

# NAVAL HISTORY STEM-H LESSON PLAN

## *Finding the Strait of Gibraltar* (advanced)

STUDENT WORK SHEET

Name: \_\_\_\_\_

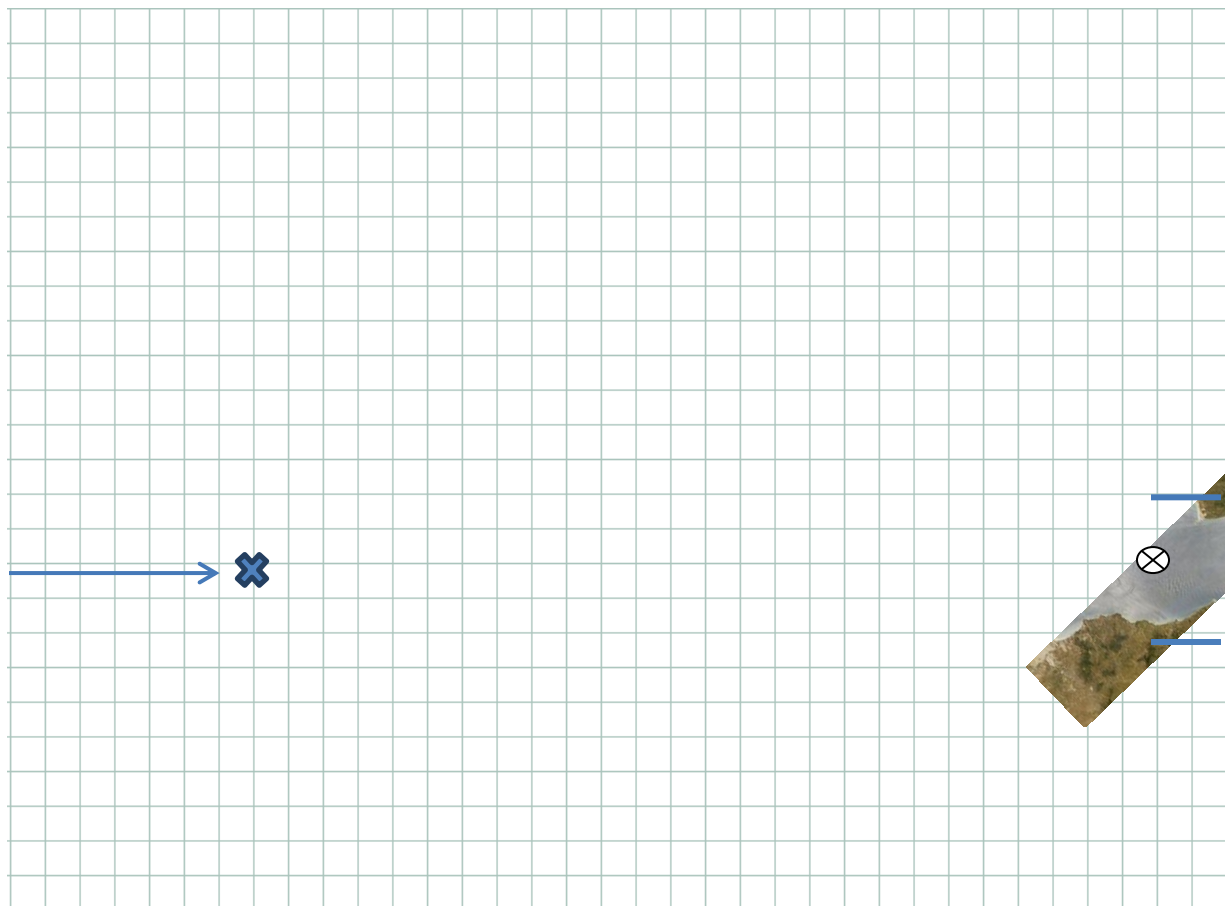
You are the navigator of a submarine that has been submerged for 12 hours and traveling at 16 knots per hour due east (090) toward the Strait of Gibraltar. Due to safety and security concerns you must bring your ship through the strait without surfacing to refine your location. "X" makes your current position based on dead reckoning and your most recent "fix". Now, using vector addition calculate, using the information provided by the inertial guidance system, and adjust your position on the chart.

Where are you? What will happen if you keep going straight east? What course do you need to follow in degrees and for how long at a speed of 4 knots to get to the front of the Strait before lining up on course 090 to the east (at the point shown by the circle on the chart.)

Your scenario: dead reckoning – 16 knots for 12 hours puts you at "X". Fluid friction slows your speed by 0.1 knots.

Information from you inertial guidance system.

- currents pushed the ship 15 degrees north for 3 hours, 25 degrees north for 1 hour and 5 degrees south for 8 hours.
- The officer of the deck of the previous watch turned the ship 5 degrees south after the 8<sup>th</sup> hour.



Each grid square is two by two nautical miles. One knot equals one nautical mile per hour.