Incident Command Scenario

Grade Level: 7-12
Length: 30-45 Minutes
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Developed by the Kachemak Bay National Estuarine Research Reserve, with funding from PWRCAC

NGSS Standards

HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Crosscutting Concepts

Systems & System Models A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.

Related Resources

Supporting Materials
Incident Command Scenario Cards

Pair With Priorities for Protection Lesson; Community Meeting Lesson

Overview

The varied participants and constantly changing conditions make it incredibly challenging to clean up and contain an oil spill.

Objectives

- Students will work cooperatively in strike teams to respond to an oil spill and react to changes in conditions.
- Students will understand some of the challenges of cleaning up an oil spill.

Materials

- ☐ 3 Walkie Talkies
- ☐ Strike Team Cards
- ☐ Changing Condition Cards
- ☐ Location Images

Background

Many people and agencies participate when an oil spill occurs in Alaska, including the Coast Guard, the local Regional Citizen's Advisory Council (if there is one), tribal governments and environmental programs, the Alaska Department of Environmental Conservation, local fishermen, wildlife biologists, and many trained volunteers. While it is beneficial to have a large pool of people-power and variety of expertise, coordinating a response between multiple agencies and volunteers is extremely challenging. This activity illustrates some of the challenges that arise when trying to contain and clean up oil in coastal areas.

Notes

Preparation

Determine a location where students can talk freely on walkie-talkies without disturbing other classes. Ideally this will be an outdoor location. Otherwise a gymnasium will do. Students will divide into three groups. The teacher should be able to see all of the groups, but the groups don't need to see one another. Each location can have something that is relevant to this simulation: a sandy location on the school grounds could represent the location where shorebirds congregate, playground equipment could be a fish hatchery, and a set of stairs can be a haul out where seals congregate. The attached images can be taped up in advance so that students have something to look at by way of a reference. Make sure the walkie talkies have been charged overnight. Set them all on the same channel.

Introducing the Lesson

Explain to students that many people and agencies participate when an oil spill occurs, including the Coast Guard, the local Regional Citizen's Advisory Council, tribal governments and environmental programs, the Alaska Department of Environmental Conservation, local fishermen, wildlife biologists, and many trained volunteers. Ask students if they would be interested in helping out if there were a spill near their community. Explain that the following activity will give them some practice with mopping up an oil spill.

Activity

1. Form the students into three Oil Spill Strike Teams. Team Green, Team Red, and Team Yellow. They are to imagine that an oil spill has occurred and is moving in the direction of their community. It will make landfall within the next 24 hours. Each team is being sent out to assess an area to determine what needs to be done to protect the region.
2. Go over the use of a walkie talkie (hold the button down to talk, release to listen, don't interrupt and active dialogue). Each team will have one walkie talkie, so you may want to set expectations about who will use it when – either all students rotate, or assign a "radio person."
3. Give each team their color-coded scenario cards and send them to their location. Once each team is in place, call them individually by walkie talkie and ask them to describe what they find in their location.

- Team Green should explain that there are harbor seals hauled out on the beach near the head of the bay.
- Team Red should explain that there are thousands of shorebirds feeding in the mud flats.
- Team Yellow should explain that they are located at a fish hatchery.

4. Radio each team in turn and ask them what the weather is doing and what their fuel needs are. Their cards will describe this.
   - Tell teams that are low in fuel that a refueling vessel is in route and will be there within three hours.
   - Tell teams that are experiencing strong winds that there is a storm coming with high seas predicted.
5. Ask all teams to determine a plan to protect their area. Give them a few minutes to discuss this. Radio each team and explain that the oil is now just a few hours out and will make landfall before the end of the day. Ask them what their plan is to protect their area.
6. Go around to each team and have them pick a "challenge card" at random. Ask them to adjust their plans accordingly. Give each team an additional few minutes to change their response plan.

Wrap-up

Call students back to a central area. Give each team 3-5 minutes to present their response plan to the rest of the group. Teams should explain why they designed that response, and possible challenges that they anticipate. Ask the other two teams to provide both positive and critical feedback, as well as suggestions for refining the response plan.

Then have all three teams consider how the response plans interact and suggest additional ways to refine the overall response plan.

Then do a general de-brief of the experience and how this is connected to their own lives and what is happening in their own communities. Ask how oil spill responders can prepare for a spill? (They hold drills to practice response techniques). What should responders think about before going out to cope with a spill? (Do they have adequate materials, fuel, food etc.) What conditions would make fighting a spill more difficult? (Stormy weather, animals present, remote locations, ice). What can be done to assist responders with the enormous task of cleaning up an oil spill? Are there things that they can do ahead of time or during a spill to support responders?

Assessment

Evaluate student collaboration, cooperation, and consideration of their peers' ideas during the response drill. Listen during discussion for arguments based on evidence from their own life and science ideas. Students who successfully meet the performance expectation will work together throughout the course of the response drill and wrap-up discussion to design, evaluate, and refine a priority list that can help to reduce the impacts of human activities on the environment and biodiversity.

Pair With

- Community Meeting Lesson Plan
- Priorities for Protection Lesson Plan

Oil Spill Strike Team card information:

Team Green:

1. You are located at the mouth of a narrow estuary which contains a beach where harbor seals haul out. There are over 60 seals in the water or on shore, many with young pups.
2. The weather is still pretty calm. You have three boats and quite a bit of boom material, but two of your boats are very low in fuel.
3. Discuss among yourselves how you will protect the seals in this estuary and what challenges you face.

Harbor Seal Haul Out

Team Red:

1. You are located in a salt marsh where thousands of shorebirds have come to eat after their long spring migration. These birds are tired and nesting before heading to their breeding grounds further north.
2. You have just two boats and only a little boom material. You do have a couple of propane hazing cannons on board. The boats have enough fuel to last the day. The wind is blowing really hard which is driving many of the birds further inland.
3. Discuss among yourselves how you will protect the birds in the salt marsh and what challenges you face.

Shore birds feed here in great numbers

Team Yellow:

1. You are located at a sockeye salmon hatchery. There are hundreds of thousands of juvenile fish in the pools ready for release within the next few weeks. This hatchery produces a run of fish that supplies much of the local community.
2. You have seven boats and they are all well supplied for fuel and boom materials. The wind has picked up and there are whitecaps on the water.
3. Discuss among yourselves how you will protect the salmon hatchery and what challenges you face.

Fish hatchery with boom

Challenge Cards:

Injury – One of the volunteers has injured themselves while carrying equipment. You must use one of your boats and captains to evacuate the injured person. Now you are missing 2 people and 1 boat. How can you protect the area?

Fuel Delay – The fuel boat has been delayed by stormy weather. Do not expect any additional fuel for the next 4 days. Develop a plan to protect the area with only your existing fuel.

Food Shortage – Your supply of food is dwindling, and none is enroute. You must develop a plan to feed your workers. You can try to find your own in the area, or send a boat to the closest community for help.

Busted Boom – Strong tidal currents ripped your boom in multiple places. You must figure out a way to repair the boom, make new boom, or do without.

Stormy Seas – A strong wind is blowing towards shore. This makes it nearly impossible to safely navigate the nearshore waters. Develop a plan on how to proceed that does not involve any boats moving close to shore.

Otters Around – A large raft of sea otters is moving towards your area. Develop a plan to protect them, as well as the resources you were originally working to protect.

Cultural Concerns – One of your team members informs you that a large part of the beach in your area is culturally important as a sacred site and should not be disturbed during the containment and cleaning process. Decide how to proceed without disembarking on these sacred lands.