Title: *Emergen-Sea Responders*
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Background Information


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Whenever there are oil spills, first responders are primarily engaged. These are people who apply remediation techniques for hazardous wastes in the environment. Often times, first responders are the difference between life and death for many of the marine organisms subject to oil contamination. Oil pollution usually affects the mobility, buoyancy, and thermoregulation of these animals, so it is significant that immediate actions are taken to reduce mortality. There are different areas in emergency management and some first responders solely handle marine animals. They provide health assessments and animal hospitalization to help ensure a greater probability of survival. The most recent and notable offshore drilling incident was the BP Deepwater Horizon oil spill which was responsible for releasing millions of barrels of oil into the Gulf of Mexico and the surrounding coast. First responders were immediately called upon to help rectify the environmental dilemma.

Louisiana State Standards (Grade-Level Expectations)

SI GLE: Pose questions that can be answered using students' own observations and scientific knowledge (SI-E-A1)
Generate testable questions about objects, organisms, and events that can be answered through scientific investigations (SI-M-A1).
Describe how investigations can be observation, description, literature survey, classification, or experimentation (SI-H-A2)
PS GLE: Create and separate mixtures (e.g., oil/water, rice/beans) (PS-E-A5)
SE GLE: Identify and explain the limitations of models used to represent the natural world (SIM-A5)
SE GLE: Determine the interrelationships of clean water, land, and air to the success of organisms in a given population (SE-H-C1)
SE GLE: Discuss how education and collaboration can affect the prevention and control of a selected pollutant (SE-H-D2) (SE-H-D3)
LS GLE: Describe the characteristics of *living (biotic)* and *nonliving (abiotic)* things (LS-E-A2)
Analyze the dynamics of a population with and without limiting factors (LS-H-D3)
Explain how selected organisms respond to a variety of stimuli (LS-H-F3)

ES GLE: Describe the abiotic and biotic factors that distinguish Earth's major ecological systems (SE-H-A1)
Cite and explain examples of organisms' adaptations to environmental pressures over time (SE-H-A8)
Give examples and describe the effect of pollutants on selected populations (SEH-A11)

Ocean Literacy Principles

Principle 5a: Ocean life ranges in size from the smallest virus to the largest animal that has lived on Earth, the blue whale.

Principle 6b: From the ocean we get foods, medicines, and mineral and energy resources. In addition, it provides jobs, supports our nation's economy, serves as a highway for transportation of goods and people, and plays a role in national security.

Principle 6e: Humans affect the ocean in a variety of ways. Laws, regulations and resource management affect what is taken out and put into the ocean. Human development and activity leads to pollution (such as point source, non-point source, and noise pollution) and physical modifications (such as changes to beaches, shores and rivers). In addition, humans have removed most of the large vertebrates from the ocean.

Principle 6g: Everyone is responsible for caring for the ocean. The ocean sustains life on Earth and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all.

Time Requirement

This is an activity that requires a minimal setup of 5-10 minutes. Teachers should mix the vegetable oil and food coloring in a bin or bowl beforehand. Adding the contents and stirring with a spoon should take no more than 3 minutes. Also, make 3-5 copies of 'Cards 1-4' for the students and cut them out prior to the start of the activity.

Materials

Access to water (i.e., faucet)
Liquid soap
Spoon
Toothbrushes
Calculators (i.e., optional)
Vegetable oil
Food coloring

Clothes or towels
Squeeze or spray bottles
Bin or bowl
Plastic sea turtles (e.g., online retailer, toy stores)

