

## **Topic: Dead Reckoning**

**Primary Goal:** Students will learn how to navigate by determining their expected future position based on current course and speed. After learning how to properly take a fix using both GPS and visual bearings, this introduces the concept of time, speed, distance, and direction.

### **Lesson Objectives:**

- Understand the concept of time, speed, and distance and how they interrelate
- Understand the reasons why you would need to predict your future position for safe navigation
- Review the different ways to obtain a fix: visually and using GPS

### **Lesson Outline:**

- I. Review the ways of obtaining a fix
  1. Visual Fix
    - a. Take a bearing from yourself to a landmark and draw a line (LOP) from the landmark using the inverse of your bearing
    - b. Find a second landmark and take a bearing using your magnetic compass
      - i. Plot on your chart and ensure that the 2 lines intersect
    - c. Find a third landmark and repeat the previous steps to determine your location
  2. GPS
    - a. Observe the latitude and longitude of your position on GPS
    - b. Using the borders of your chart, determine where the Latitude and Longitude intersect to obtain your GPS fix
- II. History of Dead Reckoning
  1. Dead reckoning has nothing to do with death, but could potentially lead to just that if you don't use it properly
  2. "Dead" is an abbreviation for "deduced", and is thus the calculation used when determining your vessel's whereabouts using your course and distance traveled
    - a. Columbus and most other sailors of his era used this method by estimating the course and distance they had sailed
- III. Dead Reckoning
  1. Process of navigation by advancing your position on a chart by using your last accurately determined fix
  2. In order to accomplish this, you need 3 variables
    - a. Course – what direction you are sailing
    - b. Speed – how fast you are sailing
    - c. Time – how long you have been sailing

3. Using the time-distance formula
  - a. This makes sense when you write out the units
$$\text{Speed} * \text{Time} = \text{Distance}$$
$$\text{miles/hour} * \text{hour} = \text{miles}$$

#### IV. Dead Reckoning in Practice

#### **Supplemental Resources:**

YouTube Video by Nautica: <https://www.youtube.com/watch?v=V8j00E89Bq4>

#### **Exercises/Activities:**

Provide the students with charts and navigation tools to complete the 3 exercises at the end of the PPT.