

## Middle School Physics: Adrift Adrift Activity Worksheet

### Step 1: Understanding Ocean Currents and CODAR

List the forces you think would have an effect on a drifting boat:

Do you think it would be easy to determine the eventual motion of a drifting boat using all the forces you have listed so far? Why or why not?

### Step 2: Practice Analyzing CODAR Images

The velocity of the vector in is: \_\_\_\_\_ km/hr

The distance between the starting point of the vector and the point on land is: \_\_\_\_\_ km/hr

The amount of time it will take the wave to reach shore is: \_\_\_\_\_ hours

### Step 3: Adding Vectors

The distance the boat traveled on Day 1: \_\_\_\_\_ kilometers

The distance the boat traveled on Day 2: \_\_\_\_\_ kilometers

The distance the boat traveled on Day 3: \_\_\_\_\_ kilometers

The distance covered by the resultant vector is: \_\_\_\_\_ kilometers

Add the component vectors from each of the three days to determine the total distance the boat drifted – place your answer here: \_\_\_\_\_ kilometers

How far from the starting point was the boat eventually located? \_\_\_\_\_ km

How does this differ from adding the component vectors over the three days?

#### **Step 4 – Using Real-Time CODAR Data**

Discuss any differences between this map and the ones used in the previous activities.

What is the general direction of the surface currents?

What is the fastest current speed on the map?

What is the slowest current speed on the map?

In what direction would a bottle drift if you dropped it at latitude 39:25 and longitude 74:05?

The speed of the vector selected for this activity is: \_\_\_\_\_ km/hour

The distance between the starting point of the vector and the selected end point is: \_\_\_\_\_ kilometers

The amount of time it would take the drifting ship to reach the selected end point is: \_\_\_\_\_ hours

Do you predict that the ship will travel in a straight line to the end point?

If not, why?

Think back to the beginning of the unit when you hypothesized about the forces that would affect the motion of a drifting boat. Was the speed and direction of the wind one of your factors?

Are the wind and the surface currents moving in the same direction?

Do you think this is always the case?

What other factor could be affecting the surface currents?

Check the real-time CODAR data over the next 2-3 days (or for as long as the amount of time you calculated in Step 5). Answer each of the following questions each time you revisit the CODAR data to check your prediction:

1. Based on the drifting speed and direction you predicted in Step 5, calculate where you would expect the boat to be located at this time.
2. Do the vectors on this most recent map support your prediction? Why, or why not?
3. Did the current pattern change over time?
4. If so, describe how it differed.

When you are done tracking the ship, discuss the movement of the ship over the entire period. Was the total movement of the ship the same as you had predicted earlier in Step 5?