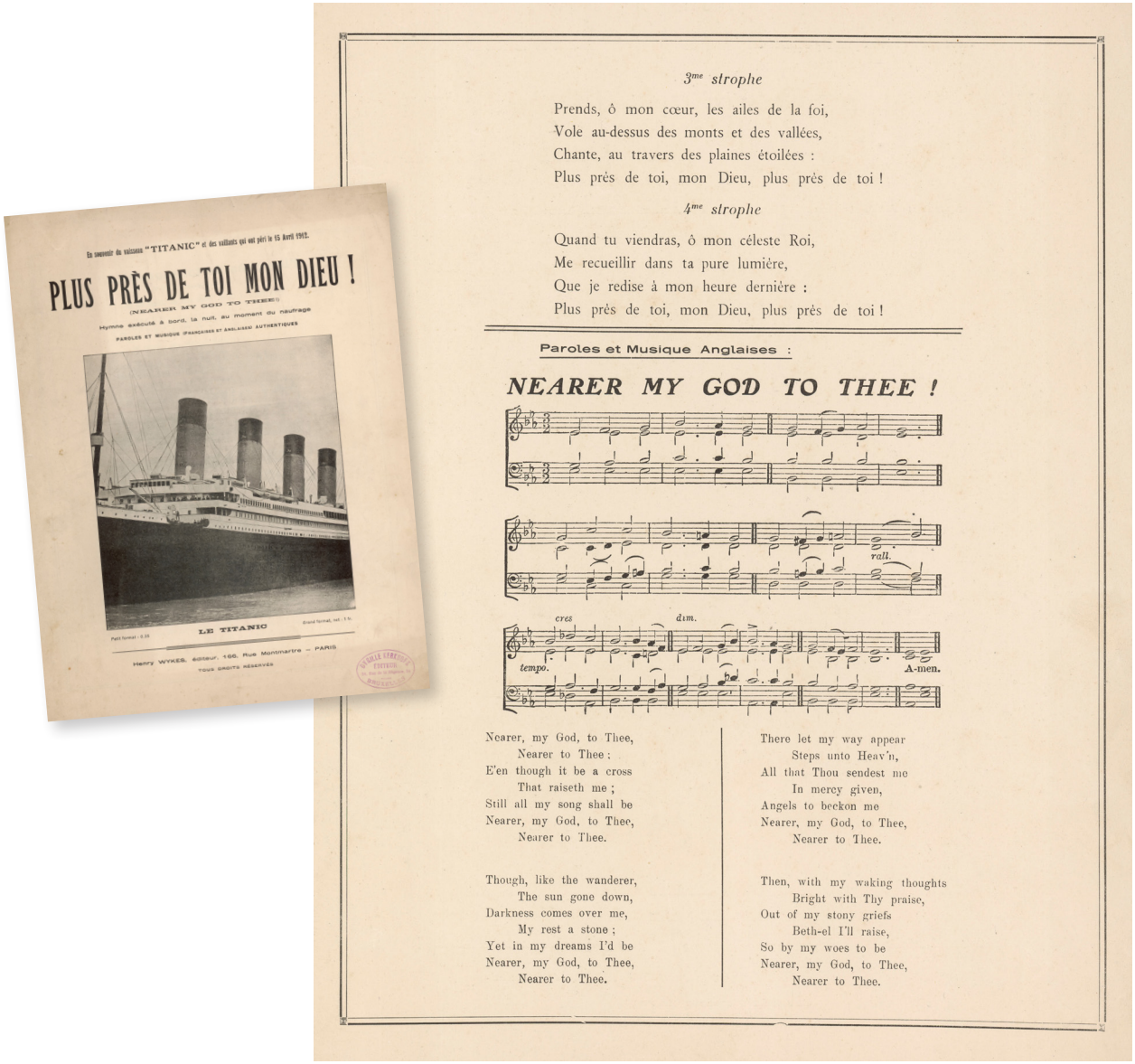


9. Introduce the online music-making platform chosen for the project. Provide a basic tutorial on how to use the music-making tool, including creating tracks, adding instruments, and arranging music. Tutorial links are found in the resources section.
    a. Garageband, a digital audio workstation usually preloaded on Apple devices
    b. BandLab, a free online music creation workstation: https://edu.bandlab.com/
    c. Chrome Music Lab, a free song melody maker with a maximum of 16 bars: https://musiclab.chromeexperiments.com/Song-Maker
    d. Free online keyboard-based music maker: https://onlinesequencer.net/
10. Give students class work time or use it as a homework assignment. Offer guidance and assistance as needed during the creative process.
    a. After students have created an initial draft, students may be paired up to exchange their songs and provide constructive feedback. Have feedback focused on creativity, emotional impact, and the three-part structure. They can then make revisions and edits.

11. Once finished, have students write an explanation for the song by using the **Your *Titanic* Commemorative Music** sheet. Per teacher's discretion, students may turn this into a rationale, persuasive, or informational essay.
12. Optional: Students present their tribute song and their written explanation to the class.
13. Summarize the lesson and discuss the significance of commemorating historical events through monuments and music, focusing on *Titanic* and the memorials discussed.

Titanic memorials are found all over the world because Titanic is an international tragedy. People from many countries (like the United Kingdom, United States, Haiti, France, Ireland, Syria, Australia, China, Mexico, South Africa, and others) traveled on Titanic, and commemorative tributes through memorials and songs allow those lives and stories to continue and be remembered.

14. Journal: What are the advantages and disadvantages of the different types of memorials (monuments, statues, songs, poems, etc.)? Which type of memorial do you think has the biggest impact? Why?



Worldwide Impact Additional Activities and Resources

Optional Extension Activities:

- Extend this lesson so students present their songs to the community as part of a class commemoration project.
- Add lyrics to fit the composition score (grade on poetry, phrasing, structure, connotation, etc.).
- Research *Titanic*'s band and the hymn "Nearer, My God, to Thee."
- Extend the Your *Titanic* Commemorative Music sheet into an essay.
- Compile or create a *Titanic* commemoration song as a class project.
- Create a 3-D replica of a memorial.
- Design and create a class *Titanic* memorial project to commemorate the event.
- Select a memorial dedicated to a person or group of people, research the people, and write a biographical report.
- Listen to excerpts of music written and dedicated to the *Titanic* tragedy.
- Research how music is used for other commemorative events around the world.
- Create a world map and draw symbols to represent where different *Titanic* societies are located.

Link to Resource Materials:

- Historical overview of music and *Titanic*: https://www.wqxr.org/story/199235-echoes-Titanic/
- Original U.S. Inquiry Trials Senate report (pdf): https://www.senate.gov/artandhistory/history/resources/pdf/TitanicReport.pdf
- Transcript of the U.S. Inquiry Trials report (pdf): https://www.Titanicinquiry.org/downloads/USInq.pdf
- Article about the changes in maritime and engineering regulations due to the tragedy: https://enginuityinc.ca/project/theTitanic/
- Free online music-learning platform: https://learningmusic.ableton.com/
- Tutorials for online music-making platforms
  - Garageband: https://thegaragebandguide.com/ or https://www.youtube.com/watch?v=-TzH30YCM84
  - BandLab: https://help.bandlab.com/hc/en-us/articles/115002945153-Getting-started-with-BandLab-s-Studio or https://www.youtube.com/watch?v=NmUaloydldg
- Brewster, Hugh and Laurie Coulter. *882 ½ Amazing Answers to your Questions about the* Titanic. Ontario: Madison Press, 1998. ISBN: 978-0-439-04296-3.
- *RMS* Titanic: *The True Story*. a360media. 2023. ISBN: 25274- 74254.

Florida State Education Standards:

SS.7.G.2.1: Locate major cultural landmarks that are emblematic of the United States.

ELA.8.R.2.1: Analyze how individual text sections and/or features convey a purpose and/or meaning in texts.

ELA.7.C.5.1, ELA.8.C.5.1: Integrate diverse digital media to build cohesion in oral or written tasks.

SC.68.CS-CC.1.3: Design, develop, and publish a collaborative digital product using a variety of digital tools and media-rich resources that demonstrate and communicate concepts to inform, persuade, and/or entertain.

SC.68.CS-CP.3.2: Create online content (e.g., webpage, blog, digital portfolio, multimedia), using advanced design tools.

VA.68.S.1.3: Use ideas from cultural, historical, and artistic references to create personal responses in personal artwork.

