

Timing Breakdown

- 1 (5 min) Initial group discussion (before they know the pathogen)
- 2 (10 min) Diagnostic results revealed one by one
- 3 (5 min) Groups finalize their response plans
- 4 (5 min) Groups present their findings
- 5 (Optional, 5 min) Instructor-led wrap-up on real-world Red Tide events

Mystery Outbreak: Coastal Illnesses & Wildlife Die-Off: Handout

Objective:

Students will work as **public health officials** investigating an **unknown outbreak**.

They will analyze symptoms, environmental clues, and diagnostic test results before **identifying the pathogen** and proposing solutions.

Case Scenario: Unexplained Illness Along Gulf Coast

 **Timeline:** Over the past two weeks

 **Location:** A small coastal town in Florida

 **Hospitals Report:**

- Dozens of **beachgoers** complaining of **coughing, wheezing, and itchy eyes**
- Several cases of **nausea and vomiting** in seafood consumers
- Two individuals with **neurological symptoms (dizziness, tingling in fingers, slurred speech)**

 **Local Wildlife Reports:**

- **Massive fish kills** observed along the shore
- Sick and disoriented **sea turtles**
- Dead manatees found in coastal waters

 **Local Concerns:**

- Residents **worry it's chemical pollution or a new viral outbreak**
 - Restaurants fear a **decline in seafood sales**
 - Tourism industry **demands an explanation**
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Student Roles & Instructions

- ♦ **Divide students into 4 groups**
- ♦ **Each group will analyze the case and propose a response**

1 Epidemiologists

- Identify **patterns** in who is getting sick and when
- Consider **possible sources** (air, water, food?)
- Suggest preliminary **public health guidelines**

2 Hospital & Clinical Team

- Assess **symptoms** and suspect possible **types of pathogens (bacteria, virus, fungus, protist, toxin?)**
- Suggest **diagnostic tests** (e.g., blood tests, water samples, imaging)
- Decide if **treatments** should be supportive or targeted

3 Environmental Scientists

- Investigate **water quality & marine life**
- Identify possible **toxic substances**
- Determine if **climate factors (temperature, storm runoff, algae blooms?)** are involved

4 Local Government & Business Leaders

- Balance **public health safety vs. economic impact**
- Decide if **beaches should be closed**
- Communicate risks to the public **without causing panic**

Diagnostic Clues

After 5-10 minutes of discussion, give students **diagnostic test results** one by one to see if they adjust their conclusions.

Lab Tests & Findings:

1 **Tissue samples from dead fish:** Show **paralysis but no bacterial infection**

2 **Water sample from the beach:** Identifies **high levels of brevetoxins**

3 **Nasal swabs from sick patients:** No bacteria or viruses detected

4 **Aerial satellite images:** Reveal a **large red-colored bloom in coastal waters**

Wrap-Up Questions & Actions

Once students **identify *Karenia brevis***, they must decide:

Immediate Actions:

- Should the beaches be **closed**?
- Should seafood sales be **restricted**?

- How should residents **reduce exposure**?

✓ **Long-Term Solutions:**

- What **factors increase harmful algal blooms**?
- How can local policies **reduce nutrient pollution**?
- What **monitoring systems** should be implemented?

✓ **Press Release Drafting (for Public Officials)**

Example:

 **"Health Officials Warn of Red Tide Blooms on Florida Coast"** 

"High levels of toxic algae have been detected along the coastline, causing respiratory symptoms and marine life die-offs. Beachgoers are advised to avoid water exposure, and seafood consumers should check for health advisories before eating shellfish. Officials are monitoring the bloom and will update the public regularly."