

# Mystery of the Dead Whale



## A Forensic Marine Science Unit

By  
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### Introduction

Sharks feeding on dead whales!? Turn your classroom into a NOAA ship to solve the mystery of the dead whale! Students become marine biologists and collect tissue samples, analyze data, and actually “test” real fish for contamination. Will students find that the whale died from oil contamination or was it a natural death? Only scientific inquiry will tell.

### Article

What was supposed to be a teacher’s summer trip to survey marine life turned into a front row seat for the largest oil spill in United States history. Talk about a teachable moment! Melinda

Storey spent 2 ½ weeks as a NOAA Teacher at Sea aboard the NOAA ship *Pisces* during the BP DeepWater Horizon Oil Spill in 2010. She left the port of Pascagoula, Mississippi, and traveled 100 miles out into the Gulf of Mexico. Then she headed west to the Flower Garden Banks Sanctuary and then back to Louisiana. Along the way back, the ship passed within six miles of the oil-spewing DeepWater Horizon oil well.

Learning from the Deepwater Horizon explosion was the perfect “real world” science lesson for Mrs. Storey’s third through sixth grade gifted students. The Gulf Coast produces one-fourth of the crude oil in the United States and has 43,000 oil wells. Students studied the risks of deepwater drilling, explored the spill’s impact on communities that depend on the gas and commercial fishing industries, learned how marine biologists were using booms and micro-organisms to clean up the spill, and then they simulated being “sniffers” at the National Seafood Inspection Lab. Students “caught fish” using a Bandit Reel just like they used on NOAA ship *Pisces*, only children casted out into the hall, which was their Gulf. They chemically tested real fish for oil contamination at three different “locations” in the Gulf. Students then wrote a report to NOAA with their recommendations as to whether or not to close the sites because of contamination, what fishing limits should be set and if a site was contaminated, what the schedule should be for further testing. This report was sent to the real Director of NOAA who was gracious enough to respond to the students.

While onboard the *Pisces*, the crew actually saw a dead whale floating in the Gulf. A rare sight indeed, this inspired Mrs. Storey to write a forensic marine science unit for students. This unit is easily replicated in any classroom and students will adore hands-on these scientific investigations that focus on data collection and analysis!

This forensic mystery combines hands-on scientific investigation, data collection, and lab activities so students can determine what killed a sperm whale found floating in the Gulf of Mexico. (The real whale was found to have died of natural causes.) After data analysis, students should conclude that death is connected to an oil spill in the Gulf. After all, there are 43,000 oil rigs in the Gulf, so another oil spill could happen and there are natural oil seepages that occur regularly! Additional activities include a critical thinking simulation that has students deciding how to use grant money given to a city to be used to restore damaged areas.

**Activities include:**

- Taking water samples from two different locations: **Site 1**: near the dead whale (The water sample will show a mysterious plume below the surface of the water that contains “a lethal oil and bacterial bloom”) and **Site 2**: ten miles away where there is a small oil slick
- Using a bandit reel to “fish” off the ship in order to collect fish that the whale may have ingested. Also to catch the Tiger Shark that was feasting on the dead whale.
- Identifying a variety of fish.

- Experiencing how a marine biologist takes data from the fish they catch aboard a research vessel and why this data is so important.
- Testing fish at the National Seafood Inspection Lab to see if they are contaminated or not.
- Becoming “sniffers” at the National Seafood Inspection Lab to sniff out any oil contamination. (Yes, they really have sniffers at the NSIL!)
- Testing tissue samples of the whale (using fresh tilapia) to see if it has any contamination that might have caused the whale to die.
- Writing a report on possible cause of death based on data collected.
- The unit culminates with a higher level thinking activity that simulates a grant to be given by BP to Orange Beach. Students become different stake holders and make recommendations as to what should be done with the grant money. They must present their persuasive speech to the Chamber of Commerce. Then the Mayor decides who gets what monies and why.

#### **Standards:**

##### **National Science Education Standard(s) Addressed:**

- Standard D: Structure the time available so that students are able to engage in extended investigations.
- Standard E: Enable students to have a significant voice in decisions about the content and context of their work and require students to take responsibility for the learning of all members of the community.
- Nurture collaboration among students.
- Structure and facilitate ongoing formal and informal discussion based on a shared understanding of rules of scientific discourse.
- People, Places, and Environment
- Individuals, Groups, and Institutions
- Civic Ideals and Practices

##### **Ocean Literacy Principles Addressed:**

- Principle 4: The ocean makes Earth habitable.
- Principle 5: The ocean supports a great diversity of life and ecosystems.