VA.68.S.3.1: Use two-dimensional or three-dimensional art materials and tools to understand the potential and limitations of each.

VA.68.H.3.3: Create imaginative works to include background knowledge or information from other subjects.

MU.68.S.1.2: Compose a short musical piece.

MU.68.S.1.3: Arrange a short musical piece by manipulating melody, form, rhythm, and/or voicing.

MU.68.S.1.8: Demonstrate specified mixing and editing techniques using selected software and hardware.

MU.68.O.2.1: Create a composition, manipulating musical elements and exploring the effects of those manipulations.

MU.68.O.3.1: Describe how the combination of instrumentation and expressive elements in a musical work can convey a specific thought, idea, mood, and/or image.

MU.68.H.2.1: Describe the influence of historical events and periods on music composition and performance.

Social Studies: SS.8.A.1.1, SS.8.A.1.3, SS.8.A.1.4, SS.8.A.1.5, SS.8.A.1.6, SS.8.A.1.7

ELA: ELA.K12.EE.1.1, ELA.K12.EE.2.1, ELA.K12.EE.3.1, ELA.K12.EE.4.1, ELA.K12.EE.5.1, ELA.K12.EE.6.1, ELA.7.R.2.1, ELA.7.R.2.2,ELA.8.R.2.2, ELA.7.R.3.2, ELA.8.R.3.2, ELA.7.R.3.3, ELA.7.C.1.2, ELA.8.C.1.2, ELA.7.C.3.1, ELA.8.C.3.1, ELA.7.C.4.1, ELA.8.C.4.1, ELA.7.C.5.2, ELA.8.C.5.2

Computer Science: SC.68.CS-PC.3.1, SC.68.CS-CC.1.1, SC.68.CS-CP.3.1, SC.68.CS-CP.3.3

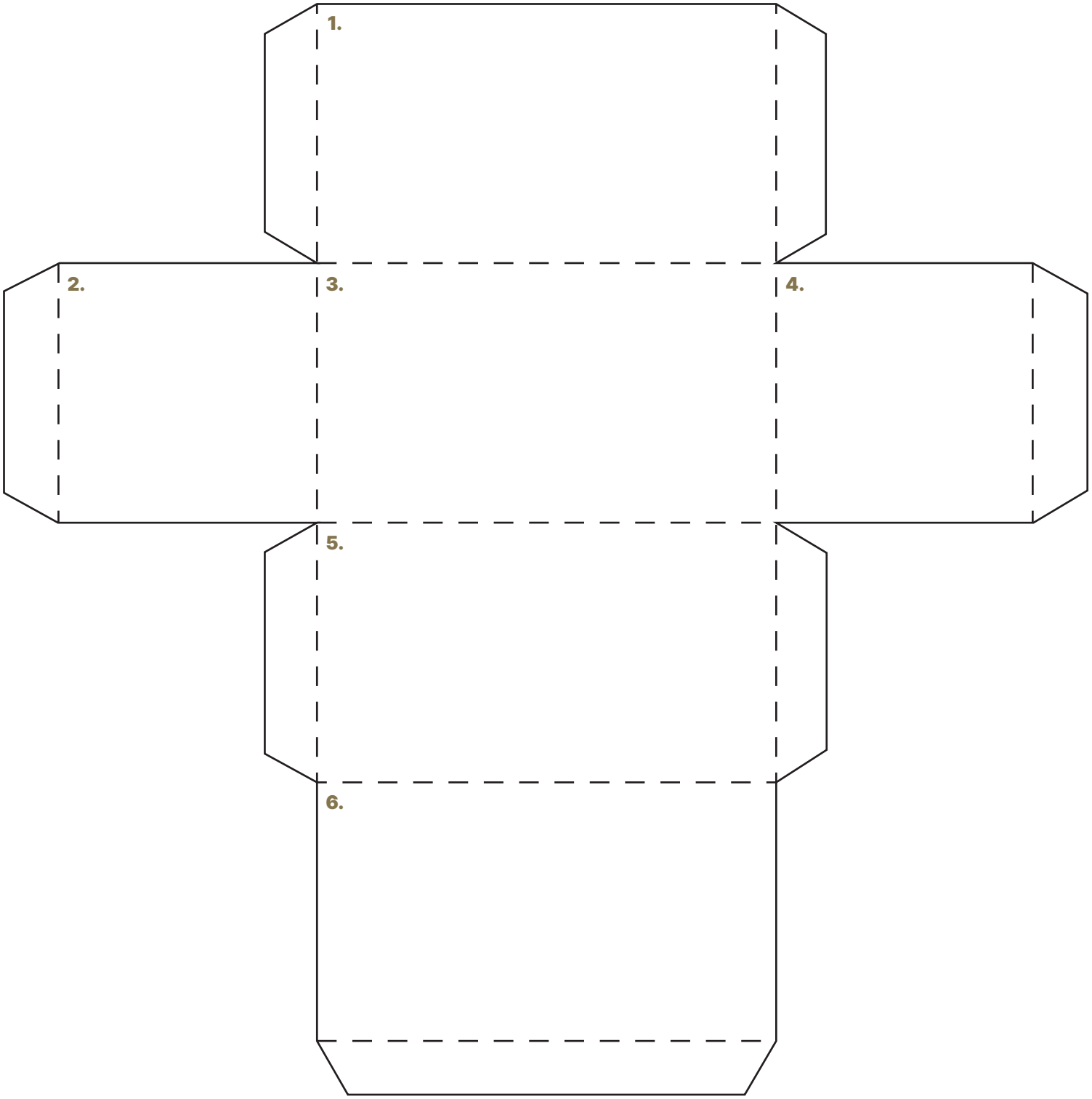
Visual Arts: VA.68.S.1.2, VA.68.S.2.2, VA.68.S.2.3, VA.68.S.3.3, VA.68.O.1.4, VA.68.H.2.2, VA.68.H.3.2, VA.68.F.1.4, VA.68.F.3.4

Music: MU.68.C.1.3, MU.68.C.2.1, MU.68.C.2.3, MU.68.S.1.7, MU.68.H.1.1, MU.68.H.2.2, MU.68.H.3.1, MU.68.F.1.1, MU.68.F.1.2, MU.68.F.3.1, MU.68.F.3.3

Memorial Note-Prism

Directions: After choosing a *Titanic* memorial, match the gold numbers below to each box of the prism. Then, research and fill out each box accordingly. You may cut on the solid lines, fold on the dotted lines, and glue the tabs to create a memorial prism.

1. Title of *Titanic* Memorial, and your name
2. Location (Draw country and star city)
3. Drawing of Memorial
4. When it was created and by whom
5. Description of Memorial
6. The significance of Memorial



Your *Titanic* Commemorative Music

Name: _____ Class: _____ Date: _____

Directions: Write one song about the *Titanic* story of April 14–15, 1912, using themes of remembrance, loss, and hope. The song needs to be between 2 to 4 minutes in length. Each composition needs three distinct parts with different moods: before the collision, during the sinking, and survivors being rescued. There should be transitions between the sections. Lyrics are optional.

Explain how you wrote your composition and conveyed the *Titanic* story. Describe:

- The emotions and messages you wanted to convey
- The type of sound or instruments you used and why you chose them
- How these musical elements help tell the story and commemorate the *Titanic* tragedy
- Your overall thoughts on your composition

Use complete sentences in all your explanations.

Emotions and Messages

Sound and Instruments

Commemorating *Titanic*

Your Overall Thoughts

Composition Rubric

Criteria	5 Points	4 Points	3 Points	2 Points	1 Point
3-Part Structure **___/5**	Exceptional use of 3-part structure, where each is distinct and transitions beautifully to the next section.	Uses 3-part structure, where each is mostly distinct and transitions well to the next section.	Uses 3-part structure, but sections are not distinct or not transitioned well.	Uses 2-part structure for composition.	Has 1 or less sections for the composition.
Mood Appropriate **___/5**	Expertly uses instruments, sounds, and rhythms that perfectly convey the emotion and mood of all sections.	Uses instruments, sounds, and rhythms that convey the emotion and mood of all sections very well.	Uses instruments, sounds, or rhythms that convey the emotion and mood of two sections.	Uses instruments, sounds, or rhythms that convey the emotion and mood of only one section.	No intentional use of instruments, sounds, or rhythms to convey an emotion or story.
Length **___/5**	Composition is 2 to 4 minutes in length.	Composition is 4 to 5 minutes or 1 ½ to 2 minutes in length.	Composition is about 1 minute in length or over 5 minutes.	Composition is about 30 seconds in length.	Minimal or no composition.
Creativity/ Aesthetics **___5**	Includes very original, unusual, or imaginative musical ideas. Great use of composition platform. Keeps the listener interested.	Demonstrates good musical creativity with some original ideas. Good use of composition platform. Keeps the listener interested.	Demonstrates some musical creativity. Some good use of composition platform. Somewhat keeps the listener interested.	Musical ideas are neither familiar nor cliché. However, there is no variety or exploration of musical elements. Somewhat keeps the listener interested.	Lacks creativity. Musical ideas are familiar or cliché. No variety or exploration of musical elements. Does not keep listener interested.

