

High School Physics: Follow That Bloom

Step 4: Predict Motion

A.2) Find the Plankton Bloom Worksheet

1. Visit the COOLroom at <http://www.thecoolroom.org/boaters.htm> to view the latest Ocean Surface Current data. Scroll down the page to the second image, which is the real-time Short Range CODAR image for the area between Brant Beach and Brigantine. The area contained in this image is where a hypothetical plankton bloom is occurring. The date to the top right of the image should be the same date as today.
2. Using a circular protractor, determine and record the general direction that the bloom (or vectors) is moving towards.
3. Compare the color of the vectors in this area to the color scale provided on the right-hand side of the image. Determine and record the average velocity of the vectors in this area.
4. Using the conversion calculator on the screen above the image, convert the cm/s speed into kilometers per hour (km/h).
5. Multiply the km/h by 24 to determine the distance the bloom will be traveling over the next 24 hours. How far, and in what direction, will the bloom be traveling in the next 24 hours?
6. Now scroll to the Long Range CODAR image at the top of the page and locate the area off the coast of New Jersey bounded by the following coordinates: 73:30-74:30 longitude, and 39:00-39:40 latitude. This is the same area you just examined on the Short Range CODAR image where the hypothetical plankton bloom is occurring. The dates for both of the images should be the same.
7. Using a circular protractor, determine and record the direction that the bloom is moving towards on the Long Range image.
8. Compare the color of the vectors in this area to the color scale provided on the right-hand side of the image. Determine and record the average velocity of the vectors in this area.
9. Using the conversion calculator on the screen above the image, convert the cm/s speed into kilometers per hour (km/h).

10. Multiply the km/h by 24 to determine the distance the bloom will be traveling over the next 24 hours. How far, and in what direction, will the bloom be traveling in the next 24 hours? Are your answers the same as they were for the Short Range CODAR image?
11. Scientists often find it helpful to look at recent conditions when trying to predict what will happen in the near future. Click on the "24-Hour Long Range Coastal Current Animation" link just below the Long Range CODAR image. You will see a Long Range CODAR image with an Animation Control at the top. Click on the "First" button on the left, and notice the date above the image. The date should be 1-2 days prior to today.
12. Locate the area of the plankton bloom (73:30-74:30 longitude, and 39:00-39:40 latitude) on the image. Click on the "Play" button, and watch the area of the bloom to see how the surface currents have changed over the past 1-2 days leading up to today. If you prefer, you can slow down the animation using the "Slower" button, or can view the animation one frame at a time using the arrow (<, >) buttons. Once the animation has finished, you can reset it by clicking on the "First" button again. Based on the animation, would you make any changes to your prediction about how the bloom will move over the next 24 hours? Why, or why not? Provide a description of the predicted path of the bloom, including shifts in speed or direction.
13. You have already learned that wind can be a major influence on surface currents. Visit the National Weather Service web site at <<http://weather.gov/>> to check the forecast for the Atlantic City, New Jersey region for the next 24 hours. Click on New Jersey on the national map, and then on Atlantic City. What is the forecast? Could the forecast have any influence on your predictions for the movement of the bloom? How?
14. Visit the COOLroom again <<http://www.thecoolroom.org/boaters.htm>> on the following day, as close to the same time as possible. Use both the Long Range and Short Range real-time CODAR images to check your predictions about the movement of the hypothetical bloom. Was your prediction about the location of the bloom proven correct? Why, or why not? If not, what factors do you think might have changed the predicted outcome?

Analysis

- In your opinion, how reliable is this data for predicting patterns in the motion of surface currents?
- What changes would you make in the presentation of the data to make it easier to analyze?