##### **State Science Standard(s) Addressed:**

- [Structure and Function of Living Systems](#)
- [Diversity and Adaptations](#)
- [Organisms and Environments](#)

## ACTIVITY 1: Testing Water for Contamination

**Focus:** This lesson helps students see contamination that is not only on the surface of the water but below and on the bottom of the ocean. Also, water contamination could be in the form of oil slicks, oil plumes or dispersants (bacteria/micro-organisms) that were added to the oil slicks.

**Grade Level:** Grades 3-12

**Average Learning Time:** One 50 minute period

### Lesson Summary (Overview/Purpose):

Students will take water samples within a 10 mile radius of the dead whale; **Site 1** is immediately surrounding the dead whale. **Site 2** is 10 miles away from the whale. **Site 1** (near the whale) will be the water sample that has a mysterious plume below the surface of the water that contains “a lethal oil and bacterial bloom.” (This contamination is what kills the whale. Oil and bacteria from dispersants have mutated and caused death. The majority of fish caught here indicate contamination.)

**Site 2** (10 miles away from whale) will be the water sample that contains an oil slick. (Here, there is probably not enough oil to cause death and fish caught here indicate very little oil contamination. This oil slick could have been cause by natural oil seepage.)

Students will use water bottles, cooking oil and Dijon mustard to actually see an oil plume that is just below the surface of the water. Students will see contamination falling to the bottom of the ocean, which will coat the bottom with a layer of contamination that will affect the bottom dwelling creatures. Students will also see oil broken up by dispersants (bacteria/micro-organisms.) Some scientists hypothesize that marine life has mutated due to the oil and dispersants. Researchers found tissue damage and gene changes in fish caught during the Gulf Oil Spill that could cause developmental and reproductive problems in fish. A study, which was paid for by the National Science Foundation and the Gulf of Mexico Research Initiative in the immediate aftermath of the spill, found mutations were consistent with exposure to oil. LSU Associate Professor of Biological Sciences Fernando Galvez said that his findings suggest that his study did indeed find mutations in fish.

**Big Idea/Essential Question:** Why is testing water for contamination important?

### Focus Questions:

- What is the impact of contamination on the habitats of ocean creatures?
- Why do scientists need to test fish?
- Why is long-term research important?

### Objectives/Learning Goals:

- Students will be able to think critically about a career in marine biology.
- Students will be able to learn how research is used to test fish for oil contamination.

- Students will be able to actually see contamination as it settles on the ocean floor.

**Materials:**

- **Water bottles**
- **Clear plastic containers**
- **Cooking oil**
- **Dijon mustard**
- **Cocoa**
- **Dawn dishwashing soap**

**Lesson Procedure:**

Students will take water samples from two sites.

**Site 1: immediately surrounding the dead whale**

For water sample containing oil plume:

- Have each student fill a water bottle  $\frac{3}{4}$  full of water.
- Add about 1 inch of cooking oil.
- Squirt about a teaspoon of Dijon mustard into the water bottle.
- Cap the bottle and shake vigorously.
- Watch and wait

This demonstration will show how plumes of contamination such as oil and dispersants can “hang” below the surface of the water and filter down to the bottom of the ocean impacting creatures that live at the bottom such as crabs, octopus, starfish, etc.

**Site 2: 10 miles away from dead whale**

For water sample containing oil slick:

- Fill a clear container (either another water bottle or clear plastic shoebox) half full water.
- Mix  $\frac{1}{2}$  cup oil with 1 tablespoon of cocoa. Mix well. This will be the oil spilled from an oil rig. The real oil in the Gulf looked like chocolate syrup. This amount will make enough for 10-15 containers. You will only need a tablespoon of oil in the container.
- Pour oil mixture into water. This will create oil “blobs” called slicks.
- Drop 2-3 drops of Dawn into the oil slick. The oil will separate. This simulates the bacterial dispersants being added to the water. Bacteria/micro-organisms “eat” the oil and that breaks up the oil slick.
- Using a straw or spoon, swirl the water. This will simulate the wave action breaking up the oil and dispersing it through the water.

## **ACTIVITY 2: Bandit Reel Activity**

### **Catching Fish like a Marine Biologist - A Simulation**

**Focus:** This lesson helps students learn how a marine biologist takes data from the fish they catch aboard a research vessel and why this data is important. Students will also learn how to analyze data.

**Grade Level:** Grades 3-12

**Average Learning Time:** One 50 minute period

#### **Lesson Summary (Overview/Purpose):**

**A simulation** - Students will “capture” paper fish of various sizes and shapes to take back to the National Seafood Inspection Lab to be tested for contamination. (Optional: measure the three lengths that marine biologists use when taking data for research.)