Total: _____ /20

9. **Illuminating the Wreck:** Science of Deep-Sea Vehicles and Light

***Titanic* Theme:** Wrecksite/Exploration/Recovery

Skills: Reading; Researching; Labeling; Classification; Experimenting; Citing Sources; Summarizing Experiment Results

Subjects: Science; Physical Science; Art; Technology; English; Social Studies; Math; Reading Informational Texts; Reading Scientific Texts

Objectives:

- Students will learn about the types of recovery vehicles used at the *Titanic* wrecksite and in deep-sea exploration by experimenting with the principles of water and light.

Essential Questions:

- What are the types of recovery vehicles, and why are they important to *Titanic* artifact recovery?
- What is the importance of light when it comes to the *Titanic* wrecksite?
- How does ocean depth affect light, its sources, and capabilities?

Time: 45 minutes (2 sessions)

Assessment:

- "How Deep?": Discovering the Ocean Layers Sheet
- Experiment Participation
- Student Journal Response

"Suddenly the lights flashed on, all 4,000 watts of them, and it seemed as though the *Titanic* had appeared with blazing clarity in her own swimming pool. Instead of the murky, mysterious remains I had expected, the dull shades of black, gray and brown, details and colors of the Ship were brilliantly clear, red, orange, gold, green, and many different shades of blue."

— Jennifer Carter,
1987 *Titanic* Expedition Leader,
First Woman to Dive to *Titanic*

Materials:

- ❑ Object to be hidden in dark classroom
- ❑ Images of *Titanic* wrecksite
- ❑ "How Deep?": Discovering the Ocean Layers sheet
- ❑ Exploring the Deep Sea: ROVs, AUVs, and HOVs information guide
- ❑ Red and green or blue laser pointers
- ❑ Medium to large clear tub or tank of water
- ❑ Whole milk
- ❑ General supplies (pencil, paper, etc.)

Procedures:

Session 1

1. Make the room as dark as possible. From their seats, ask students to find an object placed (somewhat hidden) in the room. Students might struggle and, after a few minutes, ask, "What were the challenges in finding the object? What could have made it easier?" (light, which allows us to see).

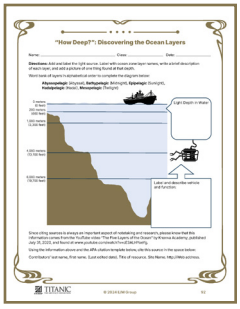
Titanic *rests at a depth of approximately 12,500 feet (about 3,800 meters or approximately 2.5 miles down) in the North Atlantic Ocean, where there is no natural light.*

2. Show images of the *Titanic* wreckside, emphasizing her depth and the challenging conditions. Overview that the day's lesson will be about deep-sea exploration, light, and underwater technology.
3. Explain that the location of where *Titanic* sank was a mystery until September 1, 1985.

A French explorer, Jean-Louis Michel of IFREMER, and U.S. explorer, Dr. Robert Ballard from Woods Hole Oceanographic Institution (WHOI), discovered the Ship in the North Atlantic Ocean. Dr. Ballard and the Woods Hole Oceanographic Institution returned in 1986 for the first official expedition. Since her discovery, there have been nine dives down to the ocean floor by RMS Titanic Inc. (RMST) to recover artifacts, map the Titanic *wrecksite, and research what happened to the Ship. RMST is the official steward of the* Titanic *wrecksite.*

   a. Optional: Show a timeline of expeditions by RMST, with each expedition having a different purpose and, therefore, different equipment: DiscoverTitanic.com/expeditions/

4. Hand out **"How Deep?": Discovering the Ocean Layers** sheet and watch a video on the five ocean zones/layers. Add and label the light source (the sun) to the picture. Pausing the video when needed, have students label the zones, add brief summaries of each, cite the source at the bottom, and include drawings, per teacher discretion: https://www.youtube.com/watch?v=cE3ALHYoeYg



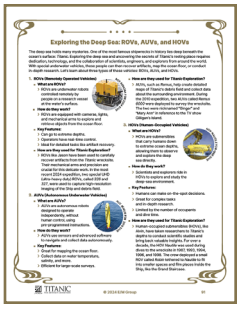
   a. Top to deepest: Epipelagic (Sunlight), Mesopelagic (Twilight), Bathypelagic (Midnight), Abyssopelagic (Abyssal), and Hadalpelagic (Hadal)
5. Have students independently dive through the layers to inspect the biodiversity within each layer. Note *Titanic* is highlighted in the midnight zone: https://neal.fun/deep-sea/
6. Explain how knowing *Titanic*'s location and ocean conditions deepen our understanding of those expeditions, the technology needed, and the state of the current wrecksite. Draw and label *Titanic* in the bathypelagic zone on the sheet.

Titanic *lies about 2.5 miles (12,500 feet) beneath the ocean surface, which is about nine Empire State Buildings stacked. The pressure is 6,000 pounds per square inch.* Titanic *is in the bathypelagic,*
also called midnight or bathyal, zone. Sunlight cannot reach it, so it is perpetually dark.

7. Discuss the significance of exploring the wrecksite, including the recovery of artifacts that provide insights into the Ship's history. To assess students' understanding of *Titanic* artifact recovery, ask them, "How can artifacts help us learn about *Titanic*? What could be some of the challenges to raising artifacts to study?"

Primary sources (like artifacts) can tell stories about the person they belonged to, the Ship design and technology used, and the historical time period. We can use them to compare life then and now, uncover mysteries, and answer research questions. Some challenges include artifact fragility, unpredictable ocean waters, ocean depth and pressure, darkness, etc.

8. Introduce the types of underwater vehicles/submersibles used to explore *Titanic* at such depths: remotely operated vehicles (ROVs), autonomous underwater vehicles (AUVs), and human-occupied vehicles (HOVs). All three have been used to research, recover artifacts, and photograph the *Titanic* wrecksite. Hand out and read the **Exploring the Deep Sea: ROVs, AUVs, and HOVs** information guide. Have students create and complete a Venn diagram comparison between the types of underwater vehicles. Discuss their conclusions.


Exploring the Deep Sea: ROVs, AUVs, and HOVs

Similarities: *All vehicles are used for deep-sea exploration and research, use advanced technology to navigate and collect data in extreme ocean depths, and are essential for collaborations and studies.*

Differences: *ROVs are operated remotely in real-time, used for detailed tasks (artifact recovery), and are highly maneuverable to fit small spaces; AUVs are pre-programmed to operate autonomously with no human interaction and used for large projects, like surveys and mapping; and HOVs carry people who directly control operations and are used for on-the-spot research.*

9. Explain how engineers build these vehicles with specialized structures, equipment, and lighting systems to navigate, withstand the intense pressure, and illuminate the dark ocean depths. This allows scientists to see and research extraordinarily dark and deep locations, like the *Titanic* wrecksite. Remind students that *Titanic* is 2.5 miles down in the midnight zone, and therefore, no natural light reaches it.
10. Review lesson as a Session 1 with understanding ocean conditions and types of underwater submersibles used and explain that the next lesson will explore the specifics with equipment and lighting systems used, accounting for how light interacts with deep ocean water. Ask students, "Why is it important to understand *Titanic*'s ocean environment when discussing the technology used to explore the wrecksite?"

By knowing what the ocean is like at that depth, we can understand why scientists and engineers build underwater vehicles the way they do. When we discuss the equipment onboard the ROVs and HOVs, we can understand better why they chose to include or consider different aspects. By knowing *Titanic* is in the midnight zone, we can predict that scientists and engineers must consider that there is no natural light.