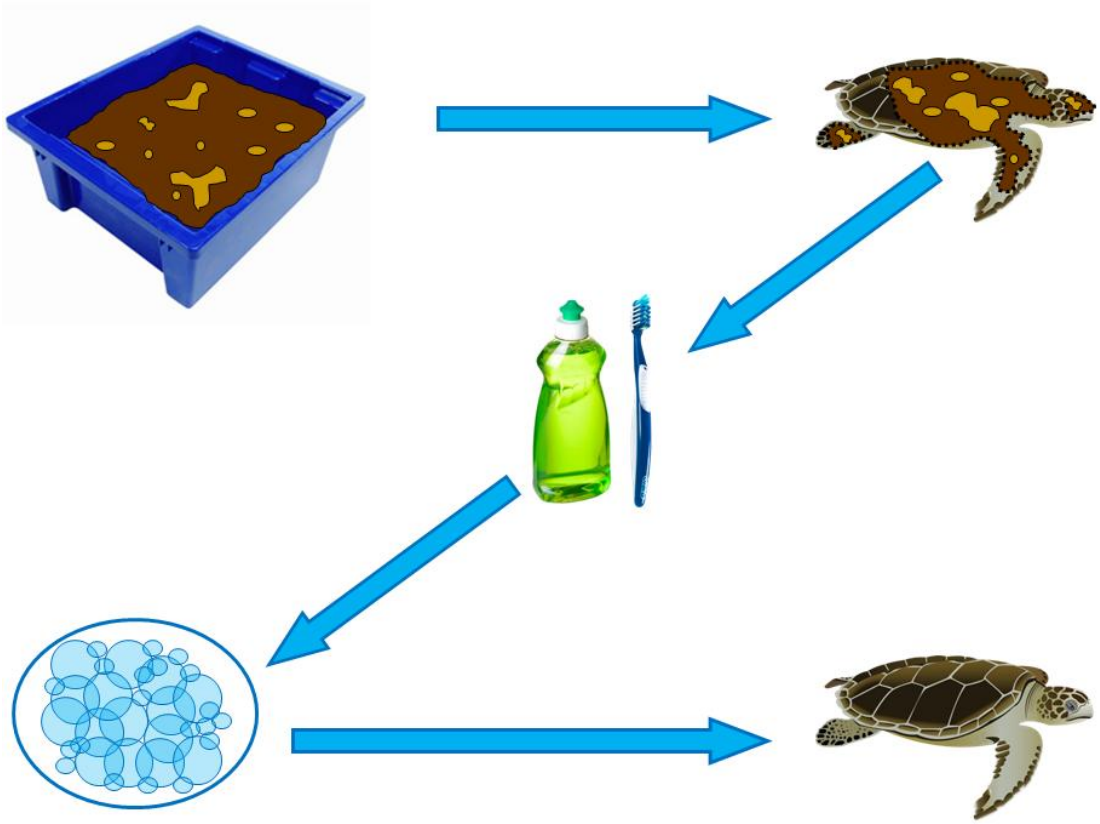
Lesson Description

Creating the Emergen-Sea Management Project

1. Pre-made, cut-out cards (subsequent pages) should be used for this "sequence activity".
2. Give each student a sea turtle and assign a verbally assign a letter to identify each toy. For a 20 student class, there will be four groups of five and letters for each turtle/student should be grouped by the following: *A-E*, *F-J*, *K-O*, and *P-T*.
3. Ask them to start with the 'Card 1' to complete this lesson. Cards will explain everything for the students.
4. For the cleaning segment, students will need to: submerge the sea turtles in the pre-made oil bin (teachers just add oil and food coloring to a bin or bowl beforehand), rinse or spray off the turtles, add soap and scrub with toothbrush, rinse or spray off the turtles, dry with cloth or towel.
5. Use observation checklist to gauge the probability of life or death. Some adding and division is required for this section.
6. No actions are needed for 'Card 3' (i.e., feeding mayonnaise or giving intravenous fluids); tell the students to simulate the actions.

Methodology

Students will imitate emergency first responders responsible for cleaning oil covered sea turtles. The first step would be general mortality assessment of the sea turtles and then gauging the life or death probability via observation checklist (e.g., external or internal wounds, mobility, etc.). Students will also play the role of a veterinarian, assessing the general health (i.e., oil consumption or dehydration) before determining if the sea turtles need to be release into the wild or remain hospitalized. This is a sequence-type activity where the students have specific instructions based on the groups of sea turtles they are given. This activity is based off of a typical classroom of 20 students, thus 1 turtle per student, but modifications can be made according to actual class size. The main goal of this lesson is to provide students with an authentic look into the troubles of oil spill recovery, especially dealing with the after-effects on marine organisms.



Card 1

Assess if sea turtles are dead or alive. If dead, forward the bodies to the Dept. of Wildlife & Fisheries. If alive, transport the animals to a nearby rescue center for cleaning purposes.

DEAD: --
ALIVE: Letters *A-T*

Card 2

Observational Checklist

General Health	Sea Turtles			
	A-E	*F-J*	*K-O*	*P-T*
External wounds	7	6	2	8
Internal wounds	6	7	3	8
Mobility (land)	8	8	2	5
Swim ability	9	4	3	6

The scores for each group (e.g., *A-E, F-J, K-O,* and *P-T*) are out of 40 points. A probability greater than 0.5 means the sea turtles will probably live. A probability less than 0.5 means the sea turtles will probably die. Dead sea turtles are forwarded to the Dept. of Wildlife & Fisheries.

Card 3

The veterinarian observes the general health (i.e., vital signs). Sea turtles are mainly checked for oil consumption and dehydration. If there has been oil consumption, then the turtles are fed mayonnaise. This helps induce diarrhea to transport the foreign material (i.e., oil) out of their bodies. If the turtles are dehydrated, they are given intravenous (IV) fluids.

OIL CONSUMPTION: *A-E*, *F-J*
DEHYDRATED: *P-T*

Card 4

The veterinarian observes the general health (i.e., vital signs). A decision is made to either release the sea turtles back into the wild (i.e., a habitat they will likely most survive in) or maintain hospitalization). This decision is determined by improvements or lack of improvements in their general health.

RELEASE: *P-T*
MAINTAIN HOSPITALIZATION: *A-E, F-J*

Standard Evaluation (Student Deductions)

1. Depending on your sea turtle alphabetical listing, what was your observational checklist probability (for life or death)? Was your turtle closer to living or dying?
2. Of the general health categories on that observational checklist (e.g., external wounds, internal wounds, mobility, swim ability), which one do you think would be the most influential for survivability? Why? Which would be the least influential for survivability and why?
3. Explain how oil contamination may affect the following: thermoregulation (ability to maintain body temperature) and buoyancy (ability to remain afloat)?
4. What is the significance of using mayonnaise to treat these animals?
5. What is the significance of using IV fluids to treat these animals?
6. Do you think there will be chronic effects for animals that were contaminated by oil, even if they were cleaned & hospitalized properly? Why or why not?

The evaluation can be in the form of a test, essay, questions and answers worksheet, or any other mode of measuring retainment or comprehension of material.