Students will catch fish at **Site 1** (surrounding the dead whale/oil plume) and **Site 2** (10 miles away/oil slick). The majority of fish at Site 1 will be contaminated with oil and bacteria that have mutated due to the dispersants added to the oil. The whale might have eaten these contaminated fish and thus died of contamination. Fish at Site 2 will have little or no contamination.

Fish to use to draw shapes of fish to catch for Bandit Reel

Reef Butterfly Fish	Dogfish Shark
Angle fish	Longspined Porgy
Red Snapper	Mahi Mahi
Marbled Grouper	Amberjack
Tiger Shark	Grouper
Tomtate	Trigger Fish

**Big Idea/Essential Question:** Why is taking data so important to a marine biologist who studies fish?

#### **Focus Questions:**

- What kinds of contamination might affect fish and other living organisms in the ocean?
- Why do scientists need to measure fish?
- Why is long-term research important?
- What might happen in the long run if money is not spent on research for the future environment?
- What is Deepwater Horizon and how did it spill oil into the Gulf of Mexico?
- What are the impacts of the oil spill on fishing?

#### **Objectives/Learning Goals:**

- Students will be able to think critically about a career in marine biology.
- Students will learn how to critically analyze data.

- Students will be able to learn how research is important to the environment.

**Background Information:**

- Students should read The Oil Spill: Disaster in the Gulf by Scholastic.
- Students should read Teacher at Sea Log 4 Measurement found at [http://teacheratsea.noaa.gov/2010/storey/storey\\_log4.pdf](http://teacheratsea.noaa.gov/2010/storey/storey_log4.pdf)

**Materials:**

- Document of Species of Fish in Gulf of Mexico to be used for identification of fish “caught”
- Meter stick to be used to measure fish in cm
- Reef Fish Survey student worksheet
- Word document of fish to use as model to draw fish on butcher paper
- Laminated paper fish to “catch.”
- Teacher made Bandit Reel – nylon rope about 10-15 ft long with smaller lengths attached at one end about 1 foot apart. Attached to the smaller lengths are gem clips so that fish could be “caught” (attached to rope) and pulled on board ship.
- *Copy of* The Oil Spill: Disaster in the Gulf by Scholastic

**Teacher Preparation:**

- Laminated fish to “catch.” Draw out different types of fish onto butcher paper in a variety of sizes and laminated them. Be sure to include a shark. These served as fish to measure.
- Teacher should make a Bandit Reel. This is one of the ways biologists catch fish aboard a research vessel. Choose nylon rope about 10-15 ft long and attach smaller lengths at one end about 1 foot apart. Attach gem clips to the smaller lengths so that fish can be “caught” and pulled on board ship.

**Keywords:**

- Marine biologist
- Bandit Reel
- Meter stick

**Lesson Procedure:**

- Pass out the student worksheet – SEAMAP Reef Fish Survey. Students will be fishing at Sites 1 and 2.
- Group students in groups of 3-5
- Give each group a Bandit Reel. Each group should throw the Bandit Reel from the doorway of classroom out into the hall. The hall represents the ocean. The teacher should wait outside the classroom and attach fish to the Bandit Reel so the students will not know what they were catching. Then the students should reel in their catch by pulling the Bandit Reel into the classroom. Be sure to “catch” a Tiger Shark at Site 1.

- As students pull in Bandit Reel, have a student be the “caller” who checks each hook and call out *“hook 1, fish,”* or *“hook 4, no fish, with bait,”* or *“hook 8 no fish, without bait.”*
- Have students write down this information in the Hook column of worksheet as it will be information they can use to analyze the data for their report to NOAA.
- After “catching” their fish, have students identify their fish. (Optional: Measure fish with the meter stick. Be sure to measure in millimeters. Take three types of measurements (explained on student worksheet and record on the Reef Fish Survey student worksheet.)

**Assessment and Evaluation:**

After completing the Reef Fish Survey simulation, students should

- Write a report about the number and type of fish “caught” in the Gulf of Mexico and explain how marine biologists use this data.
- Write a short explanation of what might happen if marine biologist did not report such data. How might that affect the fishing industry, the ecosystem of the Gulf, restaurant owners along the coast, charter boat owners, etc.

