CeNCOOS Classroom Series: Module 2: Supplemental Guide for Teachers

Developed for CeNCOOS
by
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MBARI
An Oil Tanker Runs Aground Off the California Coast; Plan and Execute an Appropriate Warming and Cleanup Response.

Description of Lesson (what students will do):

- Review and respond to online EPA emergency guidelines (Part 1)
- Determine component vectors and make specific calculations of average direction and speed of sea surface currents (Part 2)
- Predict the eventual location of the hypothetical off-shore oil spill (Part 3)
- Present their team’s strategic response plan to the class for peer review (Part 4)
Part 1: Oil Spill Response Research

Using the EPA online resource link, students will complete the “Oil Spill Research Profile”
Part 2: Vector Analysis

Using the printable “Sea Surface Vector Field for San Francisco Bay, CA”, students will derive component vectors from an identified resultant vector (see red box).
If done correctly, the results of the student’s vector analysis should resemble the diagram below (component vectors indicated in dark orange).
Part 3: Using Real-Time Data from CeNCOOS.org

Students are directed to this page for accessing real-time data. Red Square indicates generalized location of hypothetical oil spill.
Zooming in and clicking on individual vectors reveals their numeric features (speed and direction).
Part 3: Using Real-Time Data from CeNCOOS to Predict the Movement of the Oil Spill

Students choose four different vectors from the Google map at: [http://www.cencoos.org/sections/conditions/Google_currents/](http://www.cencoos.org/sections/conditions/Google_currents/) that are in the general vicinity of the oil spill (40 km West of Drakes Bay) and record the magnitude and direction (Dir.) for each in the data table:

<table>
<thead>
<tr>
<th>Vector</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnitude</td>
<td>cm/sec</td>
<td>cm/sec</td>
<td>cm/sec</td>
<td>cm/sec</td>
</tr>
<tr>
<td>Direction</td>
<td>° from N</td>
<td>° from N</td>
<td>° from N</td>
<td>° from N</td>
</tr>
</tbody>
</table>
After finding the average speed, direction, and distance travelled in 24 hours of the oil spill, students examine the following Offshore San Francisco Bay Products: “Hourly Currents”, “25 hr Currents”, Drifter Animation, and Forecast Animation to confirm the validity of their original predictions. (Part 3, Step 7)
Part 4: Presenting Your Team’s Strategic Response Plan

Students will present their findings and predictions to their peers in a Strategic response Plan that conveys how they will contain and clean-up the oil spill (techniques, equipment, and specific targeted location) supported by the evidence they gathered during the previous parts of this lesson (Parts 1-3). Their plan can be in any of the following formats:

• Formal written report
• PowerPoint Presentation
• Poster Presentation
• Public Service Announcement (PSA)
Acknowledgements:


References:

Presentation Images (Slides 1-8) retrieved on June 25, 2008 from: http://www.cenkoos.org/