



Education and Research: Testing Hypotheses

MSI—Mystery Spill Investigators

Summary

This activity provides an opportunity for students to use various resources including hands-on lab, vector analysis and a case study to determine what caused the massive bird death in Monterey Bay.

Key Concepts

- Scientific Method
- Scientific Inquiry
- Vector Analysis

Objectives

Students will be able to:

- *Use real time data* to test predictions
- *Demonstrate* understanding of harmful algal blooms
- *Explain* how HABs impact coastal ecosystems
- *Use vector analysis* to illustrate the use of HFR (High Frequency Radar)

Materials

- Computers with Internet access
- Reference articles (see below)
- “Science Sleuths” extension activity or PowerPoint slides
- CeNCOOS Vector Analysis activity (Module #2: Real-Time Data Lesson Plan):
<http://www.cencoos.org/sections/classroom/observing.shtml>
- *Mystery Spill Investigators* PowerPoint

Procedure

1. Have students read “Mystery Spill” article describing massive mysterious bird die off:
<http://www.scsextra.com/story.php?sid=44985>
2. Introduce mystery spill and discuss the processes that scientists must go through in order to conclude possible causes. (Scientific Method, etc.)
3. Have students read about possible causes of bird deaths:
 - a. Pheromone spray: <http://www.stopthespray.org/Impacts.htm>
 - b. SF oil spray: <http://www.msnbc.msn.com/id/21707524/>
 - c. Toxic algae and animals: http://www.ucsc.edu/news_events/text.asp?pid=1292
 - d. First encounter with algae foam: <http://www.incidentnews.gov/incident/7235>
 - e. How oil affects birds: http://www.ibrrc.org/oil_affects.html
4. Have students perform “Science Sleuths” extension activity or present PowerPoint slides

5. Introduce HFR and have students perform the CeNCOOS Vector Analysis activity
6. Use lab experiences to work in groups to conclude cause of “Mystery Spill” and have group produce hypothesis with supporting data to conclude what cause was. Then have groups share out.
7. Have students read the following article to verify their conclusion:
<http://www.scsextra.com/story.php?sid=51080&storySection=Local&fromSearch=true&searchTerms=>
8. As a conclusion, present the *Mystery Spill Investigators* PowerPoint, which talks about HABs and the Monterey Bay “Mystery Spill”

Assessment

- **Performance**—Did students actively participate in classroom discussions and investigations?
- **Product**—Did students’ successfully complete the CeNCOOS Vector Analysis of HFR data? Did students present a valid conclusion of what caused “Mystery Spill” with data to support it?

Additional Resources

<http://www.whoi.edu/redtide/page.do?pid=9257>

<http://www.geohab.info>

http://www.cencoos.org/documents/about/HABs_Factsheet.pdf

Extensions

- Could be modeled as a elementary detective activity
- Beneficial vs. harmful bacteria/algae (“Wanted” Poster)
- Make a dichotomous key for harmful bacteria
- Court Role play with attorneys representing culprit