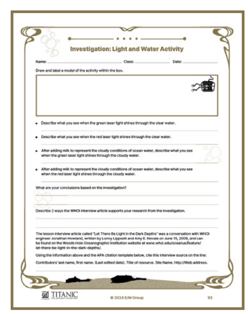
11. Journal: If you could operate any of these types of research vehicles during an expedition, which one would you choose to pilot? Why? How would you use it?

Session 2

1. Review Session 1 by asking, “How do scientists and researchers study the *Titanic* wrecksite when it is on the ocean floor?” (They use underwater vehicles/submersibles, like ROVs, AUVs, and HOVs.) Ask, “How far down is *Titanic*? What ocean zone is it in?” (2.5 miles down in the midnight or bathyal zone.) Use the following prompt as a guiding question as you lead into the activity, “What principles of light do scientists and engineers need to consider when building ROVs, AUVs, and HOVs to work at such extreme ocean depths?”
2. Ask what students already know about light, reflection, and refraction. Introduce the scientific principles of light as one of the wave types within the electromagnetic spectrum, a “rainbow-like” collection of waves that travel around us.

Light reflection is when light waves bounce back from a surface. Refraction is when light waves change direction and bend as they pass through mediums. Density affects the behavior of light by slowing light down and bending it in denser mediums, like water and glass, or absorbing or reflecting light.

3. Optional: Review and connect to Middle School Lesson 6 about waves, wavelength, wave amplitude, and how light is a type of wave.
   a. From low to high frequency, there are radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma rays. Light waves travel at the speed of light and are comprised of three properties:
      i. Wavelength (the distance between one wave peak and the next)
      ii. Wave amplitude (the height of the wave from lowest to highest peak)
      iii. Frequency (the number of waves [in hertz (Hz)], or cycles per second, propagating away from its source. The longer the wavelength, the lower the frequencies. The shorter the wavelength, the higher the frequency. They are inversely proportional to each other.)
4. Explain that students will be investigating and observing how light waves interact in water, giving them an idea of what engineers consider when building underwater submersibles. Distribute the **Investigation: Light and Water Activity** sheet. Establish student expectations and whether the activity is done as a class or in groups. Set up a clear tub or tank of water and shine two different colored laser pointers at an angle into the tank—one warm color and one cool, preferably red and green/blue. Shine a light at an angle and have students write their observations at the bottom of the Ocean Layers sheet. Have students then share their observations with the class or in groups by asking, “What did you notice when the two lights shined through the water in the tank?”


Investigation: Light and Water Activity

Both will travel well, but green/blue will appear brighter. The laser light bends or refracts and does not travel at the same angle as when it entered the water. It may refract again up to the ceiling when traveling out of the tank.

5. Continue the activity to explore how the ocean conditions in the midnight, or bathyal, zone affect the light sources used on submersibles, like ROVs, AUVs, and HOVs, exploring *Titanic* on the ocean floor.
   a. Pour in milk and stir to make the water evenly cloudy. This represents the disturbed sediment on the ocean floor and “marine snow,” or the dissolving organic particles descending from upper

zones in turbid ocean water. Shine the green/blue light to the side of the tank. Have students write and then share their observations (the green/blue light scattered and lit up almost all the cloudy water in the tank). Repeat with red laser light and have students write then share their observations (the red light only lit up a portion of the cloudy water. Red light is absorbed more than green/blue light).

6. Have students summarize their conclusions from the investigation on the **Investigation: Light and Water Activity** sheet.

Light does not act the same way in water as in air. Light will slow down and bend or refract in water because it is denser. Also, colors will appear differently because water will absorb warm colors, like red, and scatter the cooler colors, like blue. This is due to the longer wavelength light of warm colors compared to the short wavelengths of cooler tones. Thus, green/blue lights would be used more for underwater vehicles. While white LED lights are also used, especially for taking photographs, they take more power, so ROVs and HOVs need to use them more sparingly. Blue-green lights reach farther than warmer-toned lights, require less power, and are used to take black-and-white photos.

7. With crayons, use the diagram below to add the light penetration colors in the bubble on the **"How Deep?": Discovering the Ocean Layers** sheet from session 1, where light funnels out and absorbs the warm colors of the spectrum, and only blues are scattered in the deeper parts of the open ocean.
   a. Diagram the depth of light penetration in the open ocean per meter, mainly within the epipelagic zone (top layer): https://oceanexplorer.noaa.gov/explorations/04deepscope/background/deeplight/media/diagram3.html
8. Light also decreases in intensity the deeper it goes into the ocean, which is why ROVs and HOVs need high-powered LED lights to see what is on the ocean floor.
   a. Read the interview about WHOI's development of ROVs and lighting equipment: https://www.whoi.edu/oceanus/feature/let-there-be-light-in-the-dark-depths/
   b. Optional: Use the same link above to watch an interview with WHOI engineer Jonathan Howland explaining ROV technology (the first video listed)
9. Summarize the lesson by answering the initial guiding question, "How do scientists and researchers use the scientific principles of light to build underwater vehicles and explore *Titanic*? How does this work impact society?"

Deep-sea explorers use ROVs, AUVs, and HOVs to research Titanic. *Engineers use principles of light to build submersibles so scientists can see at extreme depths, like 2.5 miles down in the bathypelagic, or midnight, zone. Recovery teams need to locate and retrieve artifacts using underwater vehicle lighting systems. Artificial light illuminates where there is no natural light, but the ocean water depths can affect the light from underwater vehicles and absorb warm colors, like red or orange. Ultimately, this technological development ensures the conservation and preservation of historical artifacts for future generations and research where there are extreme conditions. Every photo and video you see from the wrecksite was possible due to this technology, allowing everyone to see* Titanic *as it is today.*

10. Journal: What is one scientific principle scientists must consider when wanting to do a deep-sea exploration of the *Titanic* wreckssite? How do the technology and expeditions today impact the next generation of ocean explorers?

Wrecksite/Recovery Additional Activities and Resources

Optional Extension Activities:

- Shine light into a prism to demonstrate how light can be refracted and dispersed in air. Then, compare to within water.
- Explore careers related to deep-sea research and exploration, like oceanographers.
- Explore how iceberg colors appear differently in water because water absorbs warm colors (red) and scatter the cooler colors (blue).
- Nautilus Live Ocean Exploration Trust STEM Learning Module with several light and color activities: https://nautiluslive.org/resource/hercules-illuminating-dark
- NOAA Ocean Exploration middle school lesson plan on bioluminescence, ocean organisms, light, and color: https://oceanexplorer.noaa.gov/edu/materials/science-of-light-investigation.pdf
- Build an ROV by following these Smithsonian instructions: https://naturalhistory.si.edu/sites/default/files/media/file/how-build-rov-ver-1.pdf

Link to Resource Materials:

- National Oceanic and Atmospheric Administration (NOAA) explanation of changes to light in deep water: https://oceanexplorer.noaa.gov/explorations/04deepscope/background/deeplight/deeplight.html
- Light and color in the deep-sea handout from NOAA Ocean Exploration: https://oceanexplorer.noaa.gov/edu/materials/light-and-color-fact-sheet.pdf
- Ships and technology used during the 1986 *Titanic* expeditions: https://www.whoi.edu/know-your-ocean/ocean-topics/ocean-human-lives/underwater-archaeology/rms-titanic/ships-technology-used-during-the-titanic-expeditions/
- Types of ocean zones/layers: https://www.noaa.gov/jetstream/ocean/layers-of-ocean
- 1986 *Titanic* wreck film footage: https://news.artnet.com/art-world/titanic-shipwreck-never-before-seen-footage-whoi-2257121
- American Museum of Natural History article about light penetration and ocean layers: https://www.amnh.org/learn-teach/curriculum-collections/deep-sea-vents/light-and-dark-in-the-sea
- Burgan, Michael. *Finding the* Titanic*:* How Images from the Ocean Depths Fueled Interest in the Doomed Ship. Mankato: Compass Point, 2018. ISBN: 978-0-7565-5644-0.
- Carter, Jennifer and Joel Hirschhorn. Titanic *Adventure: One Woman's True Life Voyage Down to the Legendary Ocean Liner*. Far Hills: New Horizon Press, 1999. ISBN: 0-88282-170-9.
- Majoor, Mireille. Titanic*: Ghosts of the Abyss*. New York: Hyperion, 2003. ISBN: 0-7868-1899-9.
- *RMS* Titanic*: The True Story*. a360media. 2023. ISBN: 25274- 74254.

