Honors Modern World History Summer Assignment

Part 1: Read *Longitude* by Dava Sobel. It is a 175-page story about navigational challenges during the Age of Discovery.

Part 2: Answers the questions that follow along with the reading. These are meant to highlight the important ideas and details in the book. There are 100 questions.

Part 3: Create a mind map of the Mechanics including their relationships with each other as well as their individual accomplishments (why they are included in the book). Do the same for the Astronomers.

Part 4: Research a scientist or inventor whose achievements were ignored during their lifetime like the subject of the book, John Harrison. Explain how the two figures were similar and different. Draw your own conclusions concerning how society treats new ideas.

Foreword by Neil Armstrong (pp. ix-xiv)

1. What did Neil Armstrong find in the National Maritime Museum in Greenwich that he called "perhaps the most significant clocks in history" (be specific: clocks & builder)?
2. Why did King Charles II order Sir Christopher Wren to build the observatory at the Flamsteed House?
3. What was the problem with Pope Alexander VI's solution to the dispute between Spain & Portugal?

Chapter 1 – Imaginary Lines (pp. 1-10)

4. What fallacy did people of Ptolemy's time believe about south of the Equator?
5. Where did Ptolemy place the prime meridian?
6. Where did later mapmakers move the prime meridian to?
7. What does one need to know to calculate longitude at sea?
8. How did the captains of the Age of Exploration (da Gama, Balboa, Magellan & Drake) determine longitude?
9. Who was the English clockmaker who accomplished the feat of determining 'true time from the home port?'

Chapter 2 – The Sea Before Time (pp. 11-20)

10. Use Wikipedia to research Admiral Sir Cloudesley Shovell. What does Damer Powell (citation) say about the local legend of the Admiral's demise?
11. What was the threat to traveling the few narrow known shipping lanes during the Age of Exploration (example: Portuguese galleon, *Madre de Deus*)?
12. Because it took so long for the *Centurion* to round the western edge of Tierra del Fuego what killed the majority of the sailors?

Chapter 3 – Adrift in a Clockwork Universe (pp. 21-33)

13. What constellations did naval navigators use at night to determine time and directions?
14. What was German astronomer Johannes Werner's proposal to find location on earth using time?
15. What was the problem with Werner's process?
16. How did Galileo Galilei propose to find location on earth using time?
17. Even though Galileo's method did not help find longitude, how was it used 'on land?'
18. From what observatory was John Flamsteed charged with mapping the heavens for navigation purposes?

Chapter 4 – Time in a Bottle (pp. 34-40)

19. What challenges did the clocks of the early 16th century have?
20. What did Galileo propose to use to 'keep time?'
21. In 1660, who created marine timekeepers based on Galileo's principles?
22. What was the challenge with these timekeepers?

Chapter 5 – Powder of Sympathy (pp. 41-50)

23. How did Sir Kenelm Digby propose to determine that it was noon at the port of departure aboard a sailing ship?

24. Prior of John Davis's backstaff in 1595, why did so many sailors end up blind?
25. What was the problem with using magnetic north & the Pole Star to determine longitude?
26. What was the problem with Samuel Fyler's approach that drew longitude meridians on the night sky?
27. What was the problem with William Whiston & Humphrey Ditton's idea of anchoring ships at 600-mile intervals across the oceans?

Chapter 6 – The Prize (pp. 51-60)

28. What were the awards promised in the Longitude Act of 1714?
29. How did Jeremy Thacker's chronometer manage to shield it from changes in atmospheric pressure & humidity?
30. How did Jeremy Thacker's chronometer maintain power?
31. How many seconds did Jeremy Thacker's lose each day?

Chapter 7 – Cogmaker's Journal (pp. 61-73)

32. When did John Harrison complete his first pendulum clock?
33. Why was this clock unique?
34. What was unique about the type of wood Harrison used to make the tower clock at Brocklesby Park?
35. What did Harrison use instead of iron or steel to avoid rusting in the tower clock at Brocklesby Park?
36. What materials did Harrison combine in the pendulum to counteract the lengthening and shrinking in hot and cold temperatures?

Chapter 8 – The Grasshopper Goes to Sea (pp. 74-87)

37. Who did Dr. Edmond Halley send John Harrison to see?
38. How long did it take to piece together the H-1?
39. How did Harrison handle his first voyage aboard the *Centurion*?
40. What location did Roger Wills believe he saw on the return trip to England?
41. What location did Harrison calculate it actually was?
42. How far off was Roger Wills?
43. Who was the biggest critic of the "defects" of the H-1?
44. How did Harrison feel about the H-2 when he presented it?
45. How long did it take to complete the H-3?