**CHART FOR ACTIVITY 2: NOAA SEAMAP Reef Fish Survey**

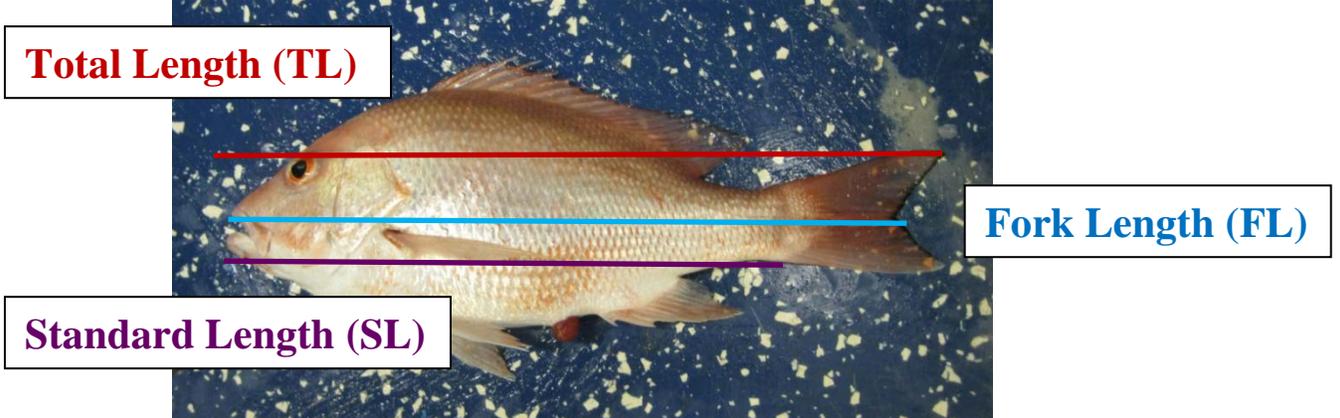
NOAA Ship *Pisces*

Geographical Area of Cruise: Gulf of Mexico

**Total Length (TL)** measurement from the mouth of the fish to the longest point on the tail.

**Fork Length (FL)** from the mouth of the fish to the indentation of the tail.

**Standard Length (SL)** from the mouth of the fish to the base of the tail.



Date	Site #	Lat/Long	Hook #	Fish Caught	TL (m)	FL (mm)	SL (mm)
			1				
			2				
			3				
			4				
			5				
			6				
			7				
			8				
			9				
			10				

### **ACTIVITY 3: Testing Fish for Contamination - A Simulation**

**NOAA National Seafood Inspection Laboratory (NSIL)**

**Focus:** This lesson helps students learn how a marine biologist tests fish for contamination at the **NOAA National Seafood Inspection Laboratory (NSIL)**

**Grade Level:** Grades 3-12

**Average Learning Time:** Two 50 minute periods – **Chemical Testing Lab & “Sniffer” Testing Lab**

- Here you can test either **ALL the fish** you’ve caught in the bandit reel **AND** the “tissue sample” of the **dead whale** to see if it is contaminated. Perhaps the whale ate contaminated fish.

#### **Lesson Summary (Overview/Purpose):**

**A simulation** - Students will use pH strips to test fish caught in the Gulf to see if they are contaminated or not.

**Big Idea/Essential Question:** Why is testing fish for contamination so important to a marine biologist who works at the National Seafood Inspection Lab?

#### **Focus Questions:**

- What is the impact of contaminated fish to restaurants and tourist industry?
- What are the impacts of an oil spill on fishing?
- Why do scientists need to test fish?
- Why is long-term research important?

#### **Objectives/Learning Goals:**

- Students will be able to think critically about a career in marine biology.
- Students will be able to learn how research is used to test fish for contamination and critically analyze data in order to report the cause of death.

### **Chemically Testing for Oil Contamination**

**National Seafood Inspection Lab**

#### **Procedure:**

1. Set up 10 stations for each Site where fish were “caught.” Each station should have a container with a raw fish (a box of frozen tilapia). Be sure to number the stations.
2. **Testing for Site 1:**
  - Put 8 tilapia in a container and add ammonia. This will be fish contaminated by oil and bacterial dispersants that have mutated.
  - Put 2 tilapia in a container and add vinegar. This will be a non-contaminated fish.

3. Have students touch pH strips to the fish in each station. If the strip turns orange the fish has oil in its tissue and is contaminated. If the pH strip turns green it has no contamination.

4. Be sure to chart data for analysis.

**5. Testing for Site 2:**

- Put 2 tilapia in a container and add ammonia. This will be fish contaminated by oil and bacterial dispersants that have mutated.

- Put 8 tilapia in a container and add vinegar. This will be a non-contaminated fish.

6. Have students touch pH strips to the fish in each station. If the strip turns orange the fish has oil in its tissue and is contaminated. If the pH strip turns green it has no contamination.

