DOMINICAN UNIVERSITY of CALIFORNIA

Maritime History: Sailing in San Francisco ** 8th grade lesson plan

Context of Site:

This site is geared to inform students about wooden ships in a pre steamboat era. The site mainly overviews Matthew Turner, his accomplishments and how they have shaped sailing in San Francisco since the time of the Gold Rush. Students will have the opportunity to relate much of the information they have learned from this site, and apply it to many key concepts, conversations, and other similar lesson plans that they will learn on The Matthew Turner.

A. Key Concepts & Standards
   a. Big Ideas & Essential Questions: Understanding of how Matthew Turner's reinvestment into shipyards during the Gold Rush, led to the creation of 280 ships. One of which, named “The Galilee” led to being the blueprint for The Matthew Turner by Call of the Seas. Students will understand key technological features of these vessels and why they played important roles in both ship technology and safety. Additionally students will learn about key actors of many of the technological innovations of these vessels, and why their contributions were important.
   b. Learning Outcome(s):
      - Students will learn why sailing has been an integral part of San Francisco's history.

   c. Standard(s): How does content relay into the standards// Lesson Plan Bullet Points
      - 8th grade standards of 8.12 & 8.12.9
      - 8.12 “Students will analyze the transformation of the American economy and the changing social and political conditions in the United States in Response to the industrial revolution”
      - The Port of San Francisco was an export hub for Gold and Silver during the time of the Gold Rush.
      - As the Transcontinental Railroad was being formed, people began to use less oceanic transportation, which really affected the use of the port of San Francisco as an economic hub.
      - Competition was heavy, the port was finding it difficult to adapt to rapid shifts in trade economy, partly because the city developed around the port.
      - As a part of the 8.12.9: “Name the significant inventors and their inventions and identify how they improved quality of life.” There are three main inventors; Edmund Halley, Matthew Turner and Robert Fulton.
      - **Mathew Turner:** one of many who immigrated to the Bay Area during the time of the Gold Rush, was one of few who thought of ways to reinvest his gold into something he found had more potential than the gold trade; the shipping business. Turner became an inspiration to many shipbuilders during, and past his time for the ways in which he utilized his knowledge behind shipbuilding and design, and his knowledge of contemporary vessels in the pacific to make sailboats that he found more efficient and effective for the modern age.
      - During Turner’s time as a pioneer in ship design, he spent a lot of his time converting old model ships into newer models. Ones that were described to be “long and sharp forward, lean and full on the waterline aft.” Out of the 228 ships

that Turner built during his time, one of his most famously known vessels was the “Galilee”, considered one of Turner's fastest and historical landmarking ships. As one of the packet liners between San Francisco, Tahiti and Papeete, it took the Galilee only 21 days to complete a typical 35 day voyage (in comparison to other sailboats during it’s time) from Tahiti to San Francisco. Additionally outside of the Galilee's record speed, one of the vessel's most prominent achievements was the advancements it helped make in correcting data on magnetic variations within different regions of the ocean as a carrier for the Carnegie Oceanic Survey Party. Contributions of 64,000 miles worth of voyages that are still used in shipbuilding and design till this day.

- The Galilee was able to serve as a blueprint for what I know today as the modern day Matthew Turner sailing ship. Although it is no longer in service, parts of the Galilee still live through the Matthew Turner, and similar innovations that mirror the Galilee for future ships will follow.
- **Edmund Halley:** Edmund Halley an English astronomer, geophysicist, mathematician, meteorologist, and physicist was the first to chart the variations within the earth’s magnetic field in the early 18th century. His discoveries changed aspects in the scientific community forever. It was in the 13th century that Europeans began to use the compass, one of the first electromagnetic technological revolutions that mariners used as a tool to navigate themselves to a destination, when they could not do it in uncharted oceans. As many voyages happened, people began to take note that compasses were not pointing to the correct geographical north, but a “magnetic north” This was commonly referred to as a “variation”. This was a result of the compasses interaction with the earth’s magnetic pull. As decades rolled on, Halley became a crucial member in disseminating the mystery of geomagnetism and his works devoted to modeling and mapping the behavior of the Earth’s magnetic field, would lead to changing sailboat design forever.
- Halley believed that the behavior of the “variations” would uncover answers to other questions surrounding nautical navigation, on the determination of longitude. Although latitude was fairly easier for mariners to determine, it was hard to determine accurate longitude especially when on the ocean. Inaccurate longitude led to a lot of loss of life and ships. His conclusions agreed with what many others previously perplexed on the same issue had, that the east-west variation could closely uncover the changes in longitude. Halley's greatest contribution to sailboat technology would be his invention of the isogonic map. An isogonic map is a map that reflects lines of constant variations over the Earth’s surface. Each line is defined and marked with different degrees, and directions of variations of the compass upon itself. Halley's hope was that these reflections of constant variations amongst the Earth’s magnetic surface could be translated to determine the Earth’s longitude. What was important about vessels like the Galilee, is that it underwent consistent modifications that were made in accordance with each new scientific discovery on geomagnetism, which changed the world of ship building forever.
- **Robert Fulton's** ability to turn steamboats into commercially viable forms of transportation, gave him the title “father of steam navigation”.Fulton had established several patents for machines that would serve and perform a variety of functions. In order to create a steamboat that was efficient, Fulton had applied himself on his own vocation to learn about the function and efficiency of waterway systems. While other inventions may not have been as successful, Fulton was able to collaborate with Robert Livingston; together they constructed a steamboat vessel that would be used on the Hudson River. Collectively Fulton achieved many milestones such as: The *Clermont* which served as the first inaugural steamboat service in the world. Fulton and Livingston created the *New Orleans* which resulted in a steamboat fright service that traveled through NOLA,

Louisiana, Mississippi and Natchez. These boats travel at records speeds about 5-8 miles an hour downstream, and 3-5 miles per hour upstream.

- Disadvantages was that the steam engines would build too much pressure and cause boiler explosions. This resulted in the loss of anybody on board. Additionally some of the steamboats in the 19th century were made of wood, and some voyages the wood would soak up too much water and eventually sink. In terms of climate, the burning of coal would also be considerably bad, however that is more a 21st century concern, than it was an 18 or 19th century concern.

    A. Pre-activity: students will be asked preemptive questions to engage with before learning the lesson.
    B. Materials and Resources: Handout questions, however activity is meant for students to engage with their instructors and one another.
    C. Assessment: activity is meant to give instructors an idea of what students may already know about the topic.

B. Ship Activity (30 minutes):
C. Materials & Resources: Handout, Pen or Pencil.
D. Implementation: Students will be given a crossword handout sheet, with a list of vocabulary terms that will outline parts of the vessel “The Matthew Turner”. Students will then write a reflection from what they learned on how these parts of the vessel are integral to its function.

E. Post Activity: Connecting w/ lesson: Reflection what have students learned on the ship
    a. Materials & Resources- Crossword puzzle
    b. Implementation- Students participate in a crossword puzzle that will gauge how much they have learned from their time on the ship.
    c. Assessments: There is an answer key which is pretty straight forward. Labeled in drive as “Matthew Turner Crossword Puzzle”.