

Red Tide Group

Read the attached information about red tide. You must put together a presentation at least 2 minutes in length on red tide. In your presentation you should include:

- What red tide is
- What causes red tide
- Where red tide occurs
- What problems it causes for humans
- Anything else you think is important.

By the end of your presentation, the class should be able to answer these questions:

- What is red tide?
- Where does red tide occur?
- Are all red tides a red color?
- What are phytoplankton?

What is a Florida red tide? A red tide is a higher-than-normal concentration of a microscopic alga (plant-like organisms). In Florida, the species that causes most red tides is *Karenia brevis*. This organism produces a toxin that can affect the central nervous system of fish. At high concentrations (called a bloom), the organisms may discolor the water. However, red tides are not always red. They can appear greenish, brownish, and even purple in color. The water can even remain its normal color during a bloom.

Is red tide a new phenomenon? No, it is not a new phenomenon. Red tides have been documented along Florida's gulf coast since the 1840s and probably occurred much earlier. Fish kills around Tampa Bay were mentioned in the logs of Spanish explorers.

Can red tides be predicted? Currently, red tides can't be predicted, but researchers are investigating the possibility. The effects of a red tide (e.g., dead fish and respiratory irritation in people) depend on the location and concentration of the red tide microorganism at a given time. The effects also depend on wind speed and direction. It is important to realize that many people still enjoy the beaches during red tides. Respiratory irritation and dead fish are not always present.

Do red tides occur anywhere else? Yes, red tide organisms occur elsewhere. Although the organism that causes Florida's red tide is found almost exclusively in the Gulf of Mexico, blooms have been found off the east coast of Florida, and a bloom was detected off the coast of North Carolina in 1987. Scientists believe the Florida Current and Gulf Stream Current carried *K. brevis* out of the Gulf of Mexico, around South Florida, and up to the Carolina coast. Other types of microorganisms cause different kinds of red tides (now called harmful algal blooms) in other parts of the world as well.

How is red tide related to respiratory irritation? People experience respiratory irritation (coughing, sneezing, and tearing) when the red tide organism (*K. brevis*) is present along a coast and winds blow its toxic aerosol onshore.

CAUTION: People with severe or chronic respiratory conditions (such as emphysema or asthma) are advised to avoid red tide areas. Generally, symptoms are temporary. Once exposure is discontinued, symptoms usually disappear within hours.

Is it safe to swim during a red tide? Yes, swimming is safe for most people. However, red tide can cause some people to suffer from skin irritation and burning eyes. Use common sense. If you are particularly susceptible to irritation from plant products, avoid red tide water. If you experience irritation, get out of the water and thoroughly wash. Do not swim among dead fish because they can be associated with harmful bacteria.

Does cooking destroy the red tide toxin? No, cooking does not destroy the red tide toxin.

Is it okay to eat shellfish during a red tide? No, shellfish should not be eaten during a red tide. If a shellfish-harvesting ban is in effect, it is not safe to eat mollusks (e.g. clams

and oysters). However, edible parts of other animals commonly called shellfish (e.g. crabs, shrimp, and lobsters) are not affected by the red tide organism and can be eaten.

Which shellfish are included in a shellfish-harvesting ban? Harvesting of bivalve mollusks such as clams, oysters, and coquinas is banned during red tides.

Is it okay to eat fish, crabs, or shrimp during a red tide? Yes, fish, crabs, and shrimp can be eaten during a red tide because the toxin is not absorbed in the edible tissues of these animals. However, if a red tide is in the area, eating distressed or dead animals is discouraged because the reason for the animal's strange behavior or death cannot be absolutely known. It could be something unrelated to red tide.

Is it okay to eat scallops during a red tide? Yes, as long as you only eat the muscle of the scallop. Do not eat whole animals.

