

Cleaning an Oil Spill

Materials Needed

- Pan (a disposable 9"x13" aluminum pan works well.)
- Vegetable Oil
- Materials to use as "booms", "skims", "vacuums" and "absorbents." For example:
 - sponges
 - cotton Balls
 - paper towels
 - shredded wheat
 - disposable Pipets
 - paper bags
 - dixie cups
 - pipe cleaners
 - much more (Instructors may want to test new materials for ease of use and potential for mess.)
- Materials for building booms, skims and modifying absorbents such as string, scissors, paper clips, etc.
- Optional: sand or aquarium rocks to serve as a "beach."
- Optional: detergent to use as a dispersant. It is recommended that adding detergent should be done after the initial clean up activity is performed and the effectiveness of the team's approach is analyzed. Detergent can then be used to show students how surfactants can disperse oil.

Procedure

Students should be arranged in groups of 3-4 to ensure teamwork. Each student should be equipped with a pan full of water and a variety of materials to use for their challenge of cleaning up an "oil spill". To each pan, 2 tablespoons (amount can vary depending on pan size) of vegetable oil will be "spilled" into their water. Students must work together to "clean up" the oil while disturbing the water as little as possible. Students should collect their oil in a separate Dixie cup. Students will assess how well they cleaned up their spill by observing the ratio of oil to water in their Dixie cup and how much oil seems to still be left in their pan.

Background Concepts

Prior to the activity, students can be taught the basic engineering strategies associated with cleaning up oil spills, i.e. booming, skimming, vacuuming, absorbing, and dispersants. (See attached Power Point.) Important chemical principles that should be taught is hydrophobicity, i.e. oil and water do not mix, and density, i.e. oil will float on water. (See Power Point.)

References

A similar activity was developed by the Museum of Science for their Engineering is Elementary series. An instructor's kit, including materials that can be used for such an activity can be ordered through their website: <http://www.eie.org/content/ecosystems>

The activity available through the Museum of Science includes a more ecological narrative to it compared to the activity led by the chemistry faculty at the Massachusetts Maritime Academy for the STEM Expo. However, the basic activity can be modified to meet a variety of educational objectives.