Florida State Education Standards:

SS.8.A.1.3: Analyze current events relevant to American History topics through a variety of electronic and print media resources.

ELA.7.C.4.1, ELA.8.C.4.1: Conduct research to answer a question, drawing on multiple reliable and valid sources, and generating additional questions for further research.

SC.68.CS-PC.2.6: Identify and discuss the technology skills needed in the workplace.

SC.68.CS-CS.1.2: Create or modify and use a simulation to analyze and illustrate a concept in depth (i.e., use a simulation to illustrate a genetic variation), individually and collaboratively.

SC.68.CS-CS.1.4: Interact with content-specific models and simulations to support learning, research and problem solving (e.g., immigration, international trade, invasive species).

SC.68.CS-CS.6.2: Describe how humans and machines interact to accomplish tasks that cannot be accomplished by either alone.

SC.7.P.10.1: Illustrate that the sun's energy arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors.

SC.7.P.10.3: Recognize that light waves, sound waves, and other waves move at different speeds in different materials.

SC.8.E.5.10: Assess how technology is essential to science for such purposes as access to outer space and other remote locations, sample collection, measurement, data collection and storage, computation, and communication of information.

SC.8.E.5.11: Identify and compare characteristics of the electromagnetic spectrum such as wavelength, frequency, use, and hazards and recognize its application to an understanding of planetary images and satellite photographs.

Social Studies: SS.8.A.1.1, SS.8.A.1.4, SS.8.A.1.5, SS.8.A.1.6, SS.8.A.1.7

ELA: ELA.K12.EE.1.1, ELA.K12.EE.2.1, ELA.K12.EE.3.1, ELA.K12.EE.4.1, ELA.K12.EE.5.1, ELA.K12.EE.6.1, ELA.7.R.2.1, ELA.8.R.2.1, ELA.7.R.2.2, ELA.8.R.2.2, ELA.7.R.2.4, ELA.8.R.2.4, ELA.7.R.3.2, ELA.8.R.3.2, ELA.7.C.3.1, ELA.8.C.3.1

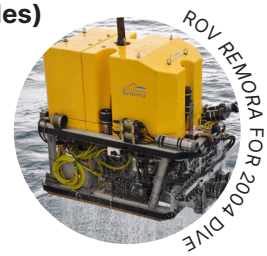
Computer Science: SC.68.CS-PC.2.3, SC.68.CS-PC.2.7, SC.68.CS-PC.2.8, SC.68.CS-CS.1.3, SC.68.CS-CS.2.2

Science: SC.7.N.1.1, SC.8.N.1.1, SC.7.N.1.5, SC.8.N.1.5, SC.7.N.1.6, SC.8.N.1.6, SC.7.N.1.7, SC.7.N.2.1, SC.8.N.2.2, SC.8.N.3.1, SC.7.N.3.2, SC.8.N.4.1, SC.7.P.10.2, SC.7.P.11.2, SC.8.P.9.2, SC.7.L.17.3

Exploring the Deep Sea: ROVs, AUVs, and HOVs

The deep sea holds many mysteries. One of the most famous shipwrecks in history lies deep beneath the ocean's surface: *Titanic*. Exploring the deep sea and uncovering the secrets of *Titanic*'s resting place requires dedication, technology, and the collaboration of scientists, engineers, and explorers from around the world. With special underwater vehicles, these people can then recover artifacts, map the ocean floor, or conduct in-depth research. Let's learn about three types of these vehicles: ROVs, AUVs, and HOVs.

1. ROVs (Remotely Operated Vehicles)



- **What are ROVs?**
  - ROVs are underwater robots controlled remotely by people on a research vessel at the water's surface.
- **How do they work?**
  - ROVs are equipped with cameras, lights, and mechanical arms to explore and retrieve objects from the ocean floor.
- **Key Features:**
  - Can go to extreme depths.
  - Operators have real-time control.
  - Ideal for detailed tasks like artifact recovery.
- **How are they used for *Titanic* Exploration?**
  - ROVs like *Jason* have been used to carefully recover artifacts from the *Titanic* wrecksite. Their mechanical arms and precision are crucial for this delicate work. In the most recent 2024 expedition, two special UHD (ultra-heavy duty) ROVs, called *326* and *327*, were used to capture high-resolution imaging of the Ship and debris field.

2. AUVs (Autonomous Underwater Vehicles)

- **What are AUVs?**
  - AUVs are autonomous robots designed to operate independently, without human control, using pre-programmed instructions.
- **How do they work?**
  - AUVs use sensors and advanced software to navigate and collect data autonomously.
- **Key Features:**
  - Great for mapping the ocean floor.
  - Collect data on water temperature, salinity, and more.
  - Efficient for large-scale surveys.
- **How are they used for *Titanic* Exploration?**
  - AUVs, such as *Remus*, help create detailed maps of *Titanic*'s debris field and collect data about the surrounding environment. During the 2010 expedition, two AUVs called *Remus 6000* were deployed to survey the wreckside. The two were nicknamed "Ginger" and "Mary Ann" in reference to the TV show Gilligan's Island.

3. HOVs (Human-Occupied Vehicles)

- **What are HOVs?**
  - HOVs are submersibles that carry humans down to extreme ocean depths, allowing them to observe and explore the deep sea directly.
- **How do they work?**
  - Scientists and explorers ride in HOVs to explore and study the deep-sea environment.
- **Key Features:**
  - Humans can make on-the-spot decisions.
  - Great for complex tasks and in-depth research.
  - Limited by the number of occupants and dive time.
- **How are they used for *Titanic* Exploration?**
  - Human-occupied submersibles (HOVs), like Alvin, have taken researchers to *Titanic*'s depths to conduct scientific studies and bring back valuable insights. For over a decade, the HOV *Nautile* was used during dives to the wreckside in 1987, 1993, 1994, 1996, and 1998. The crew deployed a small ROV called *Robin* tethered to *Nautile* to fit into smaller spaces and film places inside the Ship, like the Grand Staircase.

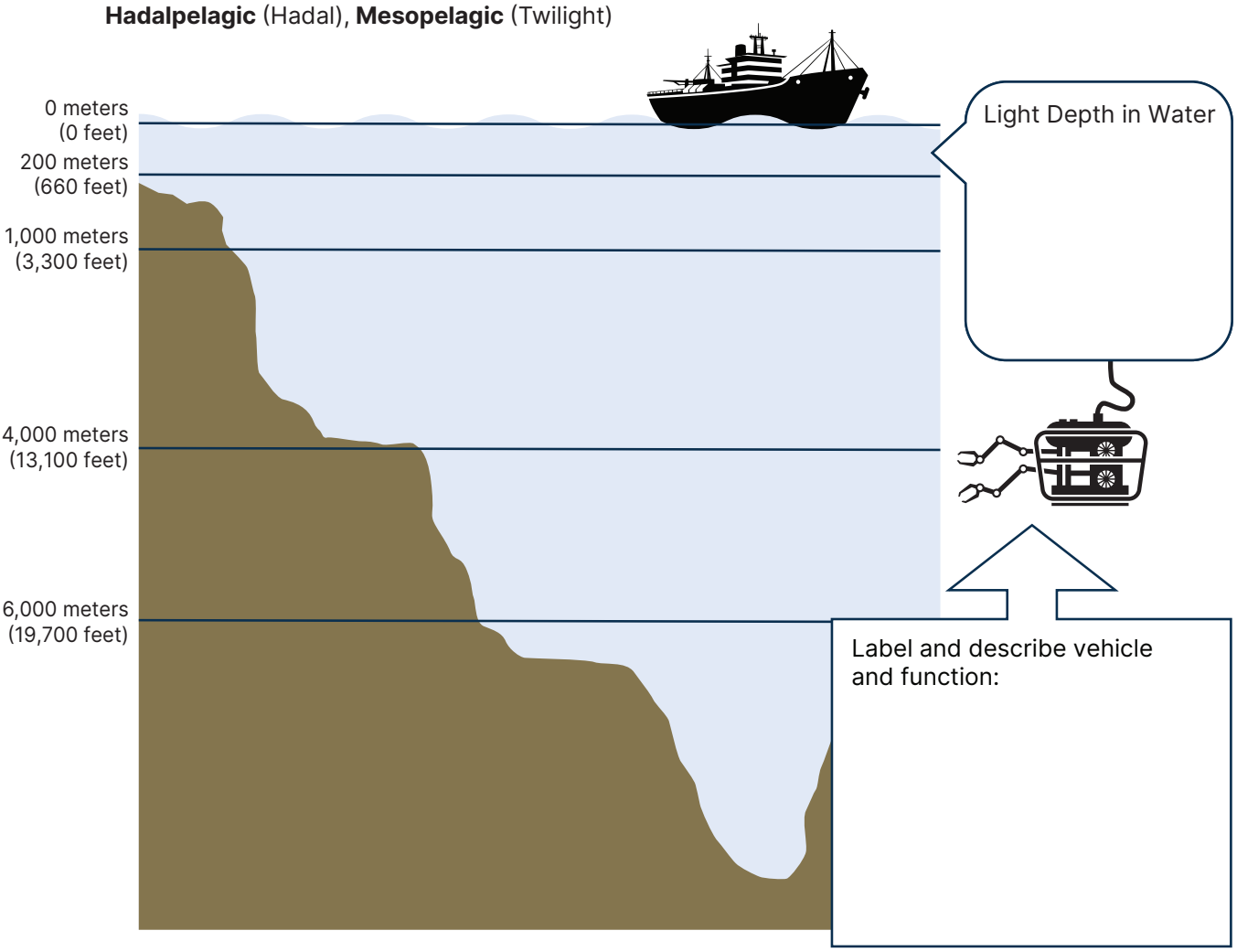
“How Deep?”: Discovering the Ocean Layers