7. Be sure to chart data for analysis.

**CHART FOR ACTIVITY 3: NOAA National Seafood Inspection Laboratory (NSIL)**  
 Geographical Area of Cruise: Gulf of Mexico

**Chemical Test for Contamination**

Date	Site #	Hook #	Fish Caught	Chemical Test Contamination (yes/no)
		1		
		2		
		3		
		4		
		5		
		6		
		7		
		8		
		9		
		10		

## ACTIVITY 4: “Sniffing” Testing for Contamination

### National Seafood Inspection Lab

#### Sniffer Testing Lab

##### Materials:

- **Sniffer Testing for Contamination** student worksheet
- Purchase a box of frozen Tilapia
- Variety of herbs – garlic, seafood mix, (anything stinky)
- 10 plastic containers with lids
- 10 small bowls of pineapple

##### Teacher Preparation:

- Thaw out Tilapia. Put 10 Tilapia in a plastic container and add garlic and any other herbs that will make the fish stinky. But be sure the herbs you choose will not make the “contaminated fish” appear distinctly different from the non-contaminated fish. Plain fish without any herbs will be the NON-CONTAMINATED FISH. Fish with herbs added will be the FISH CONTAMINATED with oil and dispersants.
- Have two containers set up for your “constants” so the students will know what a normal “fishy” smell smells like and what an “odd/contaminated” fish smells like.
- Set up 10 Seafood Inspection Stations. Use 10 tri-fold boards like they do at the National Seafood Inspection Lab. This keeps testers from seeing each other and being influenced by others. **Be sure to number each station.**
- **To test fish from Site 1:** Put a container at each station for students to test the fish. Put a contaminated fish in number 1,2,3,4,6,7,8,9 stations. Put a non-contaminated fish in number 5 and 10 stations. This helps you keep up if the students tested correctly.
- **To test fish from Site 2:** Put a container at each station for students to test the fish. Put a non-contaminated fish in number 5 and 10 stations. Put contaminated fish in number 1,2,3,4,6,7,8,9 stations. This helps you keep up if the students tested correctly.
- Put a small bowl of pineapple at each station. Students should cleanse their noses before leaving each station by smelling the pineapple.

##### Lesson Procedure:

- Pass out the student worksheet – **Sniffer Testing for Contamination**. Students will be testing fish caught at Site 1 and Site 2 in order to determine if the fish are contaminated or not. It is possible that the Sperm Whale ate contaminated fish or ingested contaminated water which caused death.
- Have students transfer the data and names of fish they caught on the Bandit Reel from the Bandit Reel worksheet.
- Have students start by smelling the container that smells like normal raw fish. This will be the “fishy” smell that means the fish is not contaminated. Then have students smell the “odd/contaminated” fish so they will know what the contaminated fish will smell

like. Allow students who are testing to come back and review the tester containers if they need to.

- Have individual students go from station to station smelling fish and writing down their findings. Students should open container lid and wave their hands towards themselves. This action will push the fish odor towards their noses. If the fish just has a “fishy” smell it is not contaminated. If the fish smells “odd” it is contaminated.
- After finishing at each station, students should replace lid on the container and then smell the bowl of pineapple to “cleanse the palate.” This is important.
- Have students write down this information in the Sniffer Testing column of worksheet as it will be information they can use to analyze the data and report their findings.
- After “testing” their fish, have students analyze data from the Bandit Reel worksheet and both the Testing Fish for Contamination worksheets and write a report of their findings to determine the cause of death.

Questions to consider:

- What were the findings of the water samples?
- What caused the mysterious plume at Site 1?
- Could oil and dispersants have caused possible fish mutations?
- How many fish were caught at each site?
- Were there great numbers of the same kind of fish found at the different sites?
- (optional) What were the sizes and lengths of the fish caught?
- Were there a number of large fish or smaller fish at each site?
- Were there hooks on the Bandit Reel still containing bait?
- Were there hooks on the Bandit Reel that did not contain bait?
- Would baited hooks indicate that there were no fish at the site to eat the bait?
- Would hooks without bait indicate that there were fish at the site?
- How many contaminated and non-contaminated fish were found at each site?
- Could the whale have ingested contaminated fish?
- Could the whale have ingested contaminated water while eating fish?
- Could the black substance on the whale have been oil?

**CHART FOR ACTIVITY 4: NOAA National Seafood Inspection Laboratory (NSIL)**  
 Geographical Area of Cruise: Gulf of Mexico

**Sniffer Test for Contamination**

- Fish that have “fishy” smell will be non-contaminated. Fish that have an “odd” smell will be contaminated.

