NO PREP

Marine Pollution

Plastics, Oil Spills, and Chemicals

Includes: Student reading, case study, differentiated questions, teacher key

Name: Period: Date:

Marine Pollution: Plastics, Oil Spills, and Chemicals

The ocean has long been considered too vast to be harmed by human actions, but in recent decades, that assumption has been shattered. Pollution in the form of plastics, oil spills, and chemical runoff has spread across every ocean, from coastal bays to the deepest trenches. These pollutants threaten marine life, food safety, and even human health. Understanding where this pollution comes from and how it impacts ecosystems is vital if humanity hopes to clean up the seas.

Plastics in the Ocean

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Plastics in the Ocean

Plastics are among the most damaging forms of marine pollution because they do not biodegrade. Instead, they break down into smaller fragments called microplastics, which can be ingested by fish, seabirds, and even plankton. Plastic bags, bottles, fishing nets, and packaging materials choke wildlife or fill their stomachs, often leading to starvation. The infamous Great Pacific Garbage Patch, a massive floating accumulation of plastic, highlights how widespread the problem has become. Even humans are affected, as microplastics have been found in seafood and drinking water.

Oil Spills and Their Consequences

While plastics accumulate slowly, oil spills cause immediate and dramatic damage. When crude oil enters the ocean, it coats the feathers of seabirds and the fur of marine mammals, reducing their ability to stay warm and buoyant. Fish and invertebrates are poisoned, and entire ecosystems can be wiped out in a single event. The 2010 Deepwater Horizon oil spill in the Gulf of Mexico released millions of barrels of oil, killing marine life, destroying fisheries, and coating coastlines in black sludge. Recovery has been slow, and some species have never returned to pre-spill numbers.

Chemicals and Agricultural Runoff

In addition to plastics and oil, chemical pollution presents a serious challenge. Agricultural fertilizers and pesticides run off into rivers, eventually reaching the ocean. These chemicals stimulate harmful algal blooms, which deplete oxygen and create dead zones where marine life cannot survive. Industrial chemicals, such as heavy metals and PCBs, accumulate in the tissues

of fish and marine mammals, eventually making their way into the human food chain. Chemical pollution is harder to track than oil or plastic, but its long-term effects are equally dangerous.

Solutions and Cleanup Efforts

Despite the grim picture, solutions are emerging. Governments and organizations are working to reduce single-use plastics, improve waste management, and develop biodegradable alternatives. Oil spill response has improved with skimmers, booms, and dispersants, although prevention remains the best strategy. For chemical pollution, stricter regulations on agricultural runoff and industrial waste can limit contamination. On a personal level, individuals can reduce their plastic use and support sustainable practices. Marine pollution is one of the most visible challenges of ocean conservation, but it is also one where collective action can make a measurable difference.

Key Information: Table: Types of Marine Pollution and Their Impacts

Pollution Type	Main Impacts on Ecosystems	Human Impacts
Plastics	Choking, entanglement, ingestion	Contaminated seafood
Oil spills	Habitat destruction, poisoning	Loss of fisheries and tourism
Chemicals	Toxic buildup in food webs	Health risks, water pollution
Fertilizers	Algal blooms, dead zones	Reduced fish stocks
Industrial waste	Long-term ecosystem damage	Food chain contamination

Case Study: The Deepwater Horizon Oil Spill

In April 2010, the Deepwater Horizon drilling rig exploded in the Gulf of Mexico, leading to one of the worst environmental disasters in U.S. history. Over 4 million barrels of oil spilled into the ocean over 87 days, spreading across thousands of miles of coastline. The spill devastated fisheries, killed countless seabirds, dolphins, and turtles, and left long-lasting damage to marine ecosystems. The cleanup effort involved thousands of workers, billions of dollars, and years of restoration projects. While some areas have shown signs of recovery, others remain scarred more than a decade later. The disaster highlighted both the dangers of offshore drilling and the urgent need for better safeguards and alternatives to fossil fuels.

1. What were some of the immediate effects of the Deepwater Horizon oil spill on marine life?

2. How did the disaster highlight the risks of offshore drilling?

Multiple Choice

1. What makes plastics particularly harmful to the ocean?
    a) They filter out harmful chemicals
    b) They strengthen coral skeletons
    c) They dissolve quickly, spreading toxins rapidly
    d) They do not biodegrade and become microplastics

2. What was one major effect of the Deepwater Horizon oil spill?
    a) It increased fish populations in the Gulf
    b) It prevented chemical pollution from spreading
    c) It killed marine animals and damaged fisheries
    d) It created new coral reef habitats

3. How do agricultural fertilizers harm the ocean?
    a) They fuel algal blooms that create dead zones
    b) They dissolve plastics faster
    c) They poison fish directly
    d) They coat sea birds and marine mammals like oil

Matching

Write the letter of the correct definition on the line next to each term.

Term	Definition
1. ___ Bags, bottles, and nets that choke wildlife	A) Oil spills
2. ___ Coat animals and destroy habitats in sudden disasters	B) Deepwater Horizon
3. ___ Cause algal blooms that deplete oxygen	C) Industrial waste
4. ___ Introduces toxins like heavy metals into food webs	D) Fertilizers
5. ___ 2010 disaster releasing millions of barrels of oil into the Gulf of Mexico	E) Plastics

Fill-in-the-Blank

1. Plastics in the ocean break down into small fragments called _____.

2. The 2010 _____ Horizon oil spill devastated ecosystems in the Gulf of Mexico.

3. Fertilizer runoff often creates _____ zones in the ocean.

Short Answer

Answer each question in 2-4 complete sentences.

1. Why are chemical pollutants particularly dangerous to marine ecosystems?

_____

_____

_____

2. What are two ways individuals can help reduce marine pollution?

3. Why is prevention often considered more effective than cleanup in dealing with oil spills?