Name: _____ Class: _____ Date: _____

Directions: Add and label the light source. Label with ocean zone layer names, write a brief description of each layer, and add a picture of one thing found at that depth.

Word bank of layers in alphabetical order to complete the diagram below:

Abyssopelagic (Abyssal), **Bathypelagic** (Midnight), **Epipelagic** (Sunlight), **Hadalpelagic** (Hadal), **Mesopelagic** (Twilight)



Since citing sources is always an important aspect of notetaking and research, please know that this information comes from the YouTube video “The Five Layers of the Ocean” by Knovva Academy, published July 31, 2020, and found at www.youtube.com/watch?v=cE3ALHYoeYg.

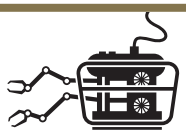
Using the information above and the APA citation template below, cite this source in the space below:

Contributors’ last name, first name. (Last edited date). Title of resource. Site Name. http://Web address.

Investigation: Light and Water Activity

Name: _____ Class: _____ Date: _____

Draw and label a model of the activity within the box.



- Describe what you see when the green laser light shines through the clear water.

_____

- Describe what you see when the red laser light shines through the clear water.

_____

- After adding milk to represent the cloudy conditions of ocean water, describe what you see when the green laser light shines through the cloudy water.

_____

- After adding milk to represent the cloudy conditions of ocean water, describe what you see when the red laser light shines through the cloudy water.

_____

What are your conclusions based on the investigation?

_____

_____

Describe 2 ways the WHOI interview article supports your research from the investigation.

_____

_____

The lesson interview article called “Let There Be Light in the Dark Depths” was a conversation with WHOI engineer Jonathan Howland, written by Lonny Lippsett and Amy E. Nevala on June 15, 2009, and can be found on the Woods Hole Oceanographic Institution website at www.whoi.edu/oceanus/feature/let-there-be-light-in-the-dark-depths/.

Using the information above and the APA citation template below, cite this interview source on the line:

Contributors’ last name, first name. (Last edited date). Title of resource. Site Name. http://Web address.

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10. From Ocean to Showcase: Artifact Conservation and Exhibitions

***Titanic* Theme:** Artifact Conservation/ Stewardship/Exhibitions

Skills: Observation; Notetaking; Application; Labeling; Classification; Conservation of Historical Items; Writing; Drawing; Pretending; Planning; Hypothesizing; Excavating

Subjects: Science; Historical Conservation; English; Social Studies; Reading Investigation; Reading Scientific Texts; Communications; Language; Visual Arts

Objectives:

- Students will learn about the classification of *Titanic* artifacts by RMS Titanic, Inc., by creating their own artifact labels.
- Students will understand the importance of preserving *Titanic* artifacts for educational purposes through a hands-on archeological excavation and conservation activity.

Essential Questions:

- What is the role of conservation with regard to history?
- How do conservation efforts by RMS Titanic, Inc. help us to learn about *Titanic*?
- What is the conservation process? How does that relate to artifacts recovered from the *Titanic* wreckside?

Time: 60 minutes

Assessment:

- Artifact Conservation Sheet
- Artifact Label
- Activity Participation
- Student Journal Response

> "It is the Company's purpose to preserve the memory of the *Titanic*, and of all who sailed on the Ship, and to promote that memory with respect and regard for the Ship's historical and maritime significance."
>
> —RMS Titanic, Inc
> Steward of the *Titanic* Wrecksite

RMS TITANIC, INC.

Materials:

- ❑ Medium-sized tubs
- ❑ Wet potting soil, sand, or dirt (with water added to either moisten or submerge to the soil level)
- ❑ Activity "artifacts" (broken or intact)
  - › Dishes (plates, cups, spoons, etc.)
  - › Toothbrush or hairbrush
  - › Papers, documents, fake money
  - › Small bags or coin purses
  - › Jewelry, glasses, coins, etc.
  - › Mechanical metal parts (gears, washers, rivets, etc.)
- ❑ Tongs or gloves
- ❑ Cleaning cloth
- ❑ Artifact Conservation sheet
- ❑ Blank index cards
- ❑ *Titanic* artifact images or replicas
- ❑ General supplies (pencil, paper, etc.)

To prepare in advance:

- Group or individual tubs filled with wet soil or sand—optionally, add water to the soil surface—with buried broken or intact items for students to recover. Do days before for deeper embedding.

Procedures:

1. Use the link DiscoverTitanic.com/artifacts/ to show images of *Titanic* artifacts. Ask students, "What do these items tell you? What information can you gather just by looking at these objects?"

   > People were traveling with essentials like brushes, clothing, accessories, etc. They are from a long time ago. Some have been broken or damaged. They are not in their original condition. Items are faded, ripped, and discolored, so chemical and physical changes have occurred and have been discolored by the environment.

2. Explain that these items serve as examples of the many different types of the more than 5,500 artifacts that have been recovered from the RMS *Titanic* wreckside since her discovery on September 1, 1985, and preserving the real artifacts is crucial for understanding history and learning about the past.

The company RMS Titanic, Inc. (RMST) is the exclusive steward of the Titanic *wrecksite, protecting and overseeing it. They recover, conserve, and display artifacts internationally, having conducted nine research and artifact recovery expeditions to the ocean floor between 1987 and 2024. (The Expedition in 2024 was mapping only; no artifact retrieval.) This is a type of underwater archeology. RMS Titanic, Inc. is dedicated to the recovery, conservation, and exhibition of* Titanic *artifacts.*

3. Define artifact, archeology, and conservation for students as according to the Merriam-Webster Dictionary. Explain how conservation is an ongoing process that begins the moment artifacts are recovered. Discuss the importance of artifact conservation, as artifacts provide valuable insights into history and the lives of people from the past.
   a. Artifact is "something characteristic of or resulting from a particular human institution, period, trend, or individual."
   b. Archeology is "the scientific study of material remains (such as tools, pottery, jewelry, stone walls, and monuments) of past human life and activities."
   c. Conservation is the "careful preservation and protection of something."
4. Use the following as a guiding question through the next activity, "How are artifacts put on display for millions to see after enduring a shipwreck and sitting on the ocean floor for around 100 years?" Instruct them to imagine themselves as *Titanic* conservators as they engage in a hands-on conservation activity to understand the process of preserving *Titanic* artifacts.

5. Distribute the **Artifact Conservation Documentation** sheet for students to recreate and record the conservation activity. Create group or individual stations for students. Establish expectations for tools and stations. Set up plastic tablecloths and place tubs of activity pre-embedded "artifacts." Students will use tongs or gloves to recover buried items in wet soil and use a cleaning cloth for tools or hands.

6. Use the **Artifact Conservation Documentation** sheet and explain the process of conserving historical artifacts, guiding students through the activity step-by-step:
   a. *Assessment and documentation:* Students first slowly search and find the item(s). They will need to label and name each recovered item on the sheet using the last two digits of the current year and a two-digit number representing the order in which items were recovered. For example, in the year 2024, the fifth item recovered would be labeled "24/05." Students then examine the artifact and fill out the sheet to describe its condition.