Date	Site #	Hook #	Fish Caught	“Sniffer” Test Contamination (yes/no)
		1		
		2		
		3		
		4		
		5		
		6		
		7		
		9		
		10		

**Assessment and Evaluation:**

After completing the all labs and analyzing all data, students should write a report of their conclusions that tells what they think caused the death of the whale.

**In report students must tell what they think killed the whale:**

1. Death by natural causes
2. Death by oil contamination
3. Death by bacterial contamination
4. If the whale is contaminated, you must explain how it could have become contaminated
5. Site your data that helped you draw your conclusion. You must prove your conclusion with facts gathered from the labs.

## **ACTIVITY 5: Whale Tissue Testing**

### **Chemical and Sniffer Test of Whale Tissue**

After analyzing student data and making their report of their findings, have students test the “whale tissue sample” to see if they drew correct conclusions.

Set up two tissue samples to test.

#### **Chemical test:**

Use a tilapia that was contaminated with ammonia. The pH strip should turn orange indicating oil contamination (or whichever contamination you choose to cause death).

#### **Sniffer test:**

Use your two containers set up for your “constants” so the students will know what a normal “fishy” smell smells like and what an “odd/contaminated” fish smells like. Your “whale tissue” should be a tilapia that has the herbs added to it indicating oil and dispersant contamination.

**NOAA** National Seafood Inspection Laboratory (NSIL)

Geographical Area of Cruise: Gulf of Mexico

### **TESTING THE WHALE TISSUE FOR CONTAMINATION**

#### **Chemical Testing data**

**Did the chemical testing at the NSIL find the whale tissue to be contaminated?**

Yes \_\_\_\_\_

No \_\_\_\_\_

#### **“Sniffing” Testing data**

**Did the Sniffers at the NSIL find the whale tissue to be contaminated?**

Yes \_\_\_\_\_

No \_\_\_\_\_

## **ACTIVITY 6: BP Grant for Oil Spill -A Simulation**

### **Activity Title: BP Grant for Oil Spill**

**Subject (Focus/Topic):** This lesson helps students critically think about all the environmental and economic impacts of the oil spill in the Gulf of Mexico.

**Grade Level:** Grades 5-12

**Average Learning Time:** This lesson should take 2-3, 50 minute periods.

### **Lesson Summary (Overview/Purpose):**

**A simulation** - Students will give 5 minute presentations to the Mayor of Gulf Shores and his City Council in order to receive funding from a \$100,000 grant from BP. This will help students to think about all the environmental and economic impacts of the oil spill in the Gulf of Mexico.

**Big Idea/Essential Question:** Change/Adaptation - This activity is designed to acquaint students with the environmental and economical impacts of any oil spill.

### **Focus Questions:**

- What is the effect of the oil spill on restaurants?
- What are the impacts of the oil spill on fishing?
- How is the oil spill affecting the tourist industry?
- What is the impact of the oil spill on wildlife and sensitive habitats?
- What is the long-term impact of the oil spill on wildlife and natural areas along the coast?
- How long will the environmental impacts of the spill be felt?
- What is the best way to let the public know about the impact of the oil on the wildlife?
- Why is long-term research important?
- What might happen in the long run if money is not spent on research for the future environment?

### **Objectives/Learning Goals:**

- Students will be able to think critically about the environmental and economic impacts of the BP oil spill in the Gulf of Mexico.
- Students will be able to think critically about how the people and wildlife have been impacted by the oil spill.
- Students will be able to learn about some of the careers that are involved with NOAA and the environment.

### **Common Misconceptions:**

- Only organisms found in the oceans are affected by an oil spill.
- An oil spill can be cleaned up quickly.
- Economies of cities are not affected by an oil spill.
- Fish are safe to eat again when oil is not found on the surface of the water.

**Materials:**

- *Copy of The Oil Spill in the Gulf of Mexico*
- *Copy of Six groups of stakeholders in Gulf Shores*
- *Copy of BP Grant*
- *Copy of activity cards*

**Technical Requirements:** If students are to make Power Point presentations, computers will be needed. Otherwise, posters will do.

**Teacher Preparation:** Teachers will need to know how oil spills impact the environments and economies of coastal towns.

**Keywords:**

- Marine biologist
- Oceanographer
- Dispersants
- Absorbents
- Crude oil
- Booms

**Lesson Procedure:**

- Read Frequently Asked Oil Spill Questions (select from internet)
- Read the BP Grant to the class.
- Divide the class into groups. Have each group discuss the concerns and answer the questions on the Activity Cards.
- Have each group prepare a 5 minute presentation.
- Have the Mayor and his Council make recommendations of who should get the grant money and how much money should each group get based on the presentations.