Chapter 9 – Hands on Heaven's Clock (pp. 88-99)

46. About how long did it take sailors to calculate time using the heavens?
47. Who were the two individuals given equal credit for creating the octant, also known as the reflecting quadrant?
48. Who succeeded Dr. Edmond Halley as the new Astronomer Royal in 1742?
49. Who turned German mapmaker Tobias Mayer's lunar tables over to the new Astronomer Royal (refer to #s22, 23, & 24 above)?
50. Who did the new Astronomer Royal have test the lunar distance method of Mayer?
51. How does the author describe the difference between the lunar distance method and Harrison's idea?
52. When did Harrison complete the H-4?

Chapter 10 – The Diamond Timekeeper (pp. 100-110)

53. How many separate parts did the H-3 contain?
54. What is the bi-metallic strip Harrison created made of?
55. What was the antifriction device that Harrison developed?
56. Who made Harrison a pocket watch for his personal use?
57. Why is it a miracle that Harrison's pocket watch still exists?
58. Once wound up, how long does the H-4 run?
59. Because of the lubricating oil used in the H-4, what needs to be done regularly (once every 3 years)?

Chapter 11 – Trial by Fire and Water (pp. 111-125)

60. To what method for determining longitude did Dr. Nevil Maskelyne subscribe?
61. What was Maskelyne primary mission?
62. Who launched his first voyage to view the transit of Venus from Polynesia?

63. How far had the H-1 traveled from England?
64. How far had the H-2 traveled from England?
65. What event stopped the H-3 from ever going to sea?
66. What had Maskelyne published upon his return from St. Helena?
67. Who was named the fourth Astronomer Royal?
68. Who was the person handpicked by the new Astronomer Royal in Barbados who would judge the performance of the Watch (H-4)?

Chapter 12 – A Tale of Two Portraits (pp. 126-137)

69. Why does the author conclude that the story of Harrison becoming fascinated with watch-works and his formal portrait by Thomas King are inconsistent?
70. What, surprisingly, is absent from the formal portrait of Harrison?
71. What change did Peter Joseph Tassaert make when he created the engraving of John Harrison?
72. What was the ruling of the Board of Longitude for the second trial of the Watch in 1764?
73. Who became the fifth Astronomer Royal in January of 1765?
74. How long did it take mariners to compute longitude according to *The British Mariner's Guide*?
75. Once Harrison had satisfactorily disassembled the watch and it had been 'sequestered,' what was he instructed to do?
76. What had everyone agreed provided the surest way for mariners to fix their positions at sea?
77. What does the author about Harrison state of mind when he sat for John Tassie's enamel paste medallion portrait?

Chapter 13 – The Second Voyage of Captain James Cook (pp. 138-151)

78. With what German food did Captain James Cook solve the scurvy problem at sea?
79. What two fruits had replaced Cook's food for the Royal Navy?
80. Who was the watchmaker hired by the Board of Longitude to reproduce an exact copy of the H-4?
81. How long did the exact copy of the H-4 take to recreate?
82. In addition to the K-1, whose three cheaper imitations did Captain Cook bring along?
83. Who occupied the empty seat on the Board of Longitude to examine the K-1?
84. What unique advantage did John Harrison's H-5 knob that extends out of the glass cover have?
85. To whom did John Harrison tell his ordeal?
86. When Captain Cook returned in 1775 which method of find longitude did he praise?
87. What happened to Captain Cook and the K-1 on his third expedition in 1779?

Chapter 14 – The Mass Production of Genius (pp. 152-164)

88. What was one large advantage the lunar distance method had over John Harrison's Watch?
89. Who accidently broke Thomas Mudge's first timekeeper?
90. What had been John Arnold's contribution to Kendall's & Mudge's three marine timekeepers?
91. What name for a marine timekeeper caught on because of Alexander Dalrymple's publication?
92. What challenge did Captain Cook notice about John Arnold's timekeepers?
93. What did John Arnold call his pocket timekeeper?
94. What skill was John Arnold honing (getting better at)?
95. What Harrison idea did Thomas Earnshaw bring down to a smaller scale?
96. What had Reverend Maskelyne finally done in 1803?

Chapter 15 – In the Meridian Courtyard

97. What does the world use to 'set its watch?'
98. Who took twelve years to clean and refurbish Harrison's sea clocks & the Watch back to working order without pay?
99. What had happened at 4pm on February 1, 1933?
100. What is the Maritime Museum curator responsible for doing early every morning before the visitors arrive?