Every Titanic *item recovered from the ocean floor by RMS Titanic, Inc. is given a number according to the dive year. The first two digits indicate the year of the dive, and then the items are numbered in the order in which they were recovered. For instance, 87/0035 was recovered in 1987, and it was the 35th object recovered that year. Sometimes, conservators add .01, .02, or A, and B at the end to denote how many pieces were inside a single recovered object, such as items inside of a bag, or if several pieces comprise one item, like a reassembled broken vase.*

   b. *Cleaning and stabilizing:* Use brushes and gentle technique to clean the artifact. Students should write down the steps they took to clean, stabilize, and identify the object. Ask, "What are at least two things you noticed the more you cleaned and tried to uncover the item?" Include these two facts after your steps/procedures.
   c. *Preservation and storage:* Record observations and any changes made to the artifact. Students will draw what the item looks like before and after cleaning. Then, students will discuss and record ways to ensure their artifact(s) remains in good condition over time.

Safe artifact storage and monitoring practices include: using a sealable, airtight plastic container and/or acid-free box; reducing exposure to light; using a dehumidifier or climate-controlled, cool, dry area; labeling and organizing by category; wrapping and/or cushioning with foam or paper; and using acid-free types of glue to not discolor over time.

Conserved artifacts are carefully monitored and maintained by trained professionals in a controlled environment with stable temperature, humidity, and light levels to keep the artifacts safe for the future.

7. Have students share their experiences with the conservation activity. Ask students, "How does this activity connect to the professional conservation work done for *Titanic* artifacts?"

> Conserving artifacts involves many steps. I wasn't expecting the amount of documentation. I thought the cleaning would be easy, but some items broke or fell apart easily. I was/wasn't expecting such a change before and after cleaning. We only had to clean items, but real conservators must submerge, chemically treat, or coat artifacts. The item changed while being conserved.

Regarding actual Titanic *artifacts, professionals consider artifact materials (textiles vs. paper vs. metal) to guide conservation efforts, as well as if recovered artifacts are brittle or unstable. New methods must be invented when a material does not have an established conservation technique. Conservators consider the size and space of artifacts and the sizes of equipment and tools that will be needed. Professionals adhere to meticulous, systematic labeling and organizing large quantities. When working with recovered pieces, they work slowly and extremely carefully to preserve as much as possible since the artifacts are irreplaceable.*

8. Link activity to RMS Titanic Inc.'s actual process for artifact conservation.
   a. Artifacts are cleaned of mud and dirt and placed in foam-lined tubs of water. Artifacts stay submerged in water while salts are leached out from the materials in a process called desalination.
   b. Electrolysis is also used to remove salts from some metal artifacts. Once the artifacts are no longer leaching salt, they are dried out. Chemical and mechanical treatments are used to remove agents of deterioration, such as fungus and rust.
   c. Protective wax coatings can be applied to metals. Some sensitive materials, such as leather, can be treated with chemicals to keep them from becoming brittle or deteriorating.
   d. Conservation is an ongoing process where items are monitored and regularly retreated.
9. Explain how RMS Titanic, Inc. has played a significant role in the conservation, preservation, and presentation of these artifacts worldwide.

The goal of the company is not only to ensure the artifacts are stabilized but also to make them available to the public. RMS Titanic, Inc.'s TITANIC: The Artifact Exhibition is unique because it is the only Exhibition that features real Titanic *artifacts recovered from the ocean floor. (Other exhibitions feature artifacts recovered from the ocean surface where* Titanic *sank, carried off and passed down by survivors, found on the bodies of victims, or from* Titanic*'s sister ships—RMS* Olympic *and HMHS* Britannic*.) There are two permanent RMST Exhibition locations as well as traveling Exhibitions. RMS Titanic, Inc. follows an agreement where artifacts must be on public display, and the only recovered item that can be sold is coal, as it is a natural resource material. (Profits from coal sales go to the conservation of the other recovered* Titanic *artifacts.)*

10. Optional: Check the website for the most current permanent and traveling Exhibition locations: DiscoverTitanic.com/exhibitions/
11. Reiterate the significance of artifact conservation, emphasizing how items are recovered from a harsh, high-pressure ocean environment 2.5 miles below on the seabed (see Lesson 9 about the technology of recovery vehicles). Introducing artifacts to a new environment above the water's surface allows researchers and everyday people the chance to discover new information about *Titanic*'s passengers, the 1912 technology and design, fashion and textiles, customs and cultural practices, societal norms, and so much more, especially when other forms of evidence are minimal or do not exist. Ask, "How could the advancement of technology impact conservation and preservation efforts? Why is conservation important to documenting history?"

> With modern advancements in technology, we can conserve more or new items from the past and ensure their preservation for future generations to research, learn from, connect with, and make new discoveries.

12. If time allows, have students write an artifact label for their conserved sample artifact from the activity. Distribute blank index cards or complete the activity on student devices. Students will include a bolded title for the artifact, a description of the item and how it could connect to *Titanic*, and the artifact recovery number in the bottom right corner. Have a gallery walk so students can view recovered class activity items and labels. Optionally, students can vote on best label and evaluate why.

13. Journal: Many find careers in this type of underwater archeology, as well as conservation, collections, and curation of artifacts for museums and exhibitions. Why would someone work in artifact recovery and conservation? Would you consider becoming a conservator, perhaps specifically of *Titanic* artifacts? Why or why not?

Artifact Conservation Additional Activities and Resources

Optional Extension Activities:

- Create a mock gallery for the "recovered artifacts," with ways to safely display the item and a plaque with information about it.
- Explore the desalination process throughout the day using this lesson to conduct and record observations: https://www.education.com/science-fair/article/fresh-water-salt-water/
- Map out and plot recent *Titanic* exhibition locations over the last five years.
- Research careers in archeology, conservation, collections, and curation at local, state, or regional institutions and organizations.
- Research the history of RMS Titanic, Inc. and its role in the conservatorship of the *Titanic* wrecksite. Create a timeline to note important dates and events.
- Create a *Titanic* artifact brochure that includes a drawing and description of at least four items (from class activity or ones recovered from the ocean floor) and a detailed explanation of the conservation process: DiscoverTitanic.com/artifacts/

Link to Resource Materials:

- TikTok KJFish, Artifacts in Orlando Exhibition: https://www.tiktok.com/@kjfish/video/7088898665447787819?lang=en
- TikTok Raf_Avila, Big Piece: https://www.tiktok.com/@raf_avila/video/7023574575829011718?lang=en
- Recovery and Conservation Process by RMS Titanic, Inc.: DiscoverTitanic.com/expeditions/
- Conservation of *Titanic* artifacts and "The Big Piece" by Evergreene Architectural Arts: https://evergreene.com/projects/rms-titanic-objects/ and https://evergreene.com/raising-the-titanic/
- Academic article about "The Big Piece" recovery and conservation: https://evergreene.com/wp-content/uploads/2012/10/RMS-Titanic-Big-Piece-A-Case-Study-and-Critical-Evaluation_J.Sembrat_2012.pdf
- Artifact conservation information, process, and examples outside of *Titanic*: https://www.brhoward.com/artifact-restoration-and-conservation
- Historical institution's detailed PDF guide to the preservation of artifacts: https://www.thc.texas.gov/public/upload/preserve/museums/files/Quick-Guide-to-Preservation-of-Artifacts.pdf
- Burgan, Michael. *Finding the* Titanic*: How Images from the Ocean Depths Fueled Interest in the Doomed Ship*. Mankato: Compass Point, 2018. ISBN: 978-0-7565-5644-0.
- Majoor, Mireille. Titanic*: Ghosts of the Abyss*. New York: Hyperion, 2003. ISBN: 0-7868-1899-9.
- *RMS* Titanic*: The True Story*. a360media. 2023. ISBN: 25274- 74254.

Florida State Education Standards:

SS.8.A.1.7: View historic events through the eyes of those who were there as shown in their art, writings, music, and artifacts.

ELA.7.V.1.1, ELA.8.V.1.1: Integrate academic vocabulary appropriate to grade level in speaking and writing.

SC.68.CS-PC.2.8: Identify interdisciplinary careers that are enhanced by computer science.

SC.68.CS-CS.6.2: Describe how humans and machines interact to accomplish tasks that cannot be accomplished by either alone.