**Assessment and Evaluation:**

Student presentations should demonstrate that they have

- Thought critically about the environmental and economic impacts of the BP oil spill in the Gulf of Mexico.
- Thought critically about how the people and wildlife have been impacted by the oil spill.
- Learned about some of the careers that are involved with NOAA and the environment.

Students may also assess how well they worked within the group. A peer evaluation at the end of the activity could be used to assess how well students participated within the group.

### **The Oil Spill in the Gulf of Mexico**

The explosion of BP's Deepwater Horizon oil rig has spilled millions of gallons of oil into the Gulf of Mexico. This has impacted fish, mammals, and beaches from the coasts of Louisiana to Florida. Both the environment and the economy have been hurt. People who earn a living in the Gulf are impacted as well. BP has offered to give a \$100,000 grant to help the people who live in Gulf Shores, Alabama. They are to use this money to help reduce the negative environmental and economic impacts that have occurred due to the oil spill. The Mayor of Gulf Shores has decided to hold a public meeting to hear how the citizens of Gulf Shores want to use this money.

### **BP Announces \$100,000 Grant!**

BP acknowledges that over 250 million gallons of oil have spilled into the Gulf of Mexico. They have pledged to make this mistake right by helping communities along the coast. In response to this environmental disaster, BP has announced that it will give Gulf Shores, Alabama, \$100,000 toward emergency aid.

At 6:00 tonight there will be an emergency public meeting at the Gulf Shores City Hall. The Mayor and his Council will hear public opinions as to how this money should be spent. He wants to hear from you, the people. He needs to know how you want to use this money to protect our coast and town. In order to have a voice in how the funding is allocated, please come to this meeting to present your case. All recommendations will be heard.

If interested in speaking, please prepare a 5 minute presentation. You can create a Power Point with pictures and information or you can just speak and show pictures. At the end of the meeting, the Mayor and his Council will announce their funding recommendations.

Please join us in making Gulf Shores the place it used to be!

### **Six groups of stakeholders in Gulf Shores**

Students will represent six groups of stakeholders in Gulf Shores:

1. **The Gulf Shores City Council** – This is the group that will preside over the public meeting. They will ultimately decide how to use the BP grant money but they want to hear everyone's ideas. It's important that this money be used to do the most good and to help the most people. After all, it's people who are most impacted in Gulf Shores.
2. **Dauphin Island Sea Lab** – The mission of the Dauphin Island Sea Lab is to help marine biologists and teachers develop marine science education, to help marine biologists and oceanographers carry out marine science research, to establish a coastal management policy, and to educate the general public about the environment of the sea.
3. **Citizens of the Restaurant Coalition** – The owners of the Gulf Shores restaurants are worried that they will have to close their businesses because people are afraid to eat the fish that local fishermen bring into the port. Even if they can stay open, they are worried about where they will be able to get the seafood that they serve. If they can't

get fresh seafood that is safe to eat then they will have to close. Many of these business owners have families to feed and take care of.

4. **Gulf Shores Tourist Bureau** – This organization is responsible for public relations. That means they provide pamphlets, magazine articles, and TV ads to advertise the wonderful white sandy beaches of Gulf Shores. Hotels and local condominiums depend on the advertisements of this Bureau to bring people to Gulf Shores. Businesses such as souvenir shops, beach gear shops, and the Gulf Shores Zoo might have to close if tourists don't return. Without clean beaches and plenty of safe seafood to eat, the tourists will not come. Many businesses will close and the economy of the town will suffer.
5. **Fishing Industry** - Gulf Shores has a rich history and diversity of saltwater fishing opportunities – both for sport and for commercial purposes. The salt waters of the Gulf of Mexico bring fishermen from all over the United States. Fishing is very important to the people of Gulf Shores. Many families own charter boat businesses and if they can't earn a living catching and selling fresh fish, they will have to move away. Many of these fishermen have earned a living doing this for generations and they do not want to move. Many a tear has been shed over this disaster.

- Read Frequently Asked Oil Spill Questions in class
- Have students look at the Exxon Valdez website
- Read the BP Grant to the class.
- Divide the class into groups. Have students make cause/effect statements. If \_\_\_\_\_ happens, then \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ will result.
- Have each group discuss the concerns and answer the questions on the Activity Cards.
- Brainstorm ways the BP money can help stakeholders. What specifically can they do with the money?
- Have each group prepare a 5 minute presentation.
- Have the Mayor and his Council make recommendations of who should get the grant money and how much money should each group get based on the presentations.

