Health, Safety and Environmental Management Pathway: Multi-modal

Problem-based Scenario Outline

School Site: Ballard High School, Maritime Academy Seattle, Washington

Pathway Knowledge and Skill(s):

- P06.1 Develop and maintain safety, health and environmental management systems
- P 02.1 Develop logistics solutions for customers

Performance Element(s):

- Define logistics and distribution.
- Identify and analyze the major alternatives for each component of the logistics solution which could include the selection of:
  - Transportation carriers (marine, surface and air)
  - Routes and schedules
  - Logistics networks
- Complete oil spill drill as a group team member.
- Develop written business plan.
- Present logistics plan to business panel.
  - Understand the process and basic requirements of marine construction.
  - Use maps, routes and other geographic information to identify and analyze alternative transportation routes.
  - Describe and explain the factors used in comparing alternative transportation modes and carriers or other contractors.
  - Demonstrate an understanding of the scope and major components of logistics systems**.**
  - Describe and explain the tradeoffs between costs and service levels in evaluating alternative logistics solutions.
  - Describe and provide examples of the major types of customer requirements for transportation/distribution services addressing time, quality and costs.
  - Describe and explain the factors in comparing alternative transportation modes and transportation carriers or other contractors.

Title: Oil Spill Drill

Completion Time: 4 weeks

Problem Statement: You are a member of a team involved in responding to an oil spill. Depending on your team, you may be required to ensure equipment and personnel are routed to the scene, determine safety requirements, predict the path of the spill, or determine animal species affected by the spill. You will be assessed during a "real-time" spill during which you will work with your team members to determine the most effective and efficient manner of containing the spill, cleaning up the spilled oil, and disposing of the oil.

You are a member of one group that makes up a Spill Response Team. You may have any of the following responsibilities:

a. Logistics – organize spill response equipment and personnel
b. Safety – ensure safety of all personnel involved
c. Command – establish command system
d. Science – advise on science-related issues
e. Prediction/Planning – predict path of spill

Every group will be given the following prompt:

The Arco Marine Tanker Arco Independence has been involved in a collision near Ediz Hook and Po ferry headed from Port Angeles to Vancouver, B.C. loses steering and rams the Arco Independence fuel tanks, above and below the water line.

Although the two ships are still stuck together, the captain of the Arco Independence immediately as determining there is no imminent danger of sinking to either vessel, requests assistance. The ship is barrels of diesel fuel.

Location: 48 degrees 9 minutes North and 123 degrees 22 minutes West

Winds are variable 30-35 knots from the WSW. Seas have heavy chop

Occupations and Related Job Titles (*Examples*):

- Transportation Operations
- Risk Management Specialist
- Marine Diving and Salvage

Business/Industry/Government Partner(s):

- Foss Environmental
- Clean Sound Cooperative
- U.S. Coast Guard
- Global Diving and Salvage
- Insurance Companies
- NOAA (National Oceanic and Atmospheric Administration)
- Tug/Barge Operators
- Surface Shipping Companies
- Air Shipping Companies

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Students: In groups (Logistics, Prediction, Safety, Science, Command) students must decide how to contain the ship and spilled oil, clean up the spill, and dispose of the product. Each group member will be assigned a role within their group, as each group has its own role in the larger process. Each group will be required to report their information.

Products (all groups):

- Identify the most cost-efficient method of transferring the spill response materials to the desired location.
- Decide on which carrier and which sailing/route the materials will be shipped.
- Provide a detailed budget for transportation costs.
- Write press release for oil spill drill.
- Write individual reflection on drill and your group/role.
- Develop distribution plan.
  - Word processed and edited.
  - Maps of possible routes, with distances.

- Presentation
  - Using power point and digital camera – minimum of five slides with three images.

Products (by group):

- **Logistics-** Create logistics plan for transporting spill recovery equipment to site.
- **Science-** Determine properties of spilled product and identify species affected.
- **Command-** Create press release detailing clean up plan.
- **Safety –** Determine safety requirements and location of decontamination stations.
- **Prediction –** Create video of spill trajectory.

Process:

- Students use all skills/tools available in identifying and evaluating all possible routes.
- Students complete the project in the allotted time.
- Identify causes for performance problems and gaps in transportation operations and troubleshooting methods for possible scenarios.
- Determine methods of measuring customer satisfaction.

Required Materials and Resources:

- Computers
- Word processing and presentation software
- Spreadsheet with spill response equipment and capacities
  - Portable spill response equipment
  - Spill response vessels
- Site location and map
  - Maps of Puget Sound and the Strait of Juan de Fuca
  - Distances by land/sea/air

- Shipping cost sheet(s)
  - Price: per total weight, number of containers, or total shipment
  - Compare cost/time/services requirements
    - Liner Trade/Tug & Barge/Air/Surface shipping
  - Insurance for equipment/personnel
- Computer with word processing/Power Point software
  - Projector for multimedia presentation
  - Word processor for writing Media release statements
- Specialized information for teams (most available on internet)
  - GNOME software for predicting spill path
  - ADIOS software for identifying properties of spilled oil
  - ESI (environmental sensitivity index) maps with animal/fish/bird species

Suggested Assessment Approaches:

- Students will be graded on their depth of knowledge in the industries the scenario involves (as evidenced in the students' drill performance as well as their written plan)
- Each group will submit copies of a written business plan outlining their proposal and justifying the group's decisions.
- Each student will be responsible for their own written reflection, assessing how the group's decision was made and each student's role in the process.

Related Academic Skills

Washington State Essential Academic Learning Requirements:

- Science: Students will identify a challenge which lends itself to being resolved through the application of science or technology; identify and describe the risks, benefits, trade-offs, and constraints when developing alternative solutions; compare and evaluate solutions and consequences; read, comprehend, and critique scientific information from popular academic, technical, and telecommunication sources; use science vocabulary appropriately in written explanations and verbal presentations; and produce science reports. (EALR's 3.1, 3.3, 4.1, 4.2, 4.3, 5.4)

- Civics: Students will analyze how individual rights and responsibilities can be balanced with the common good and analyze aspects of public policy-making and decision-making. Students will demonstrate their understanding of means to evaluate controversial issues and evaluate different solutions. (EALR's 4.1, 4.2, 4.3)

- Communication: Students will analyze and reflect on ideas while paying attention and listening in a variety of situations; make well-chosen and varied connections between own purposes and audience interests and needs; create a comprehensive and organized presentation with a clear sequencing of ideas and

transitions; participate in a group to write, work toward consensus, propose solutions, and demonstrate results; and determine effective communication techniques in a career setting.
(EALR's 1.1, 2.1, 2.2, 3.2, 4.4)