SC.8.N.1.6: Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.

SC.8.P.9.1: Explore the Law of Conservation of Mass by demonstrating and concluding that mass is conserved when substances undergo physical and chemical changes.

SC.8.P.9.2: Differentiate between physical changes and chemical changes.

VA.68.S.2.3: Use visual-thinking and problem-solving skills in a sketchbook or journal to identify, practice, develop ideas, and resolve challenges in the creative process.

VA.68.S.3.3: Demonstrate understanding of safety protocols for media, tools, processes, and techniques.

VA.68.F.2.2: Identify careers in support industries related to the art-making process, industrial design, digital media, and/or graphic design.

Social Studies: SS.8.A.1.1, SS.8.A.1.3, SS.8.A.1.4, SS.8.A.1.5, SS.8.A.1.6

ELA: ELA.K12.EE.1.1, ELA.K12.EE.2.1, ELA.K12.EE.3.1, ELA.K12.EE.4.1, ELA.K12.EE.5.1, ELA.K12.EE.6.1, ELA.7.R.3.2, ELA.8.R.3.2, ELA.7.C.3.1, ELA.8.C.3.1, ELA.7.C.4.1, ELA.8.C.4.1

Computer Science: SC.68.CS-CS.1.2, SC.68.CS-CS.1.3, SC.68.CS-CP.3.1, SC.68.CS-PC.2.3, SC.68.CS-PC.2.6, SC.68.CS-PC.2.7, SC.68.CS-PC.3.1, SC.68.CS-CS.1.4, SC.68.CS-CS.2.2

Science: SC.7.N.1.1, SC.8.N.1.1, SC.7.N.1.4, SC.8.N.1.4, SC.7.N.1.6, SC.7.N.2.1, SC.8.N.3.1, SC.7.N.3.2, SC.8.N.4.2

Visual Arts: VA.68.C.1.1, VA.68.C.2.1, VA.68.S.1.2, VA.68.S.1.3, VA.68.S.2.2, VA.68.S.3.1, VA.68.S.3.5, VA.68.O.1.1, VA.68.O.1.2, VA.68.O.1.3, VA.68.O.1.4, VA.68.H.1.2, VA.68.H.2.2, VA.68.H.2.3, VA.68.H.3.2, VA.68.H.3.3, VA.68.F.1.1, VA.68.F.1.4, VA.68.F.3.3, VA.68.F.3.4

Artifact Conservation Documentation

Name: _____ Class: _____ Date: _____

1. Assessment and documentation

Write below the last two digits of the current year, backslash, and the item's number in order of its recovery. For example, the fourth item in the year 1993 would be "93/04."

Artifact Number: _____

Examine the artifact and describe its condition: What does it look like? How many pieces?

_____

_____

Hypothesis: Explain your plans for conservation and how they will affect the item.

_____

_____

2. Cleaning and stabilizing

What tools and techniques will you use to clean and stabilize the artifact(s)?

_____

_____

What are your independent, dependent, and control variables?

Independent: _____

Dependent: _____

Control: _____

Draw what the item looks like at first, making sure to include as accurate details and coloring as possible. After cleaning, repeat by drawing what the item looks like afterward.

Before	After

What steps did you take to clean and stabilize the item(s)? (Continue numbering as needed)

1. _____

2. _____

Two observation notes as item(s) are cleaned and stabilized:

3. Preservation and storage:

What was the result of your hypothesis? How did the conservation process impact the item?

What are ways to keep the real artifact(s) in good condition over time?

What would you use to ensure your item from the activity is preserved in good condition?

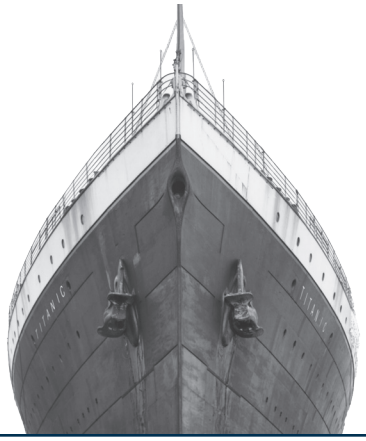
How could the item you recovered, if it was real, connect to *Titanic*?

Titanic Project Ideas

Additional suggestions for research projects, creative writing activities, and journal prompts:

The People

- Imagine the thoughts of Captain Smith as the Ship is going down.
- You made it into a lifeboat. Debate the reasons for and against rowing back to save more people.
- As the captain of *Californian,* explain your actions and decisions that night.
- What were the fates of the passengers who survived the sinking?
- Read a choose your own adventure-type book and let the class vote on the decisions. Have students try their hand at writing their own version as a passenger on *Titanic*.
  - Temple, Bob. *The Titanic: An Interactive History Adventure*. Revised edition. Mankato, Minn., Capstone Press, 2016. ISBN: 978-1-4296-3052.
  - Wallace, Jim., et al. *Terror On the Titanic.* [Rev.]. Waitsfield, Vt., Chooseco, 2011. ISBN: 978-1-933390-24-6.
- Imagine the experiences of the crew aboard the rescue ship *Carpathia* and the recovery ship *Mackay-Bennett.*



The Aftermath

- Describe a research and recovery expedition to the wrecksite as the operator of a submersible.
- Create a travel brochure to advertise an adventure on board a recovery and exploration expedition today.
- Compare the travel times for a trans-Atlantic voyage of the Age of Exploration to today.
- Explore the science behind which artifacts have survived and why.
- What safety procedures and changes have been implemented as a direct result of this disaster?
- What ocean marine life is found around the Ship's remains?
- Compare and contrast the inquiries in the U.S. (Senate hearings) and Britain (Board of Trade investigation).

The Ship

- What were the fates of *Titanic*'s sister ships, *Olympic* and *Britannic*, as well as that of the last surviving White Star Line ship, *Nomadic*?
- Create a 1912 travel brochure to advertise *Titanic*.
- Investigate unusual cargo, such as "dragon's blood" and a new Renault car.
- Investigate animals onboard as pets, livestock, and food.
- Compare and contrast *Titanic* to a modern cruise ship.
- Measure out the dimensions of a lifeboat (30 × 9 × 4 ft.) on the floor and mark with tape to have students see how many of them would fit (collapsible dimensions, 27.5 × 8 × 3 ft.).

National Curriculum Standards

All of the lessons provided are created with the following national curriculum standards for both social studies and English as led by the National Council for the Social Studies (NCSS) and National Council for Teachers of English (NCTE).

National Council for the Social Studies (NCSS)

https://www.socialstudies.org/national-curriculum-standards-social-studies-chapter-2-themes-social-studies

Middle School Lesson Plan Structure: Utilizes 9 of the 10 NCSS Standards Themes.

1. **Culture:** Social studies programs should include experiences that provide for the study of culture and cultural diversity.
2. **Time, Continuity, and Change:** Social studies programs should include experiences that provide for the study of the past and its legacy.
3. **People, Places, and Environments:** Social studies programs should include experiences that provide for the study of people, places, and environments.
4. **Individual Development and Identity:** Social studies programs should include experiences that provide for the study of individual development and identity.
5. **Individuals, Groups, and Institutions:** Social studies programs should include experiences that provide for the study of interactions among individuals, groups, and institutions.
6. **Power, Authority, and Governance:** Social studies programs should include experiences that provide for the study of how people create, interact with, and change structures of power, authority, and governance.
7. **Production, Distribution, and Consumption:** Social studies programs should include experiences that provide for the study of how people organize for the production, distribution, and consumption of goods and services.
8. **Science, Technology, and Society:** Social studies programs should include experiences that provide for the study of relationships among science, technology, and society.
9. **Global Connections:** Social studies programs should include experiences that provide for the study of global connections and interdependence.

National Council for Teachers of English (NCTE)

https://cdn.ncte.org/nctefiles/resources/books/sample/standardsdoc.pdf

Middle School Lesson Plan Structure: Utilizes 11 out of 12 NCTE Standards.

1. Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.
2. Students read a wide range of literature from many periods in many genres to build an understanding of the many dimensions (e.g., philosophical, ethical, aesthetic) of human experience.
3. Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics).
4. Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.
5. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.
6. Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and nonprint texts
7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.
8. Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.
9. Students develop an understanding of and respect for diversity in language use, patterns, and dialects across cultures, ethnic groups, geographic regions, and social roles.
11. Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.
12. Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).

Notes