**Presentation requirements:**

1. 5 minute presentation to the Mayor and Council
2. Presentation should be colorful and informative.
3. After presentation, time will be given to the Mayor and Council to ask questions and make comments.
4. Funding by the Mayor and Council is final.
6. Families have lived in Gulf Shores for years and years. This is their home and they don't want to leave but they have to be able to earn money to feed their families.
7. **Gulf Shores State Park Rangers and Oil Spill Volunteers** – This group includes Park Rangers and citizens who have volunteered to clean up the oil from the beaches. They have seen firsthand how the fish, birds and mammals have been hurt by this oil spill. They have also seen the devastation of their beloved beaches. They have volunteered

countless hours picking up tar balls, cleaning oil slick birds, turtles and dolphins, and removing oil from the beaches. They have seen the suffering of animals and people.

**Activity Cards:**

<p style="text-align: center;"><b>Mayor and Council</b></p> <p><b>Primary Concern:</b> Which groups need funding the most? How much money should each group get? Council members include: a state park official, an environmentalist, an educator, an owner of a hotel, a fisherman, an owner of a restaurant, and a member of the Board of Tourism.</p> <p><b>Task:</b> Assess the situation and inform the public of the oil spill location, size, damage, etc. Listen objectively to all presentations. Fairly decide how to best use this money to protect our coast and town. After hearing all presentations, announce your decision and tell why the amount was awarded.</p>	<p style="text-align: center;"><b>Citizens of the Restaurant Coalition</b> (owners of local restaurants, waitresses and waiters)</p> <p><b>Primary Concern:</b> What is the effect of the oil spill on restaurants? How can the BP grant money be used to help restaurants?</p> <p><b>Consider:</b> Have many restaurant owners had to lay off workers? Have many restaurants closed? Have many restaurants had to change their menu? How have restaurants reassured their customers that the fish is safe to eat? Have many restaurants served more chicken, steak and pork chops rather than seafood? How can restaurants bring business back to eat in their businesses? How do restaurants affect local economies?</p>
<p style="text-align: center;"><b>Fishing Industry</b> (fishermen and people who work in seafood businesses)</p> <p><b>Primary Concern:</b> What are the impacts of the oil spill on fishing? How could the BP grant money be used to help the fishing industry?</p> <p><b>Consider:</b> How might the oil spill affect fishing now and in the future? How will the spill affect not only individual fishermen, but also the big companies who buy the fish to sell to restaurants and hotels around the world? Would much money be lost? Would the loss of the fishing industry affect the economy of Gulf Shores? How can we keep fishing families from moving away? What might happen in the long run if money is not spent on fishing?</p>	<p style="text-align: center;"><b>Gulf Shores Tourist Bureau</b></p> <p><b>Primary Concern:</b> How is the oil spill affecting the tourist industry? How can the BP grant money be used to help bring tourists back to Gulf Shores?</p> <p><b>Consider:</b> Are many hotels reporting cancelations? Are neighboring cities reporting tourism is down? Are many rental condominiums reporting cancelations? Do you need money to reassure the public that the beaches are clean and that it is OK to return to their favorite vacation spot? How can the Tourist Bureau bring people back to Gulf Shores? What might happen in the long run if money is not spent on tourism?</p>

**Dauphin Island Sea Lab  
Oceanographers, Marine Biologists, and  
Teachers**

**Primary Concern:** Your main concern is the long-term impact of the oil spill on wildlife and natural areas along the coast. How can the BP grant money be used to help the local environment?

**Consider:** How long will the environmental impacts of the spill be felt? How have other oil spills impacted the environment? Do we need to monitor contamination of the area? If so, what types of monitoring are recommended? What is the best way to let the public know about the impact of the oil on the wildlife? Why is long-term research important to Gulf Shores? What might happen in the long run if money is not spent on research for the future environment?

**Gulf Shores State Park Rangers and  
Oil Spill Volunteers**

**Primary Concern:** What is the impact of the oil spill on wildlife and sensitive habitats? How can the BP grant money be used to help the state park and local habitats?

**Consider:** How much of the money, if any, should be put toward rescue and rehabilitation efforts? Should money be spent on cleaning up the habitats if BP is hiring people to do this? Is the state helping the State Park with any funding? If so, how much more might you need? Why is it important to help the wildlife? Why is it important to clean up the natural areas along the coast? Are people canceling their visits to state parks along the coast? Does the income generated by state parks affect local economies?

*Resources:*

*"Frequently Asked Oil Spill Questions"*

The Oil Spill: Disaster in the Gulf by Scholastic.

Teacher at Sea Log 4 Measurement found at  
[http://teacheratsea.noaa.gov/2010/storey/storey\\_log4.pdf](http://teacheratsea.noaa.gov/2010/storey/storey_log4.pdf)