"Red Tide" is a common name for a phenomenon known as an [algal bloom](#), an event in which estuarine, marine, or fresh water algae accumulate rapidly in the water column, or "bloom". These algae, more correctly termed [phytoplankton](#), are microscopic, single-celled protists, plant-like organisms that can form dense, visible patches near the water's surface. Certain species of [phytoplankton](#) contain photosynthetic pigments that vary in color from green to brown to red, and when the algae are present in high concentrations, the water appears to be discolored or murky, varying in color from white to almost black, normally being red or brown. Not all algal blooms are dense enough to cause water discoloration, and not all discolored waters associated with algal blooms are red. Additionally, red tides are not typically associated with tidal movement of water, hence the preference among scientists to use the term [algal bloom](#).

The term "red tide" is most often used in the United States of America to describe a particular type of algal bloom common to the eastern [Gulf of Mexico](#), and is also called "Florida red tide". This type of bloom is caused by a species of [dinoflagellate](#) known as *Karenia brevis*, and these blooms occur almost annually along Florida waters. The density of these organisms during a bloom can exceed tens of millions of cells per liter of seawater, and often discolor the water a deep reddish-brown hue.

The most conspicuous effects of red tides are the associated wildlife mortalities among marine and coastal species of fish, birds, marine mammals and other organisms. In the case of Florida red tides, these mortalities are caused by exposure to a potent neurotoxin produced naturally by *Karenia brevis*, called [brevetoxin](#).

It is unclear what causes red tides, but the frequency and severity of algal blooms in many parts of the world have been linked to increased nutrient loading from human activities. The growth of marine phytoplankton is generally limited by the availability of nitrates and phosphates, which can be abundant in agricultural run-off. Coastal [water pollution](#) produced by humans and systematic increase in [sea water temperature](#) have also been implicated as contributing factors in red tides. Other factors such as iron-rich dust influx from large desert areas such as the Saharan desert are thought to play a major role in causing red tides. Some algal blooms on the Pacific coast have also been linked to occurrences of large-scale climatic oscillations such as [El Niño](#) events. While red tides in the Gulf of Mexico have been occurring since the time of early explorers such as [Cabeza de Vaca](#) it is unclear

what initiates these blooms, and how large a role [anthropogenic](#) and natural factors play in their development. Algal blooms in many parts of the world cannot be reasonably linked to human influence, and are generally accepted as a natural occurrence. It is also debated whether the apparent increase in frequency and severity of algal blooms in various parts of the world is in fact a real increase or is due to increased effectiveness of monitoring programs and species identification ability [1] [2].

Some red tide organisms produce large quantities of [toxins](#), such as [saxitoxin](#), [ciguatoxin](#), and [brevetoxin](#), which disrupt the proper function of [ion channels](#) in [neurons](#). [Domoic acid](#), a toxin produced by [diatoms](#) of the genus *Pseudo-nitzschia*, has been linked to neurological damage in certain [marine mammals](#), and is frequently found in algal blooms on the U.S. West Coast. Some red tide toxins can become highly concentrated in various marine organisms that have the ability to filter and consume large quantities of toxic plankton directly from seawater. These include shellfish, finfish, baleen whales, and benthic crustaceans. Frequently, shellfish collected in areas affected by algal blooms can be potentially dangerous for human consumption, leading to closures of shellfish beds for harvesting. Initial signs of shellfish poisoning from red tide toxins such as domoic acid is tingling in the lips followed by a reduction of motor abilities and difficulty breathing and can be fatal if consumed in sufficient amounts. If these symptoms occur after eating shellfish, seek immediate medical treatment. Standard medical treatment is to give victims oxygen, or to hook them up to a breather. There exists no antidote, and treatment consists of keeping the patient alive until the toxin has passed from the system. Note that in some cases, the [brevetoxin](#) in Florida red tides can become aerosolized, causing respiratory irritation to beachgoers.

Toxins commonly associated with red tide are [brevetoxins](#), [saxitoxins](#), [domoic acid](#), [okadaic acid](#), [azaspiracid](#), and [ciguatoxin](#).

Red tide is referenced in [D&D](#), as a blindness-inducing water-borne plague most often encountered on the [Elemental](#) Plane of Water.